Algebra II
Lesson #4 Unit 7
Class Worksheet #4
For Worksheet #5

We are given a line, d,

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We are given a line, d, and a point, F, not on that line.

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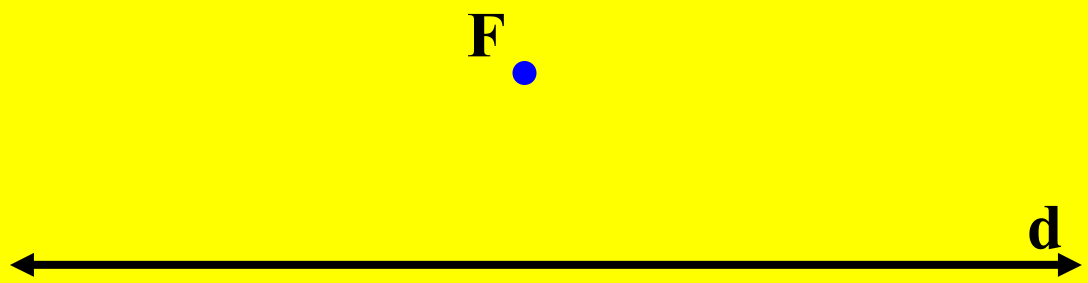
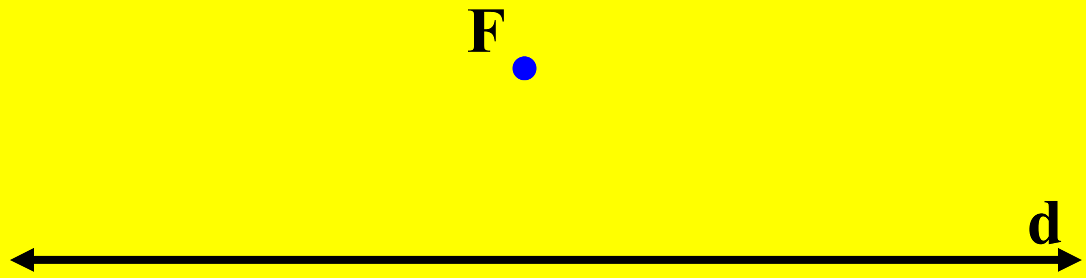


We are given a line, d, and a point, F, not on that line. We want to consider the set of all points in the plane which are equidistant from point F and line d.



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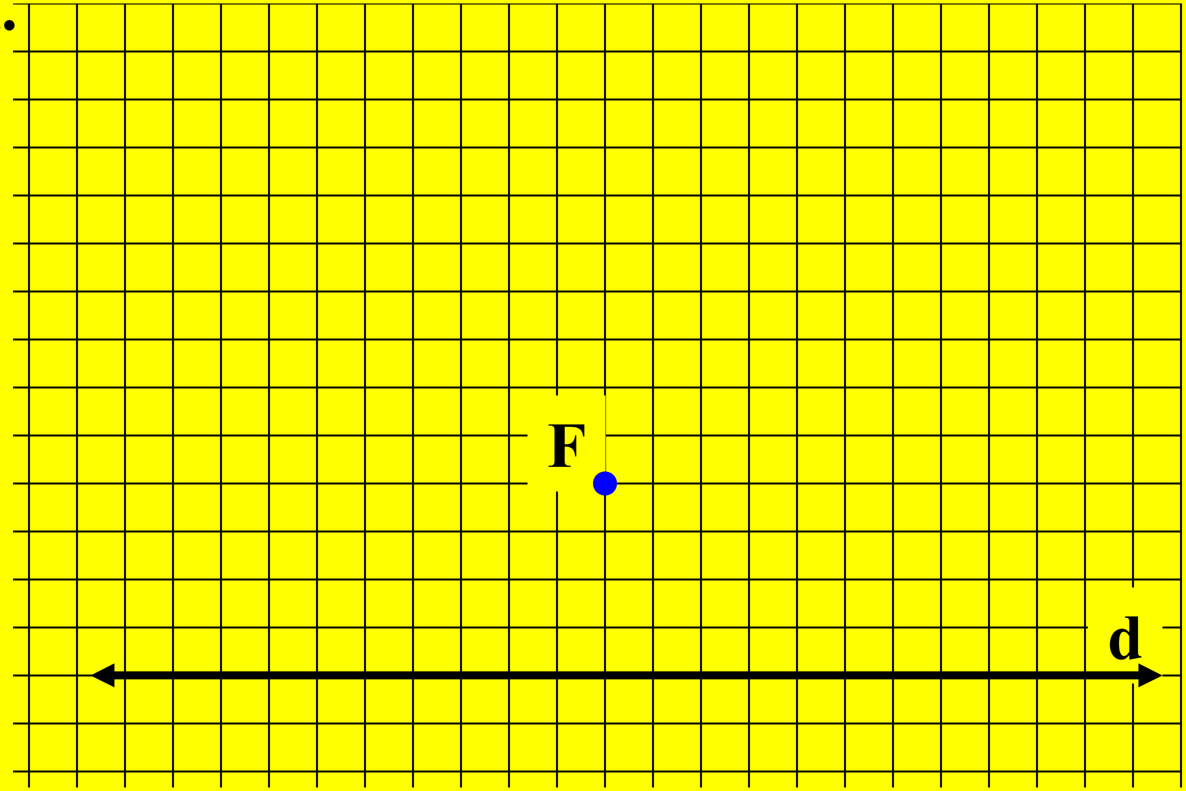

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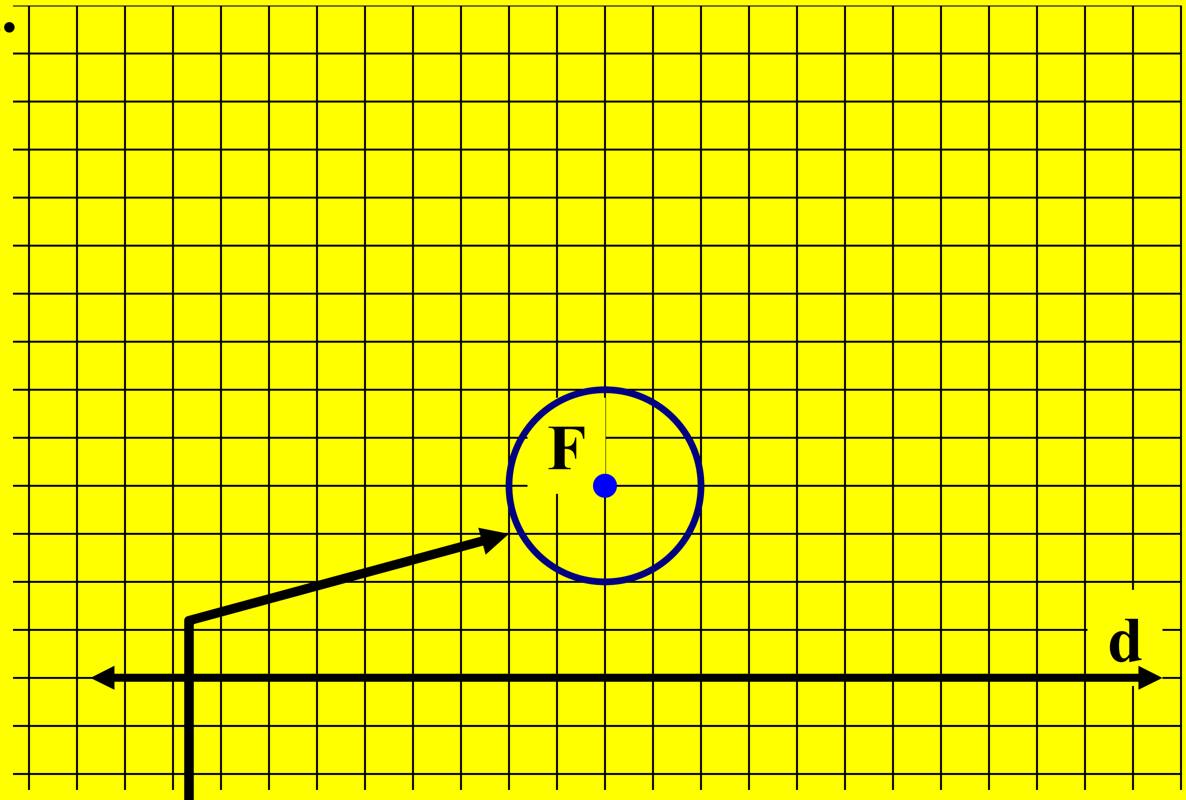
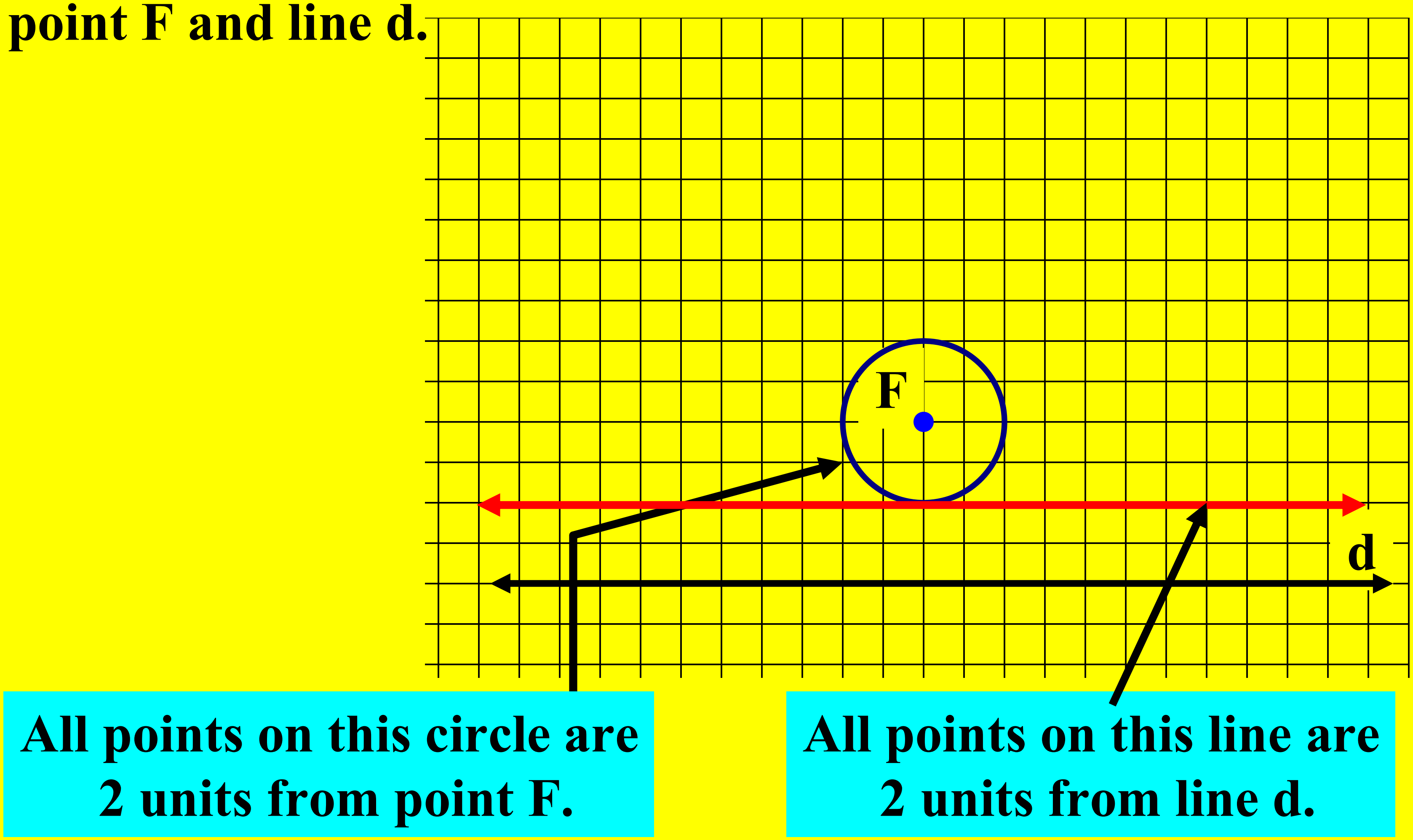


All points on this circle are 2 units from point F.

We are given a line, d, and a point, F, not on that line. We want to consider the set of all points in the plane which are equidistant from point F and line d.



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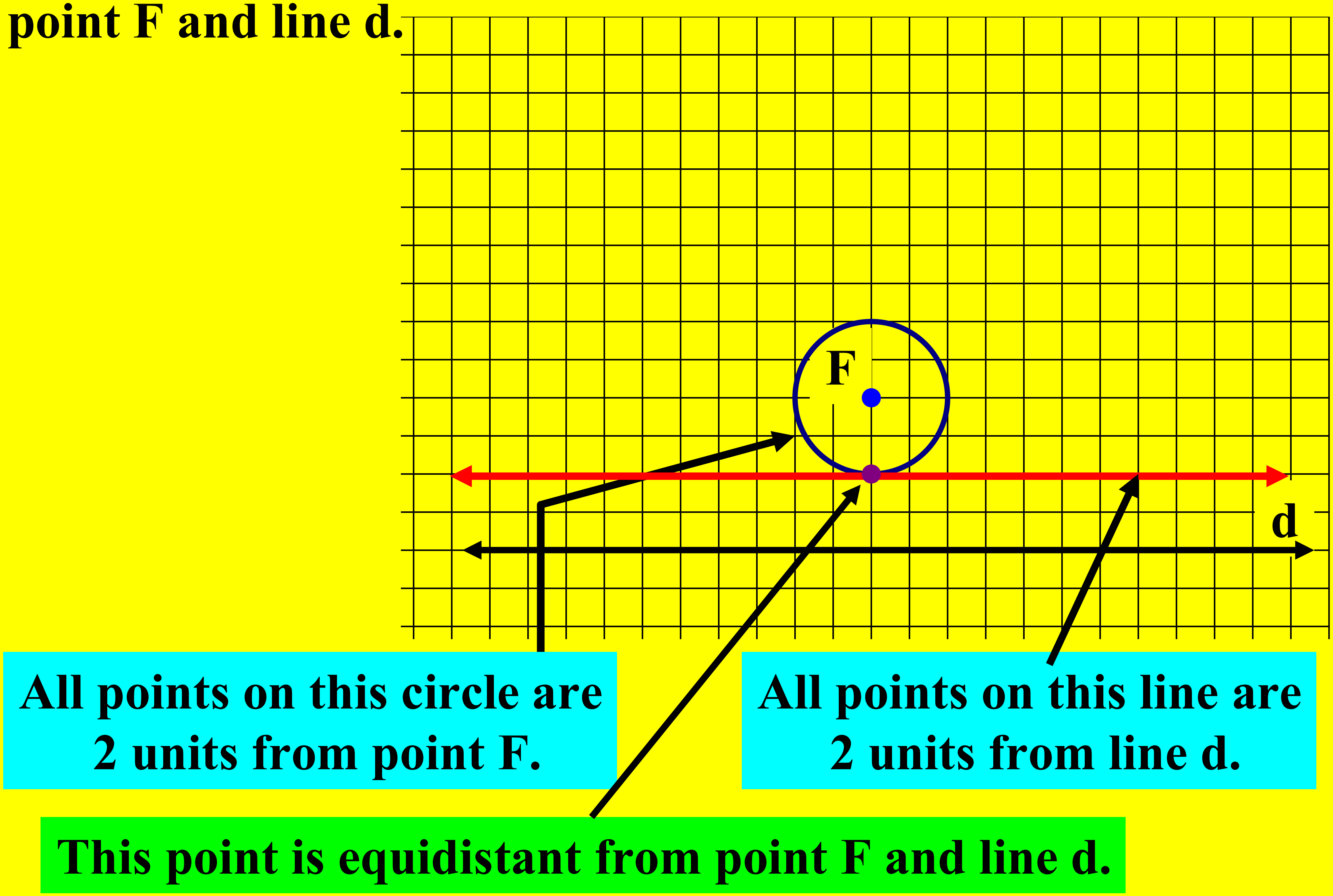

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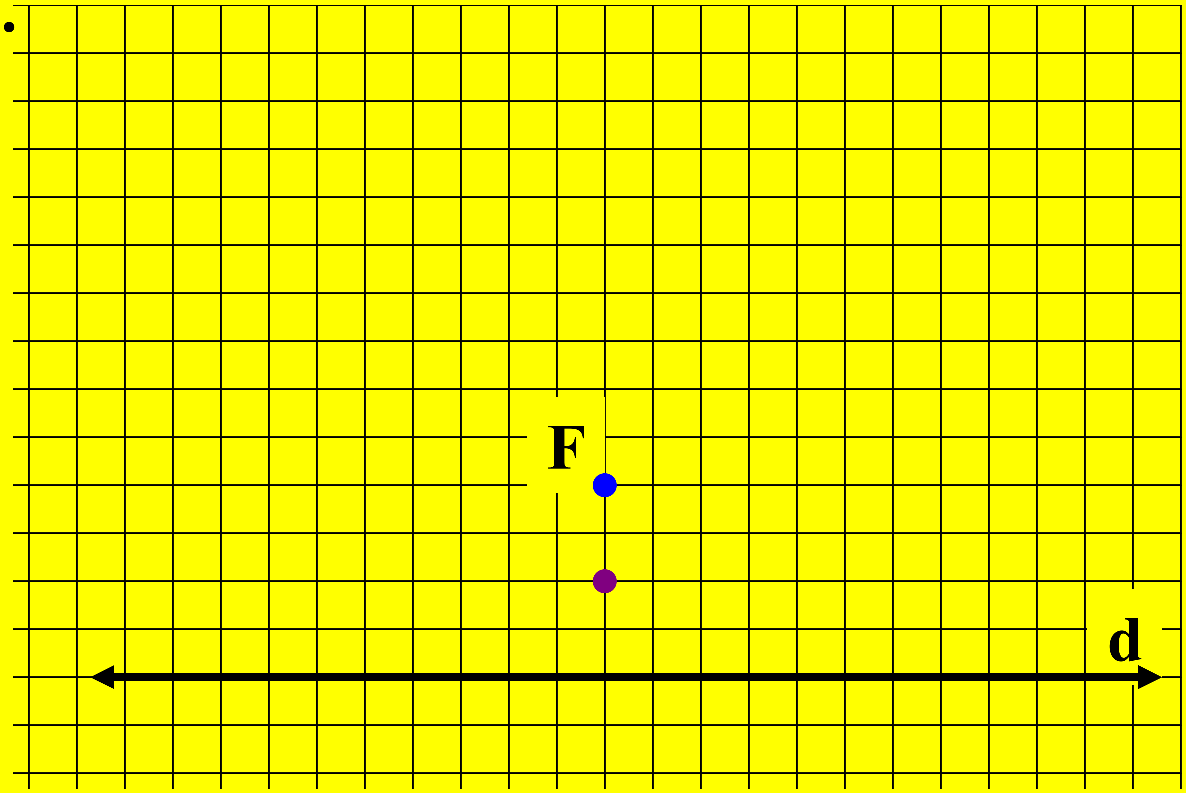

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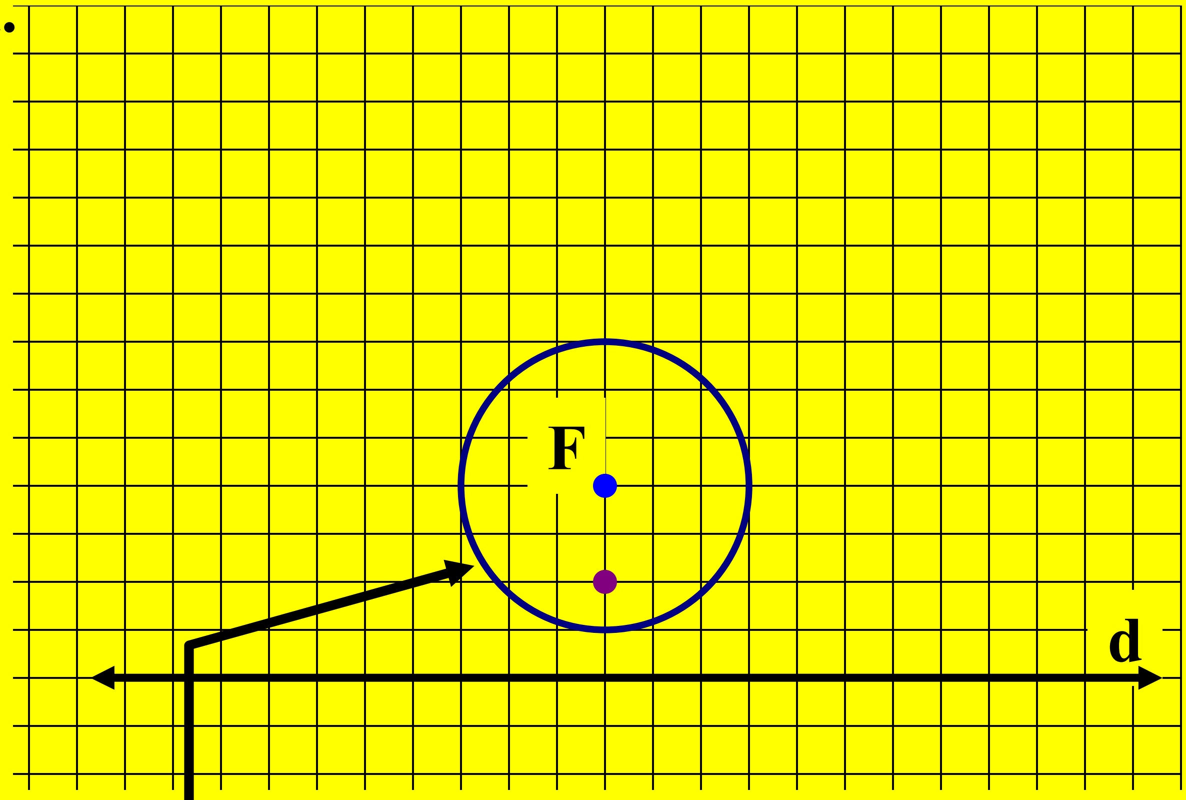
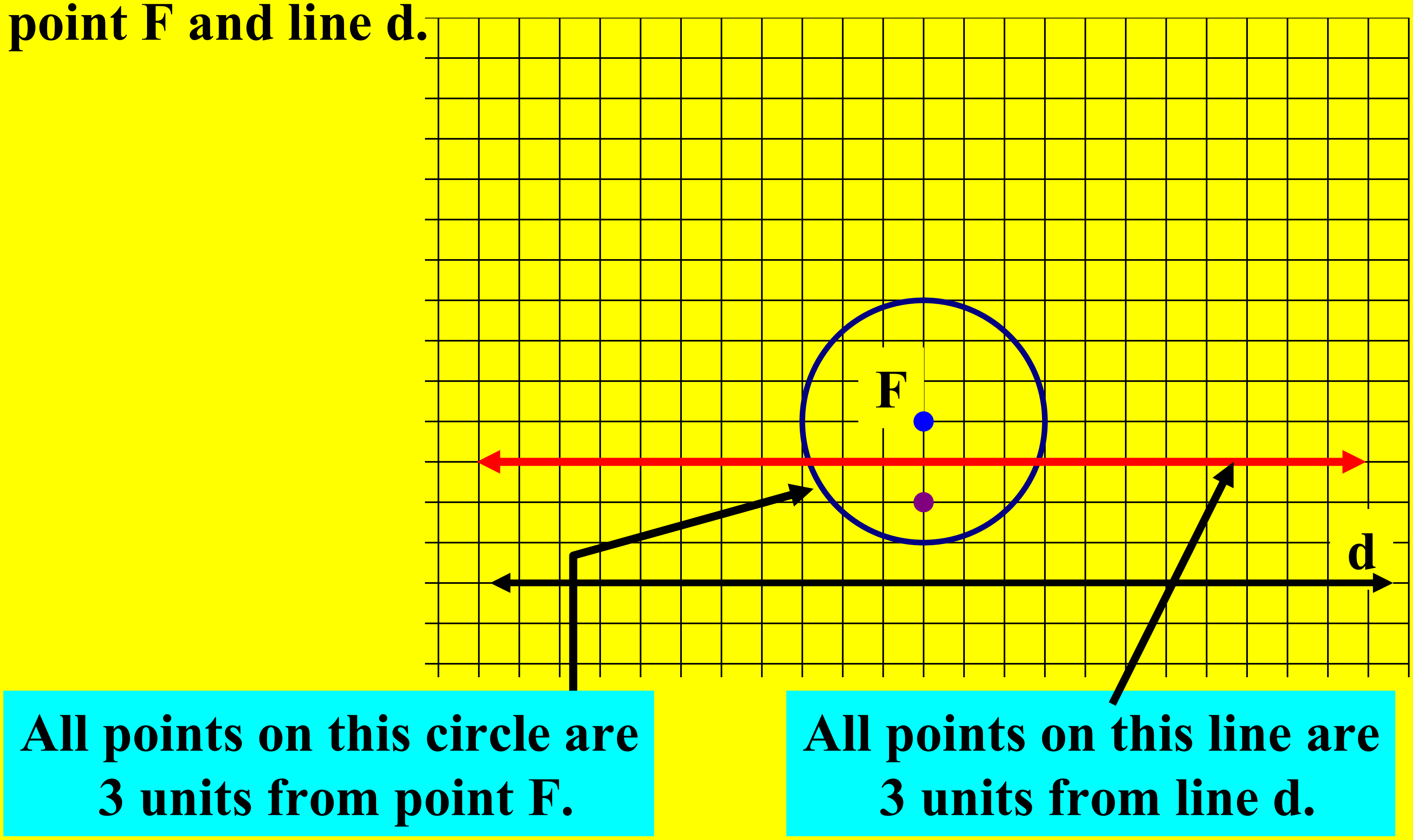


All points on this circle are 3 units from point F.

We are given a line, d, and a point, F, not on that line. We want to consider the set of all points in the plane which are equidistant from point F and line d.



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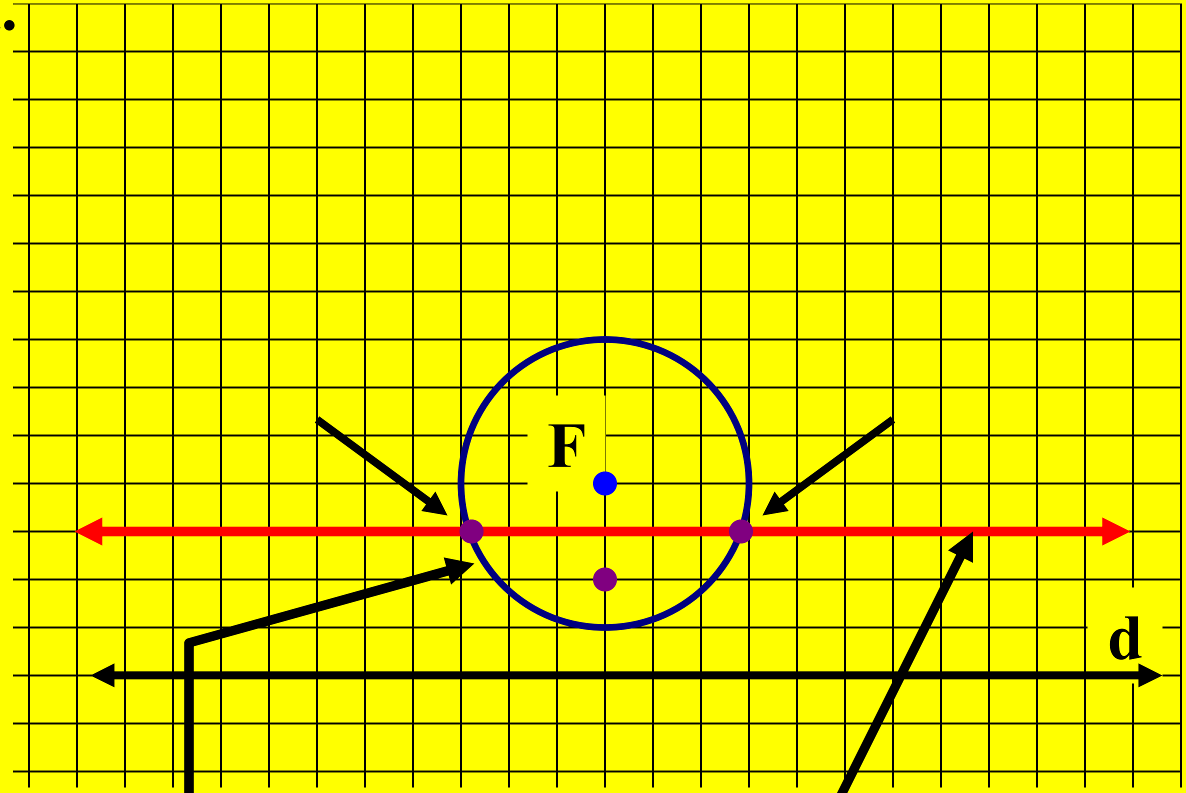
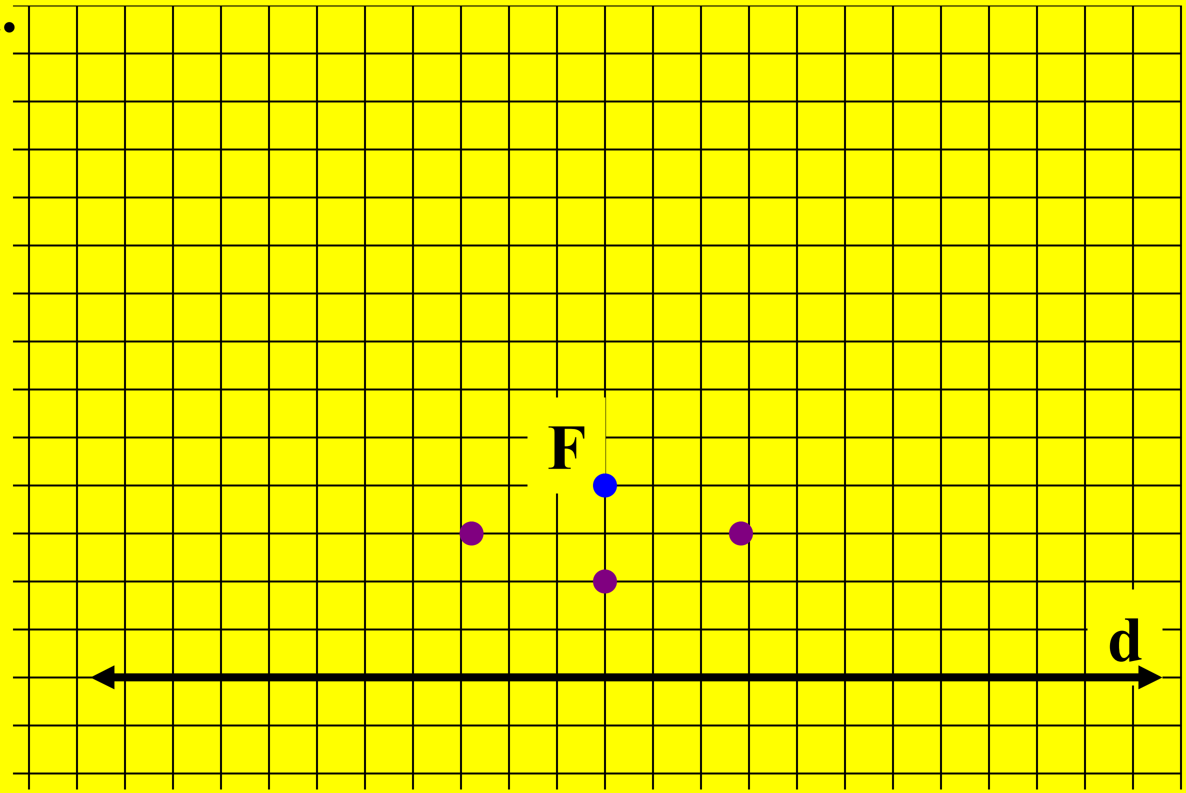


All points on this circle are 3 units from point F.

All points on this line are 3 units from line d.

These two points are equidistant from point F and line d.

We are given a line, d, and a point, F, not on that line. We want to consider the set of all points in the plane which are equidistant from point F and line d.



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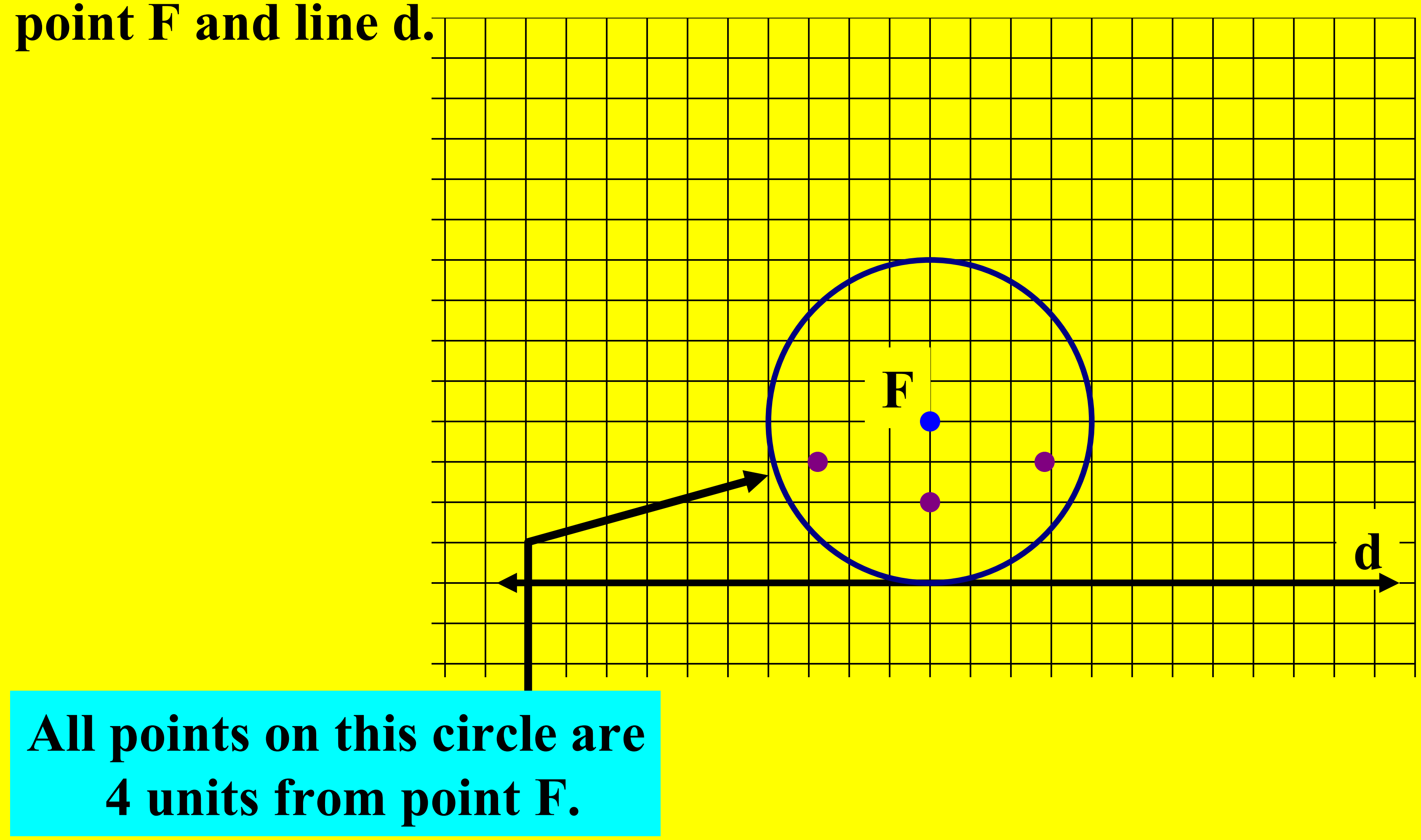

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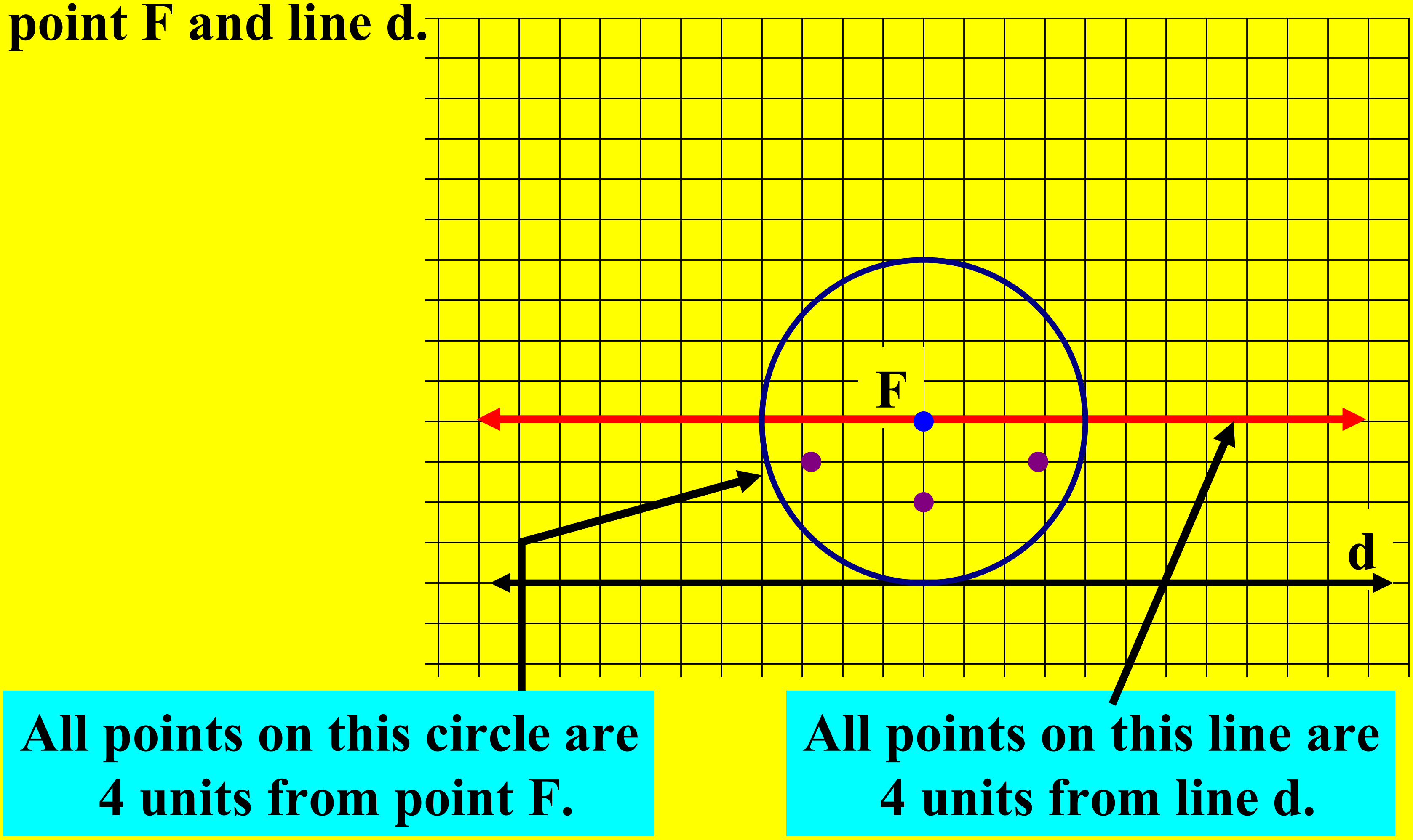

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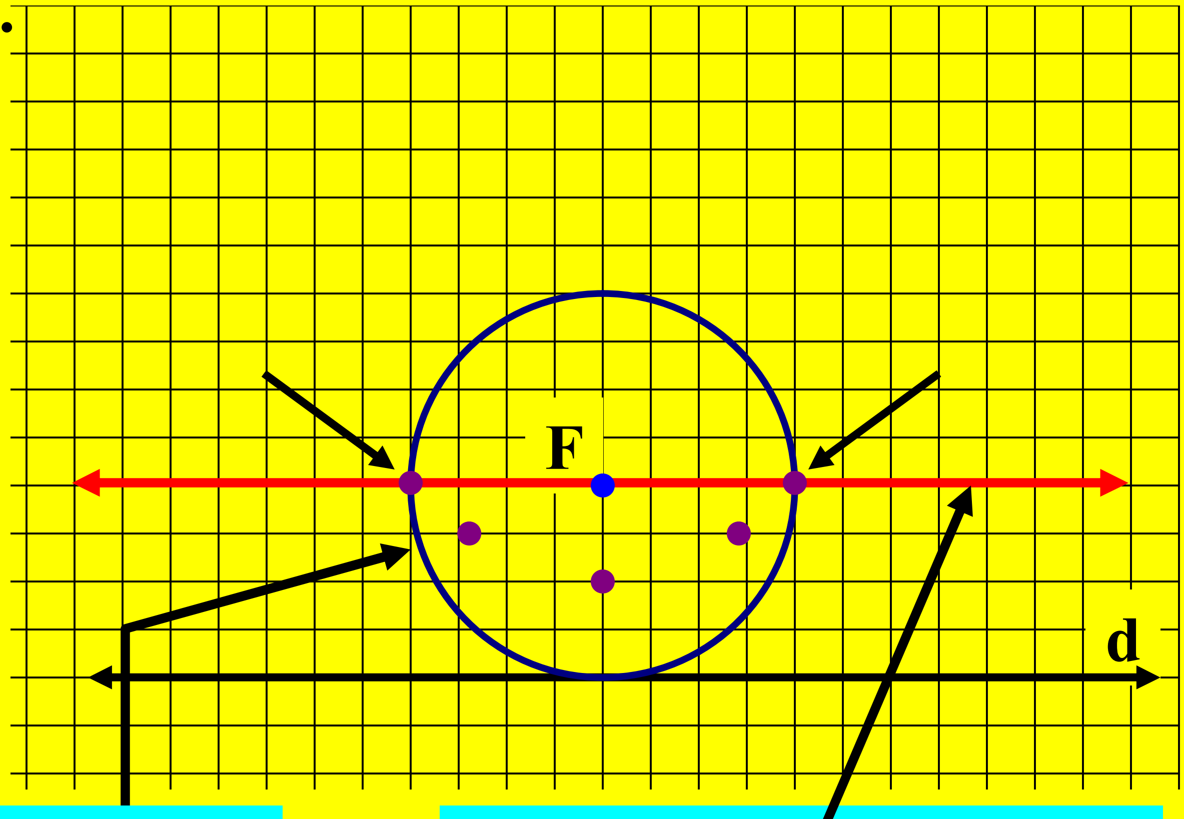
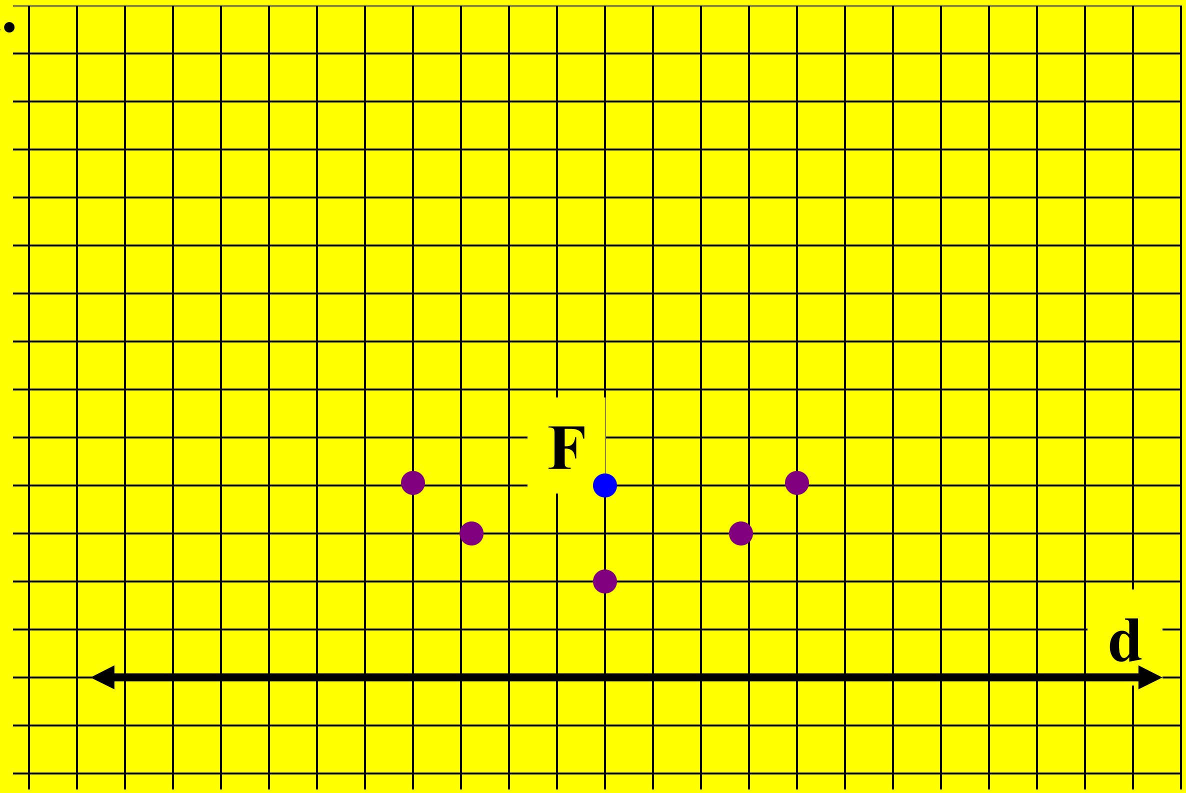


All points on this circle are 4 units from point F.

All points on this line are 4 units from line d.

These two points are equidistant from point F and line d.

We are given a line, d, and a point, F, not on that line. We want to consider the set of all points in the plane which are equidistant from point F and line d.



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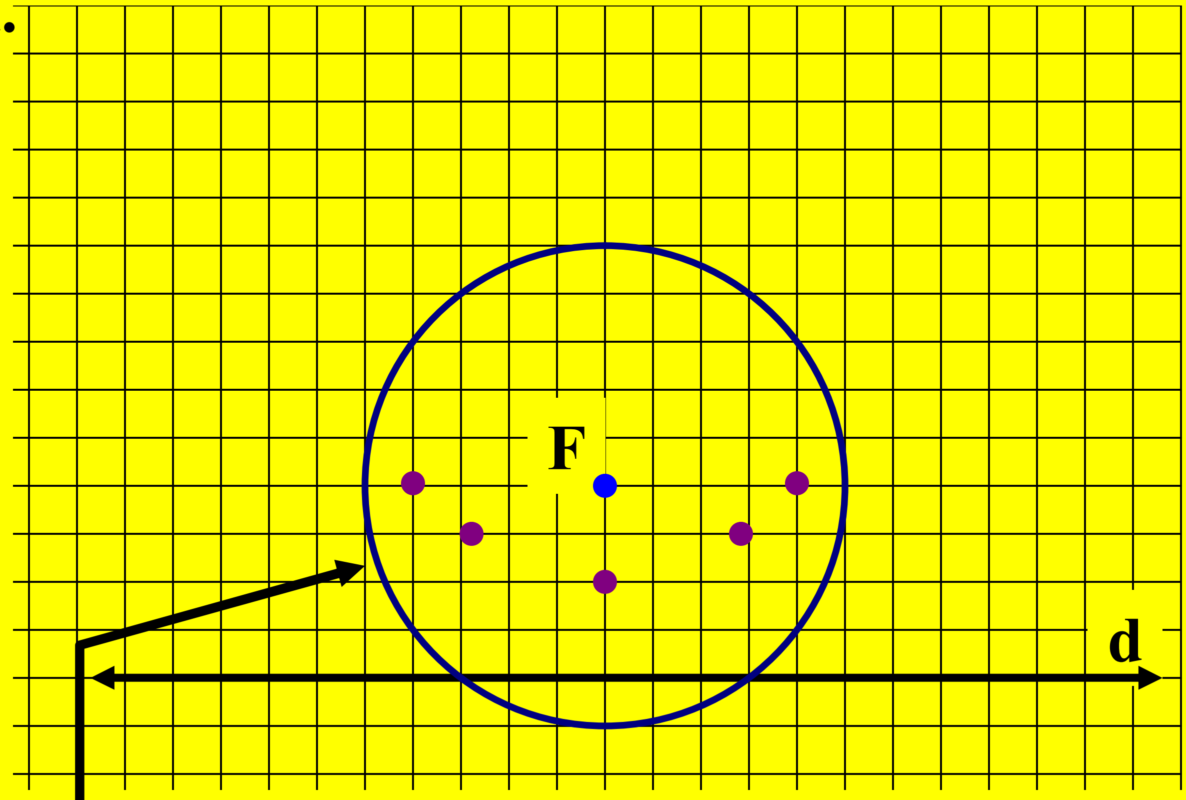
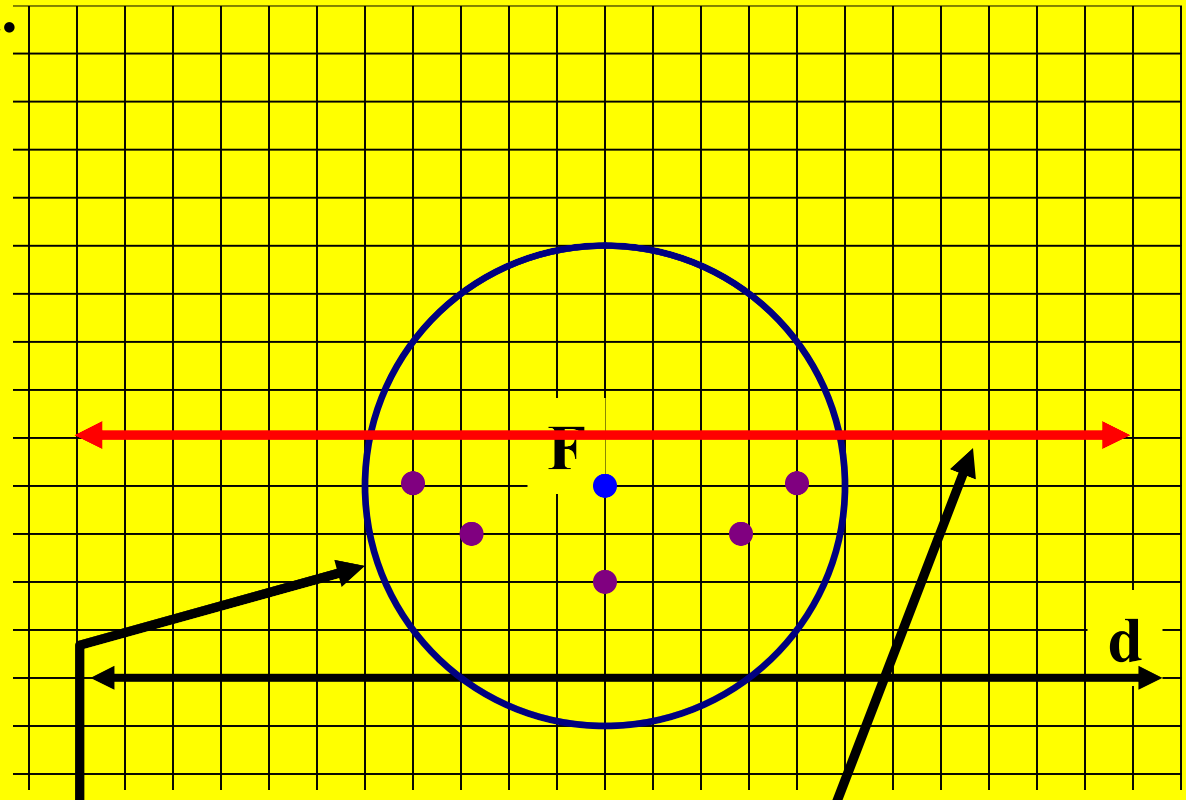


All points on this circle are 5 units from point F.

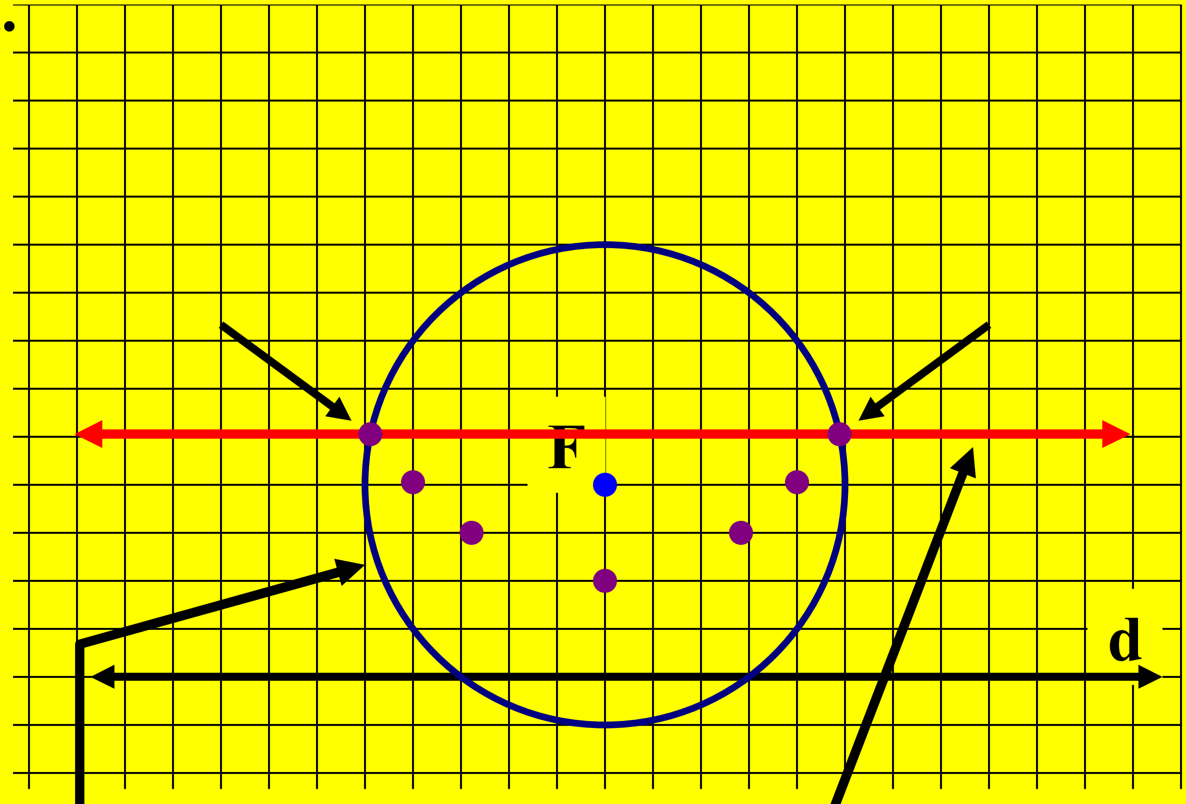
We are given a line, d, and a point, F, not on that line. We want to consider the set of all points in the plane which are equidistant from point F and line d.



All points on this circle are 5 units from point F.

All points on this line are 5 units from line d.

We are given a line, d, and a point, F, not on that line. We want to consider the set of all points in the plane which are equidistant from point F and line d.

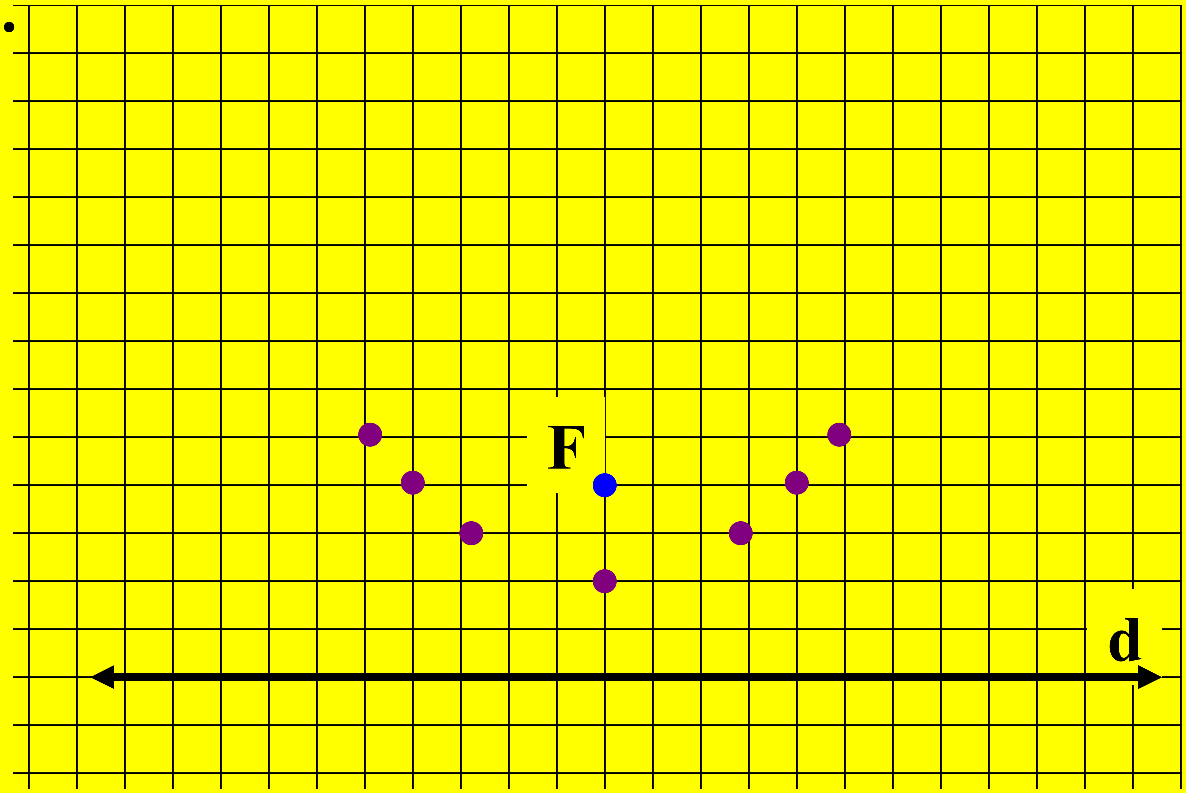


All points on this circle are 5 units from point F.

All points on this line are 5 units from line d.

These two points are equidistant from point F and line d.

We are given a line, d, and a point, F, not on that line. We want to consider the set of all points in the plane which are equidistant from point F and line d.



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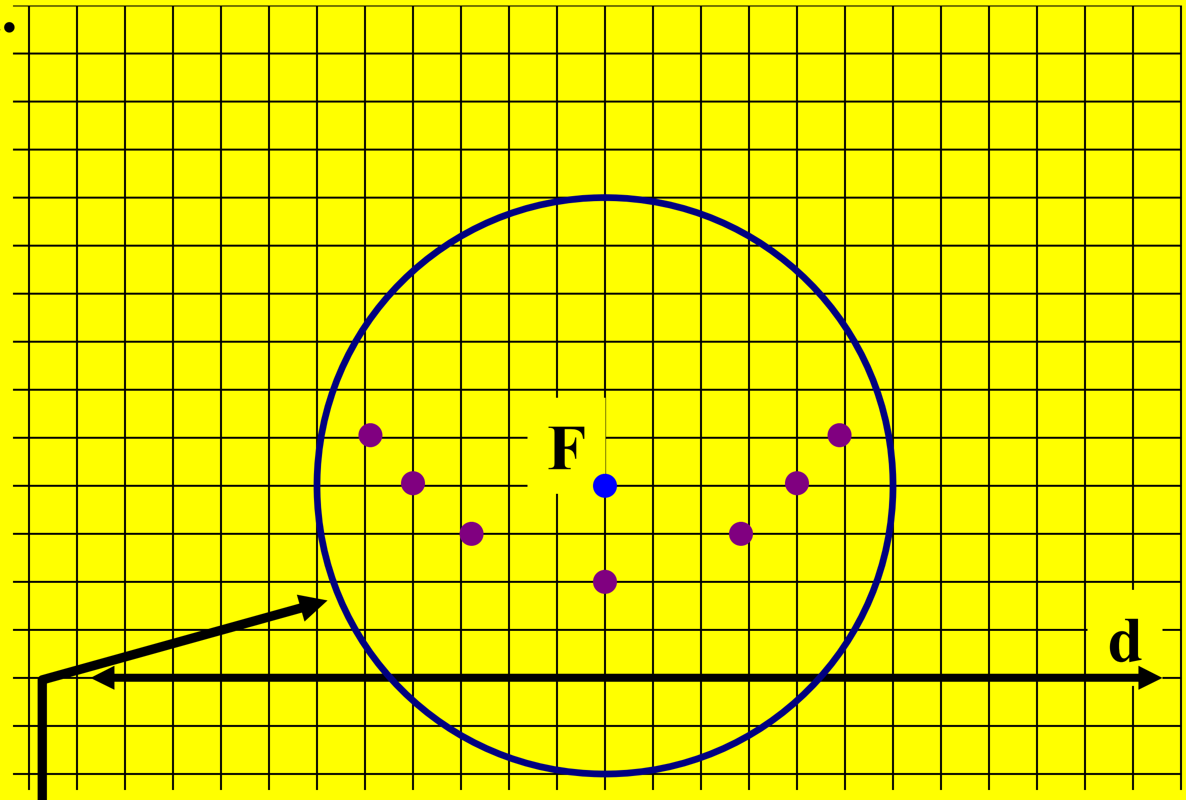
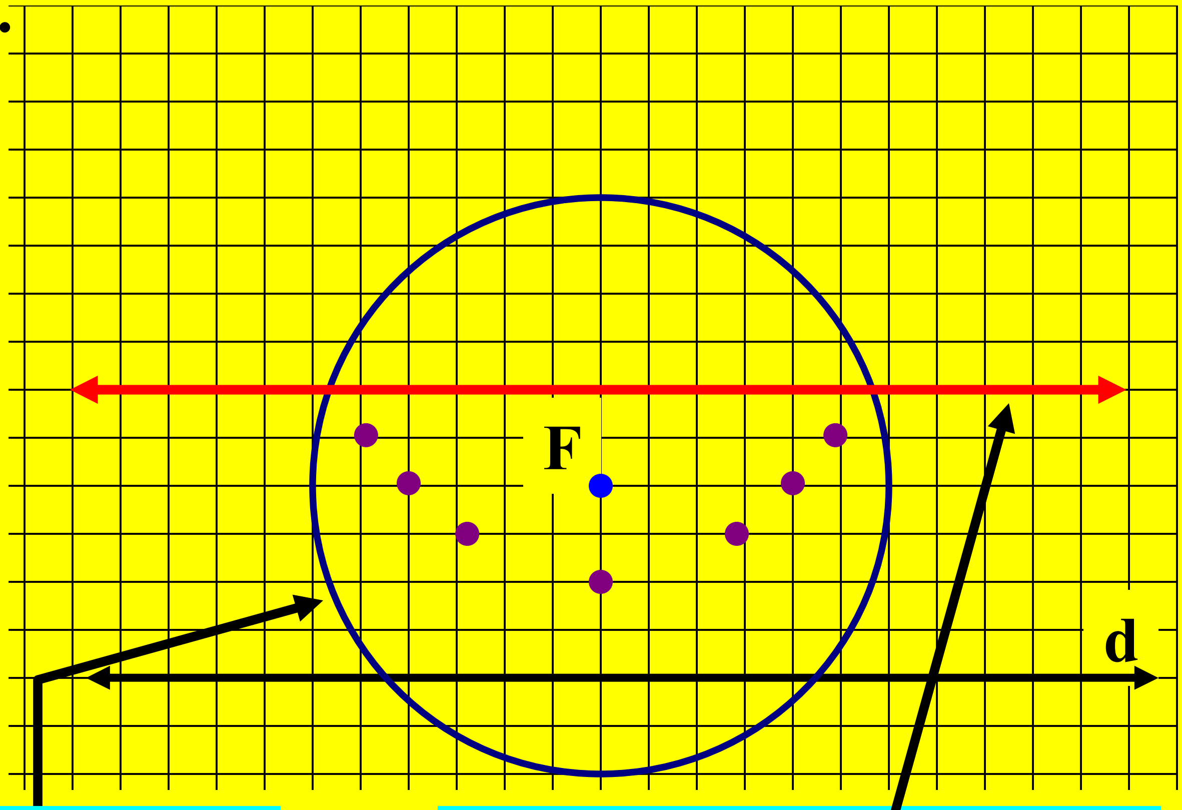


All points on this circle are 6 units from point F.

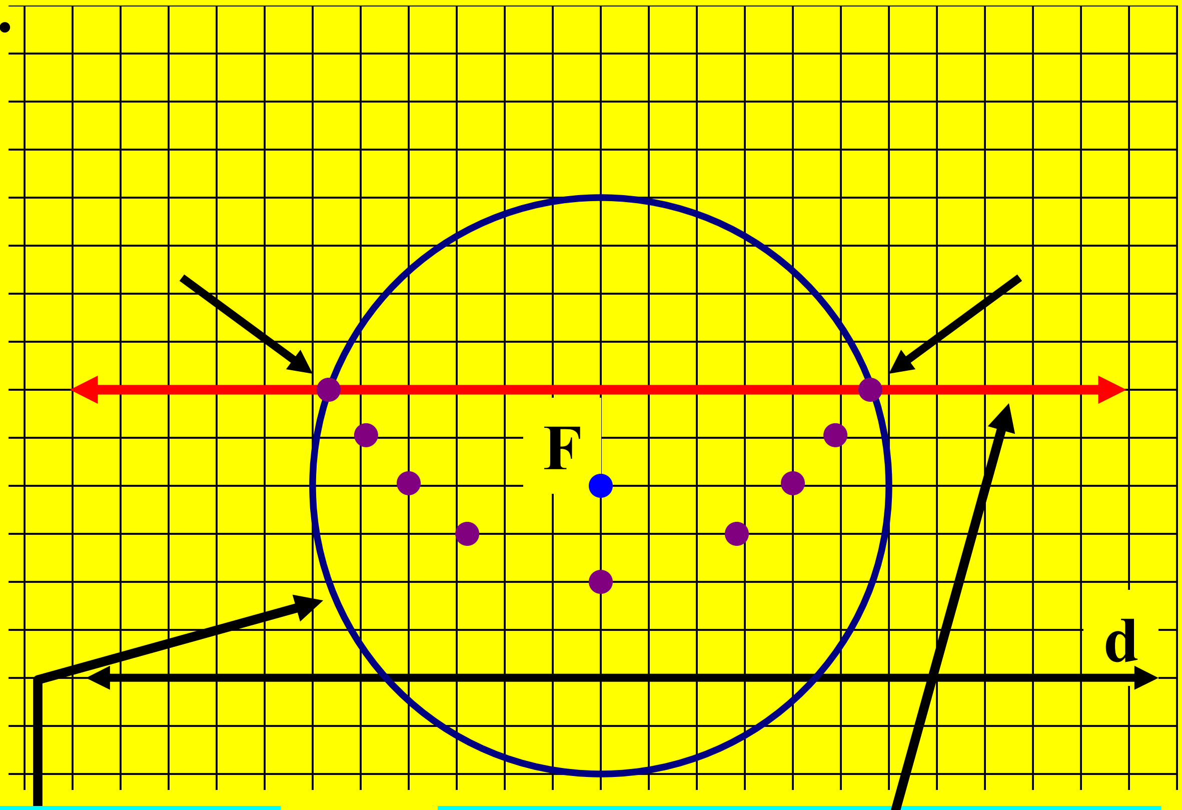
We are given a line, d, and a point, F, not on that line. We want to consider the set of all points in the plane which are equidistant from point F and line d.



All points on this circle are 6 units from point F.

All points on this line are 6 units from line d.

We are given a line, d, and a point, F, not on that line. We want to consider the set of all points in the plane which are equidistant from point F and line d.

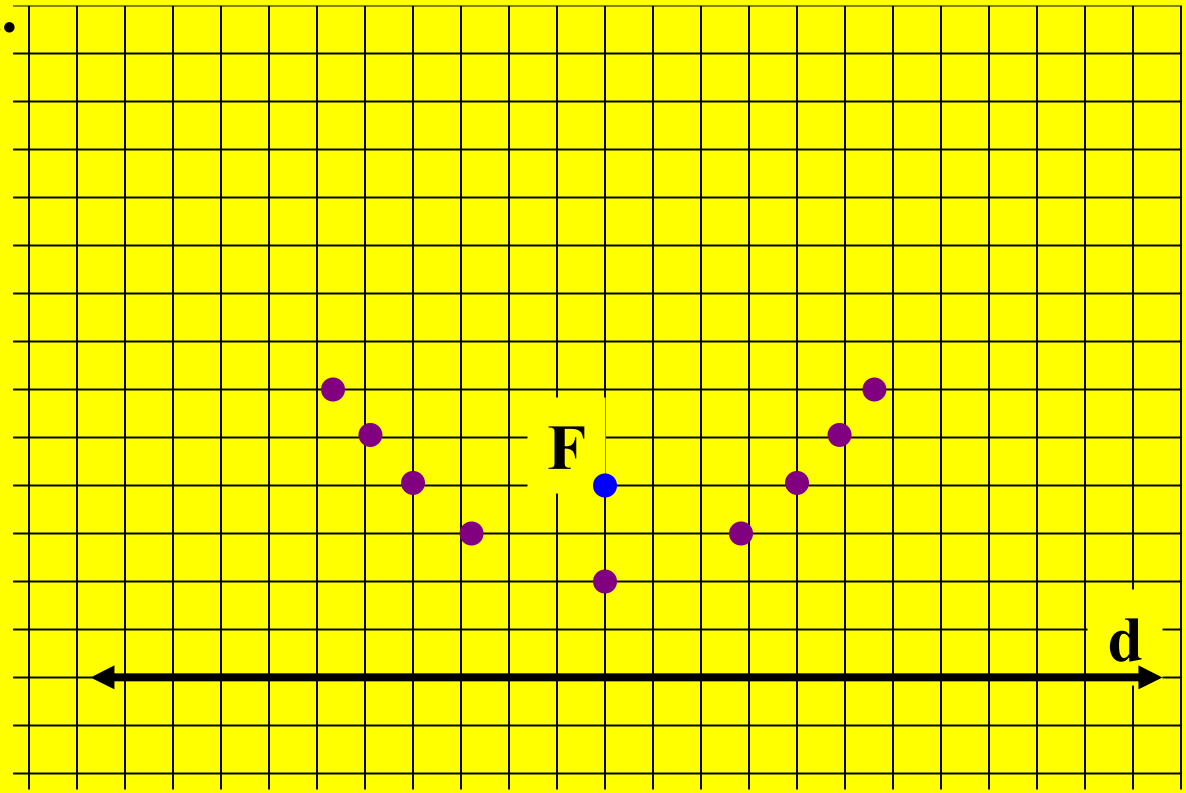


All points on this circle are 6 units from point F.

All points on this line are 6 units from line d.

These two points are equidistant from point F and line d.

We are given a line, d, and a point, F, not on that line. We want to consider the set of all points in the plane which are equidistant from point F and line d.



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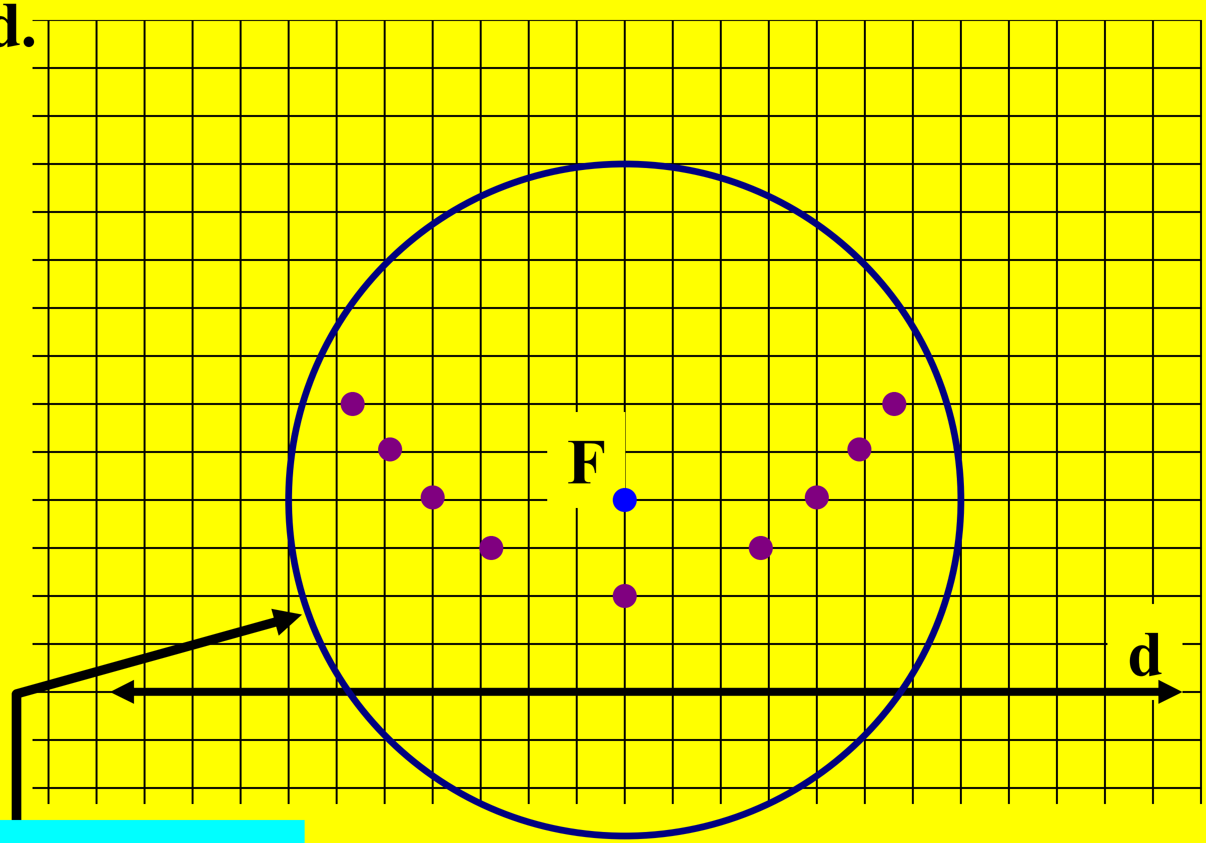
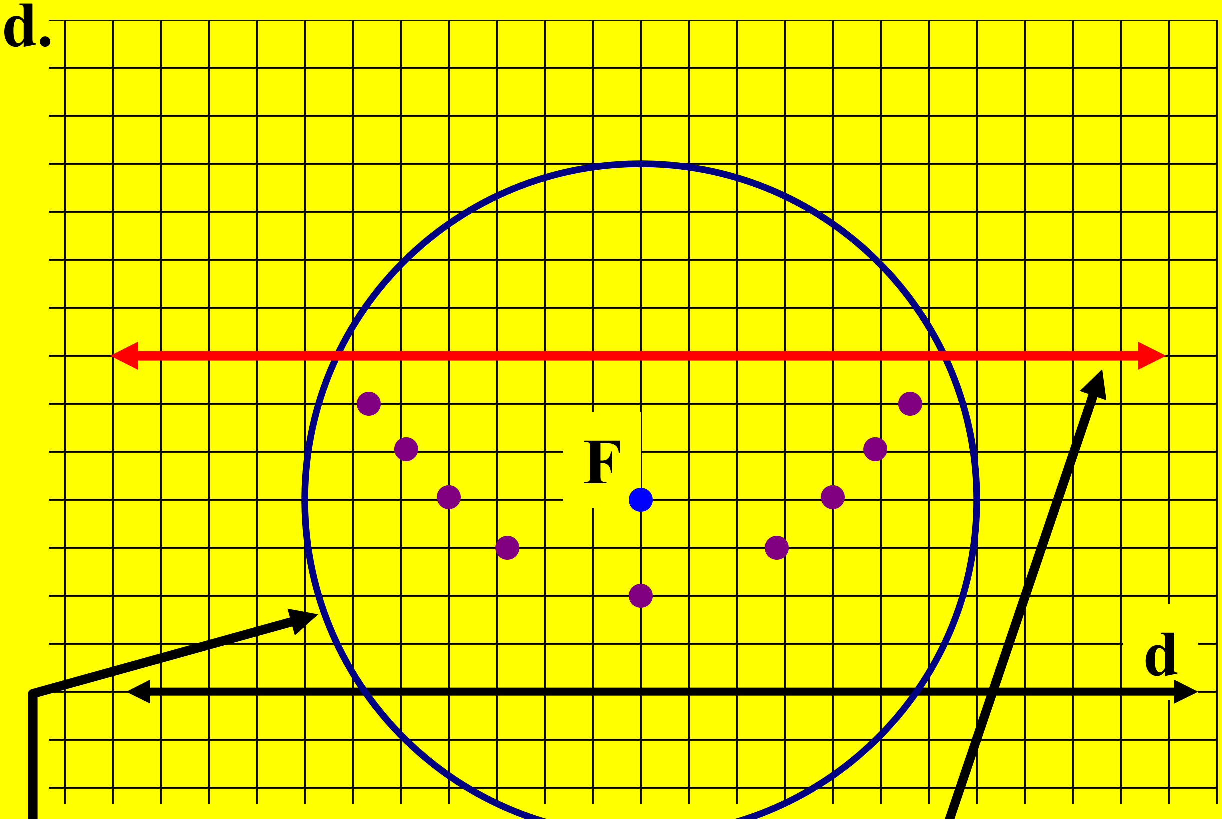


All points on this circle are 7 units from point F.

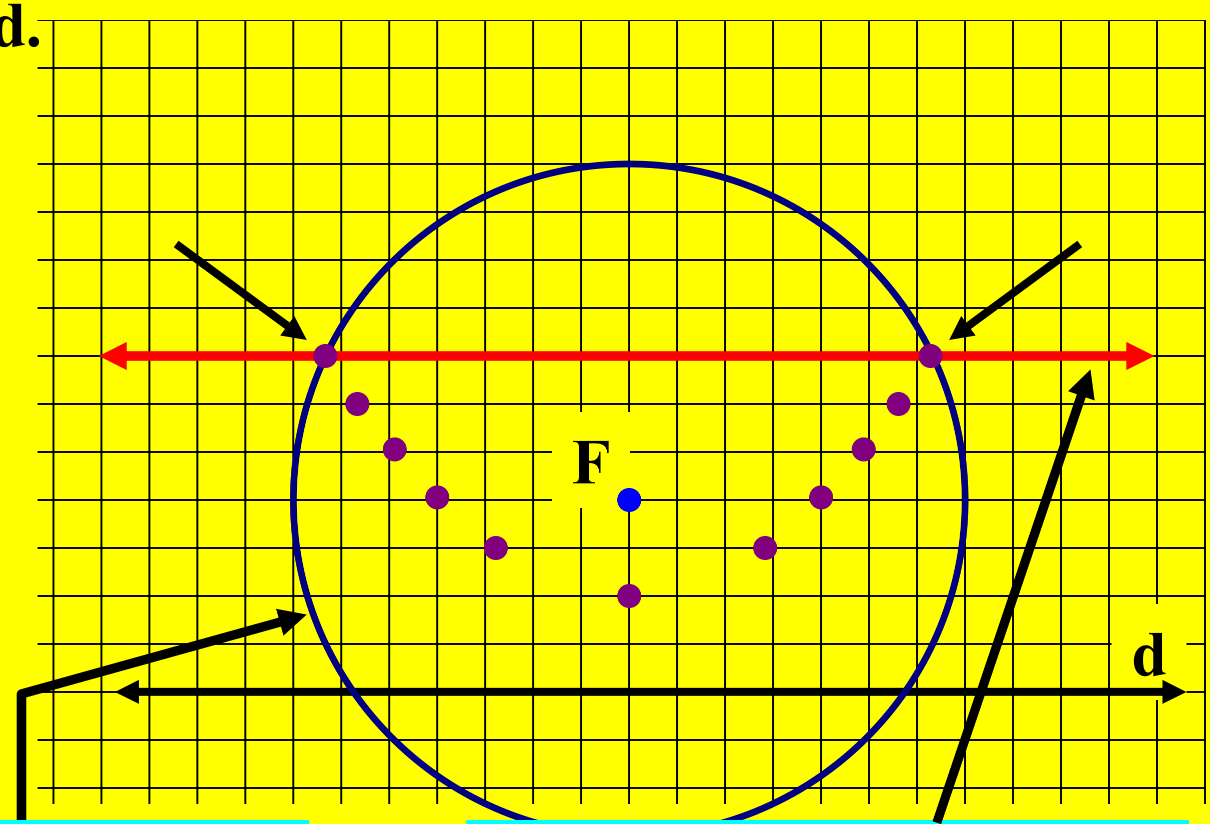
We are given a line, d, and a point, F, not on that line. We want to consider the set of all points in the plane which are equidistant from point F and line d.



All points on this circle are 7 units from point F.

All points on this line are 7 units from line d.

We are given a line, d, and a point, F, not on that line. We want to consider the set of all points in the plane which are equidistant from point F and line d.

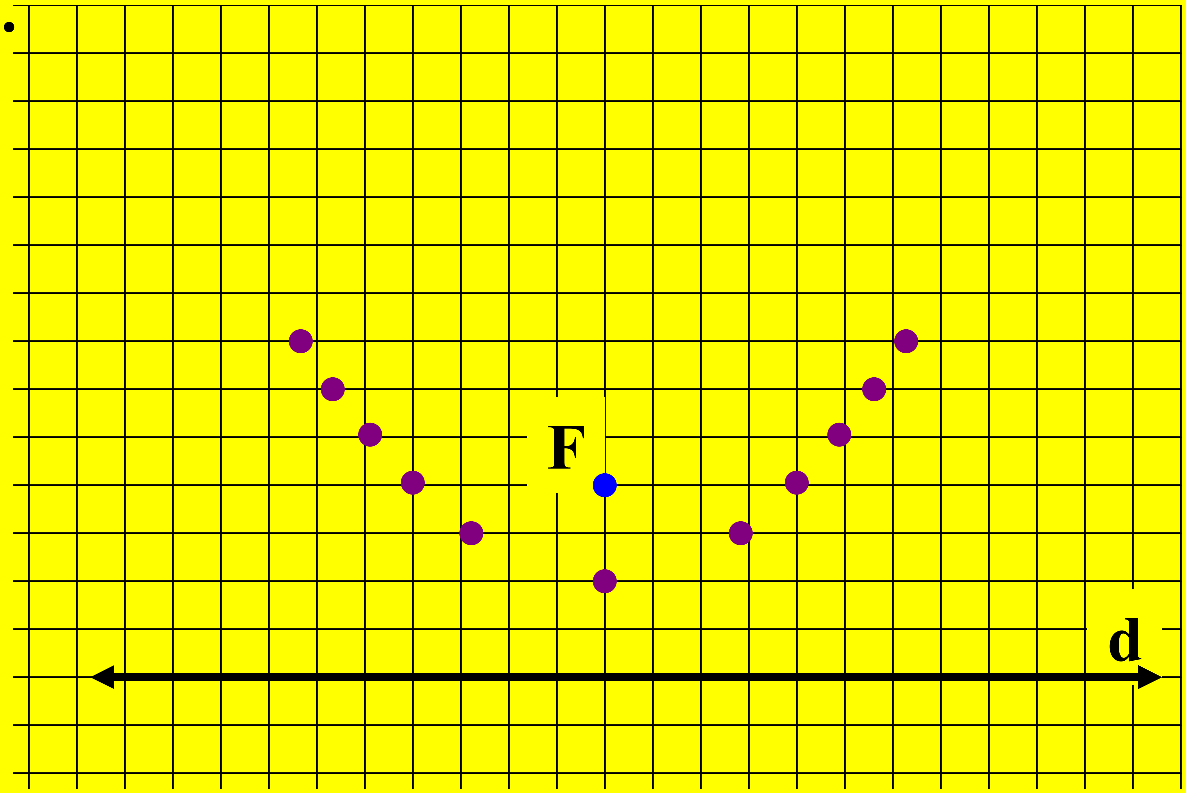


All points on this circle are 7 units from point F.

All points on this line are 7 units from line d.

These two points are equidistant from point F and line d.

We are given a line, d, and a point, F, not on that line. We want to consider the set of all points in the plane which are equidistant from point F and line d.



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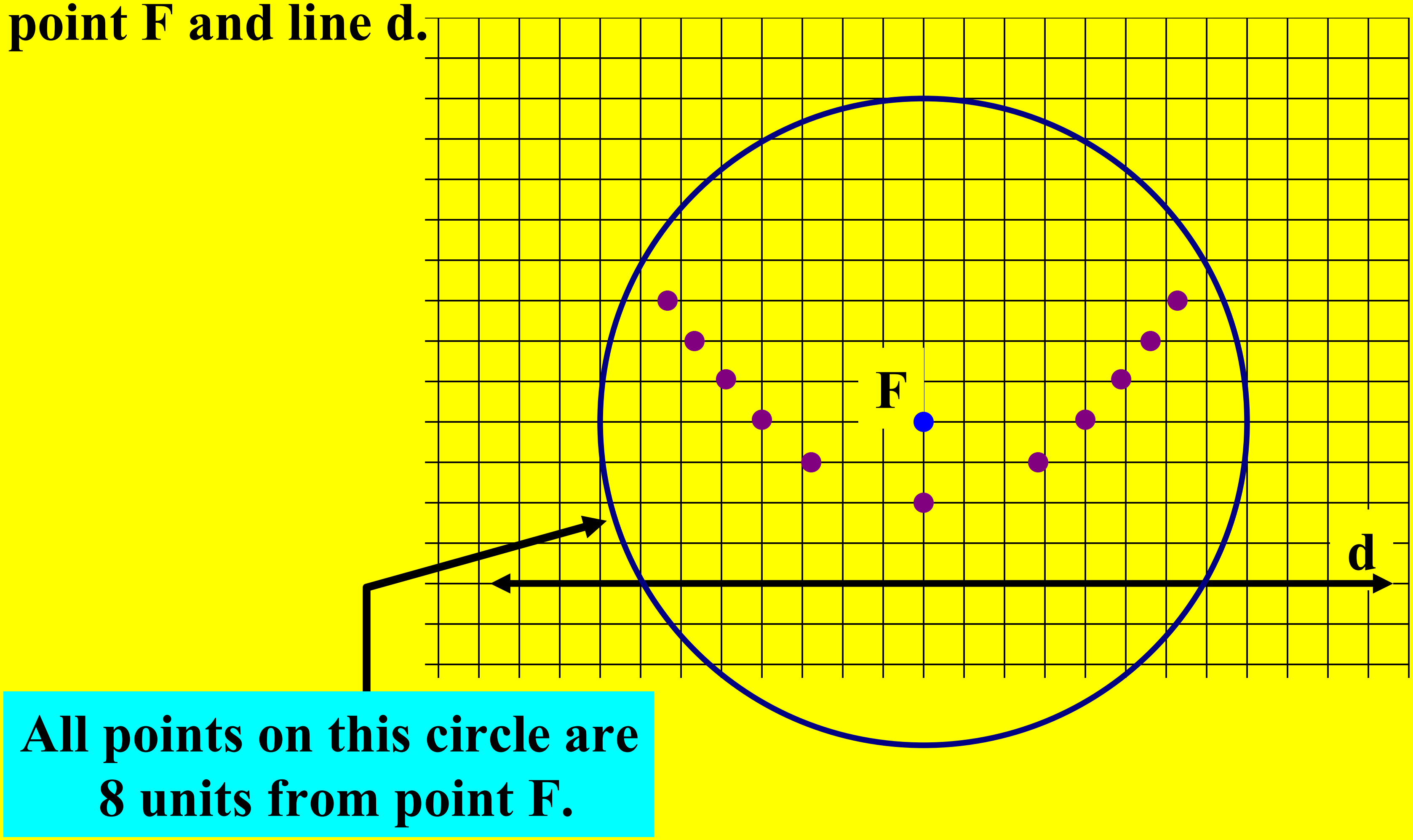

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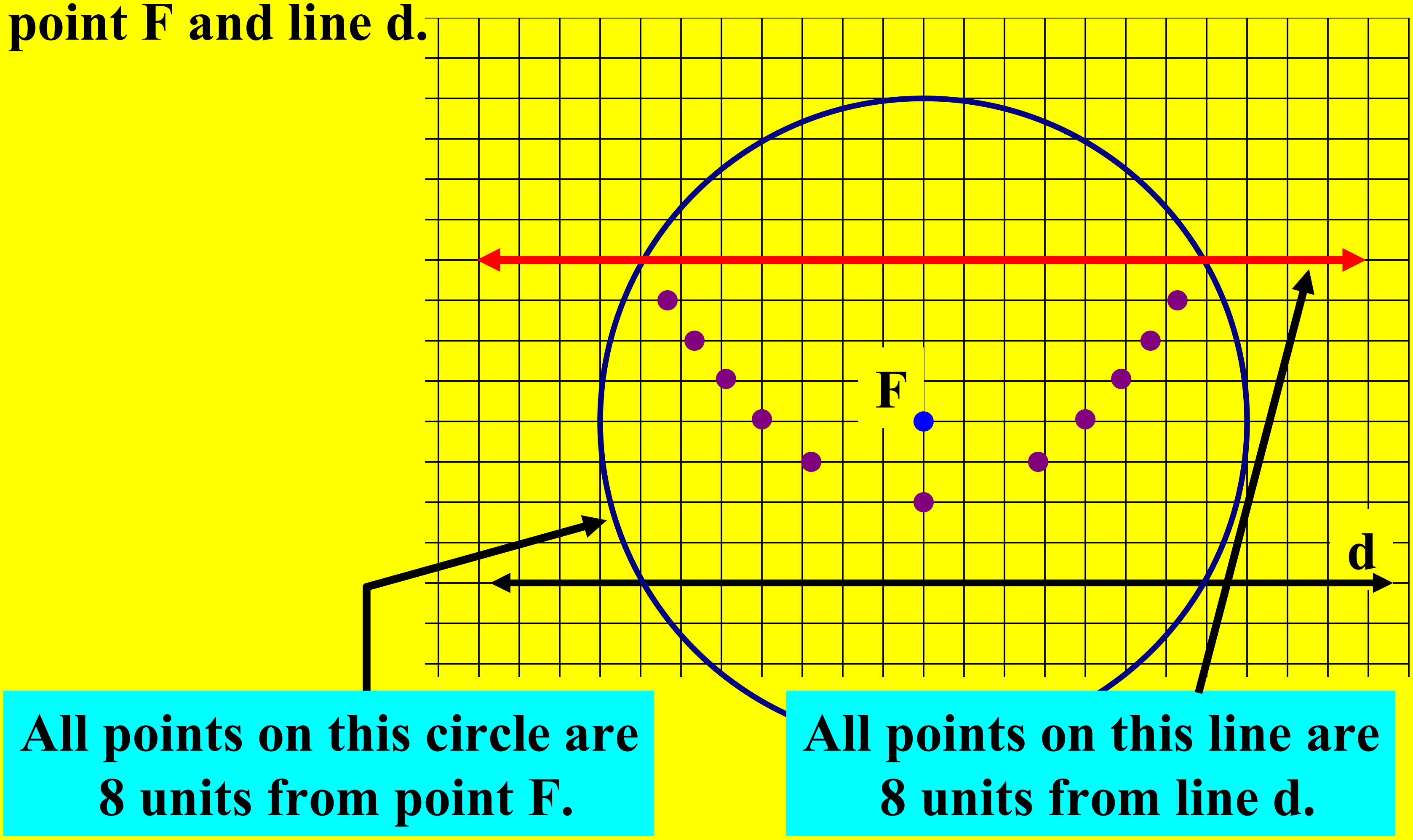

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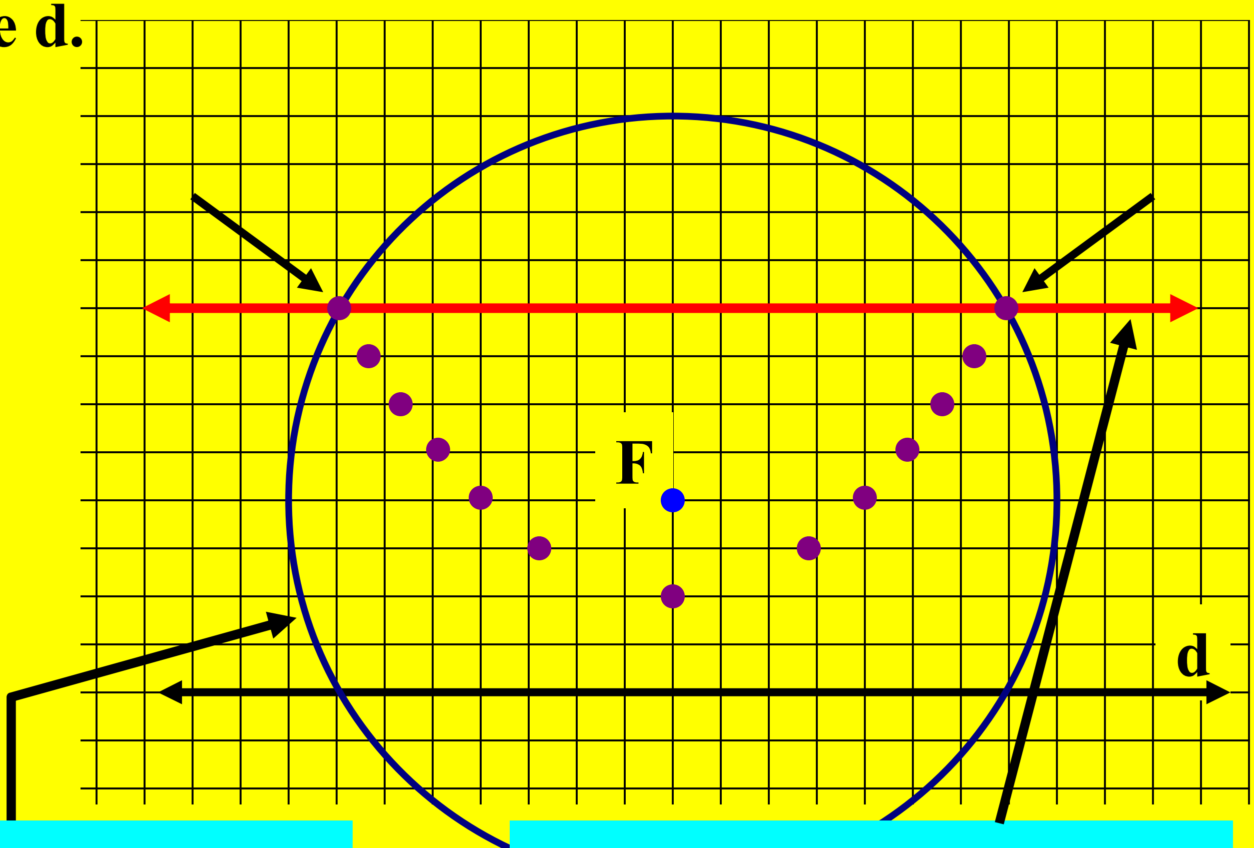
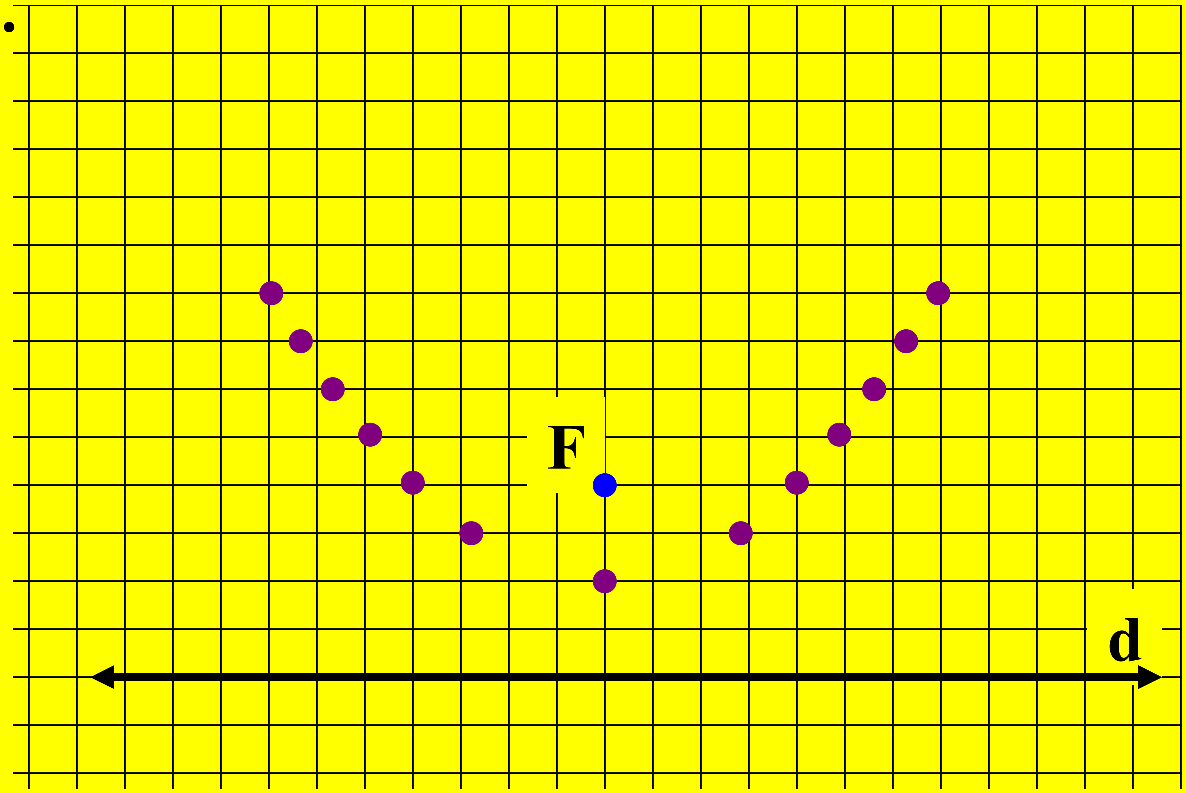


All points on this circle are 8 units from point F.

All points on this line are 8 units from line d.

These two points are equidistant from point F and line d.

We are given a line, d, and a point, F, not on that line. We want to consider the set of all points in the plane which are equidistant from point F and line d.



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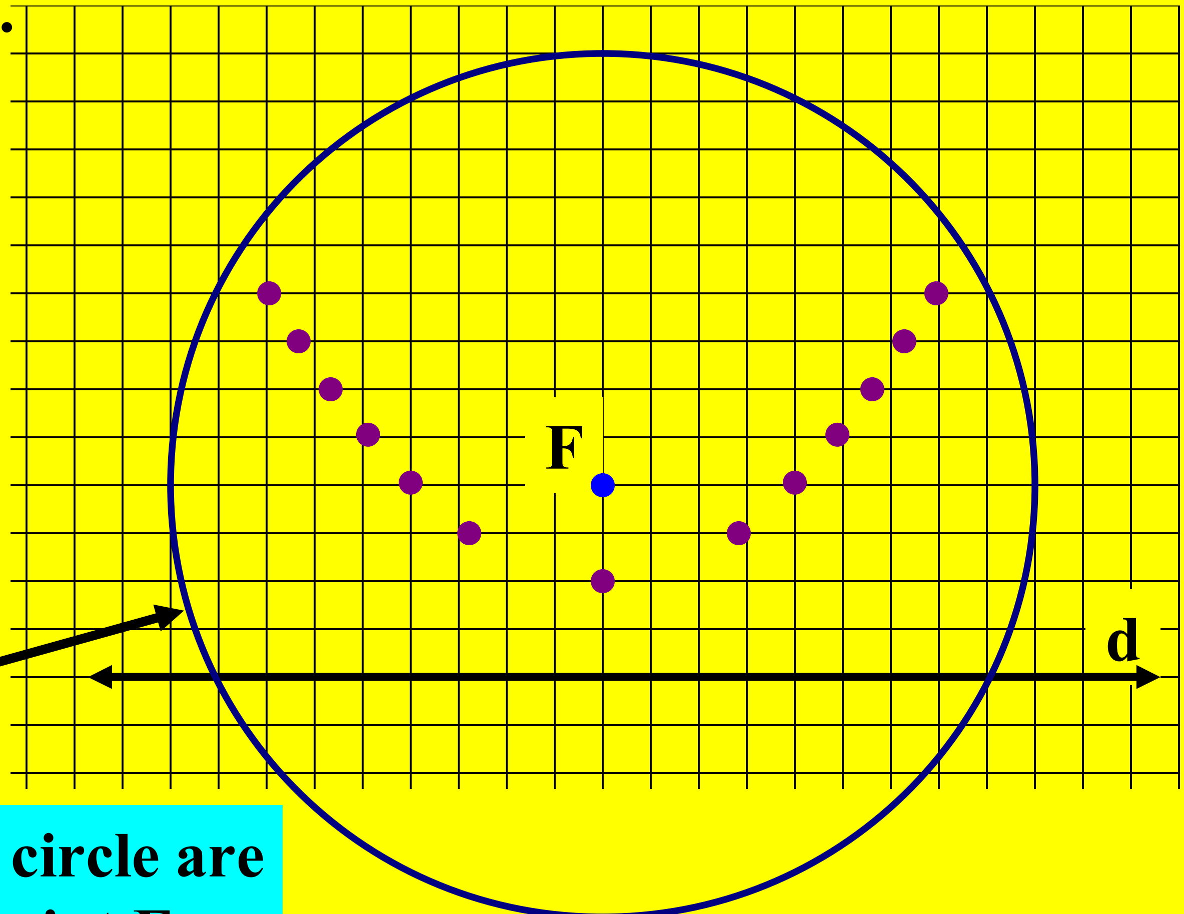
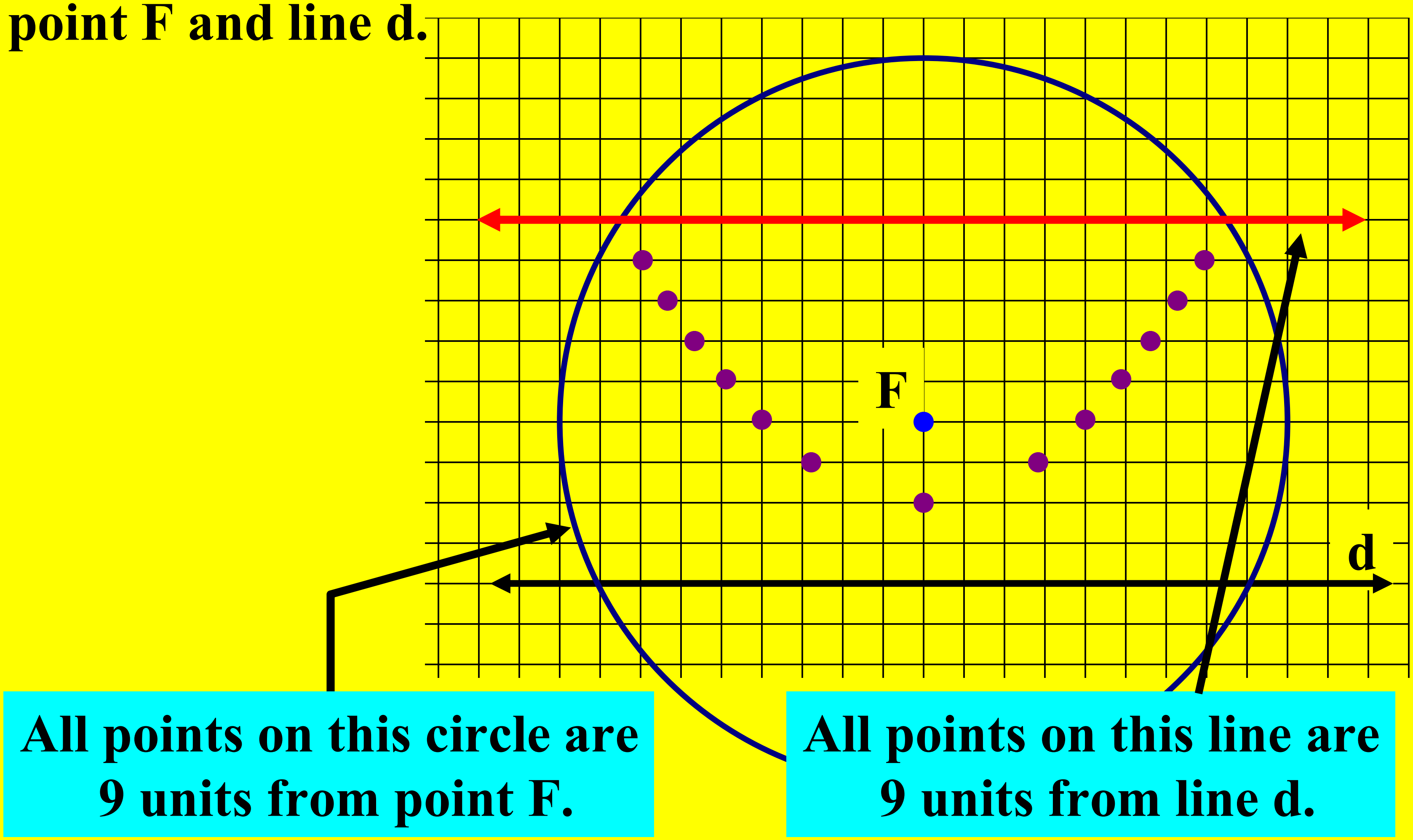


All points on this circle are 9 units from point F.

We are given a line, d, and a point, F, not on that line. We want to consider the set of all points in the plane which are equidistant from point F and line d.



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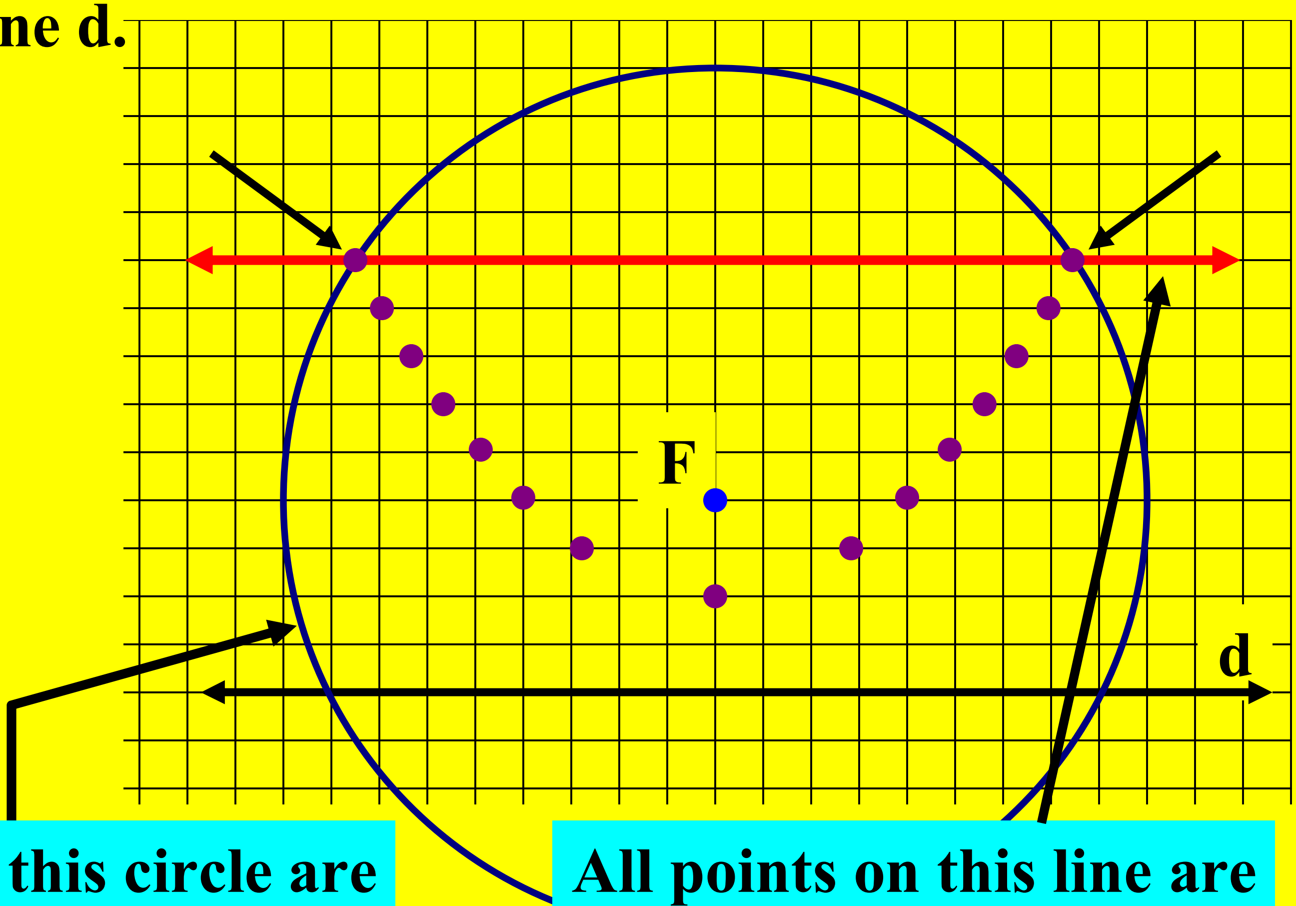
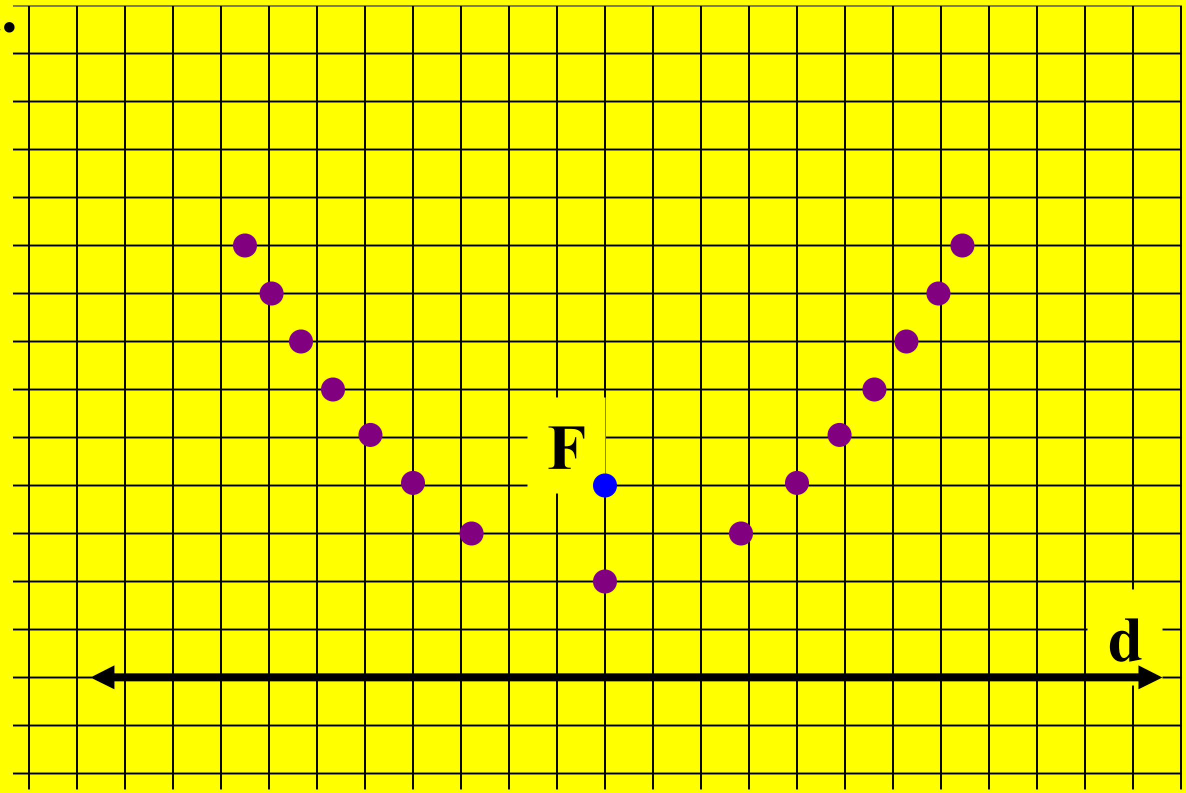


All points on this circle are 9 units from point F.

All points on this line are 9 units from line d.

These two points are equidistant from point F and line d.

We are given a line, d, and a point, F, not on that line. We want to consider the set of all points in the plane which are equidistant from point F and line d.



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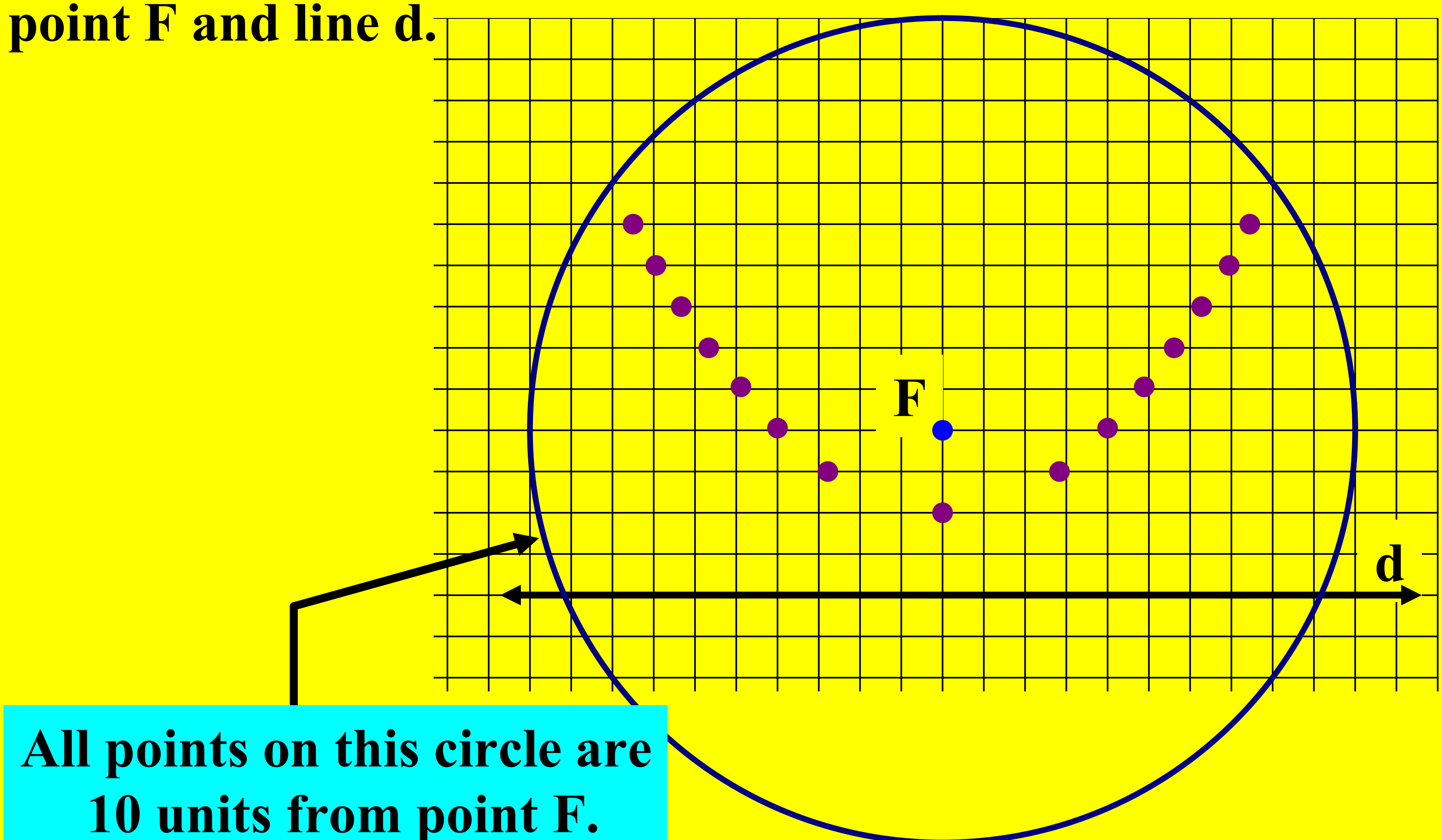

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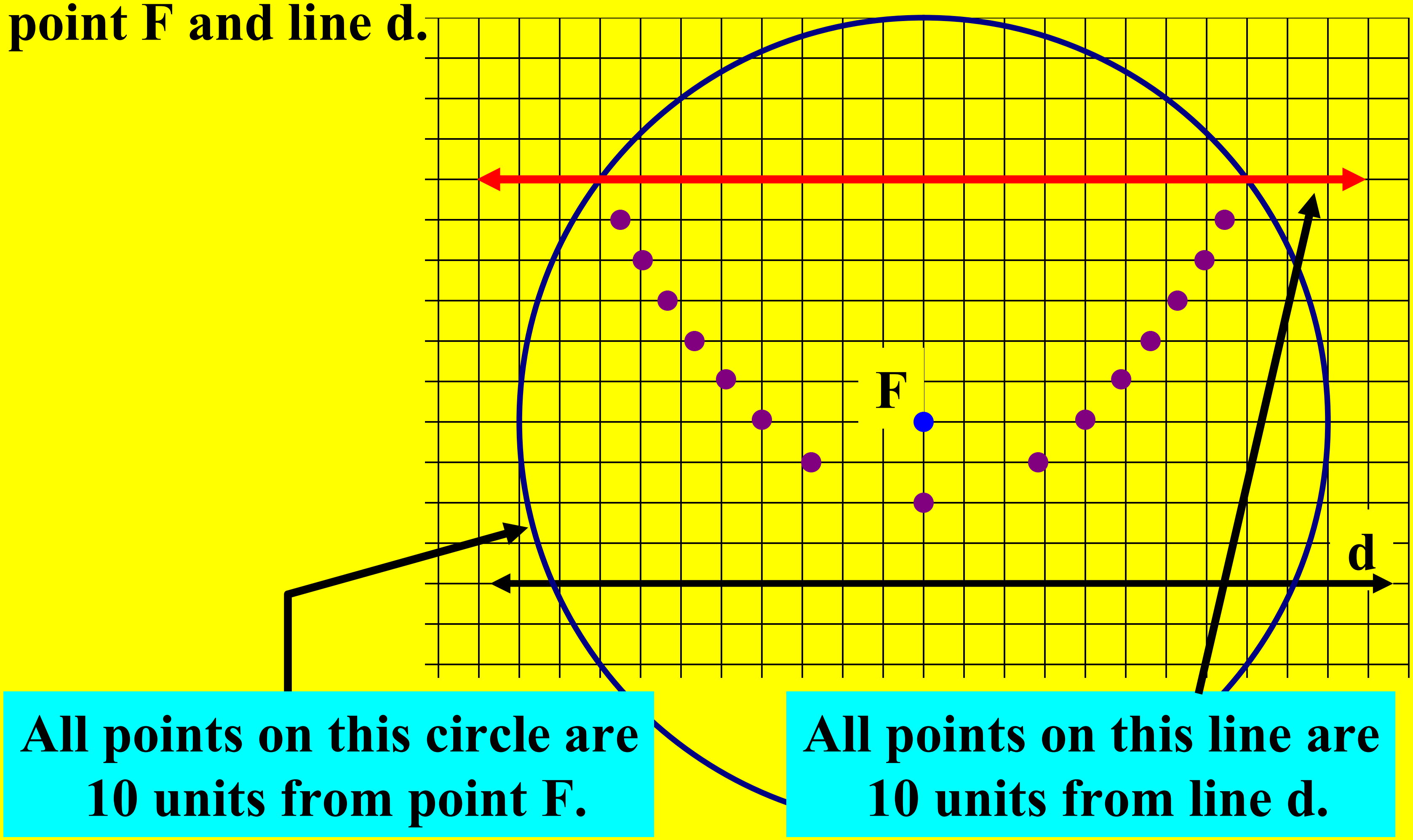

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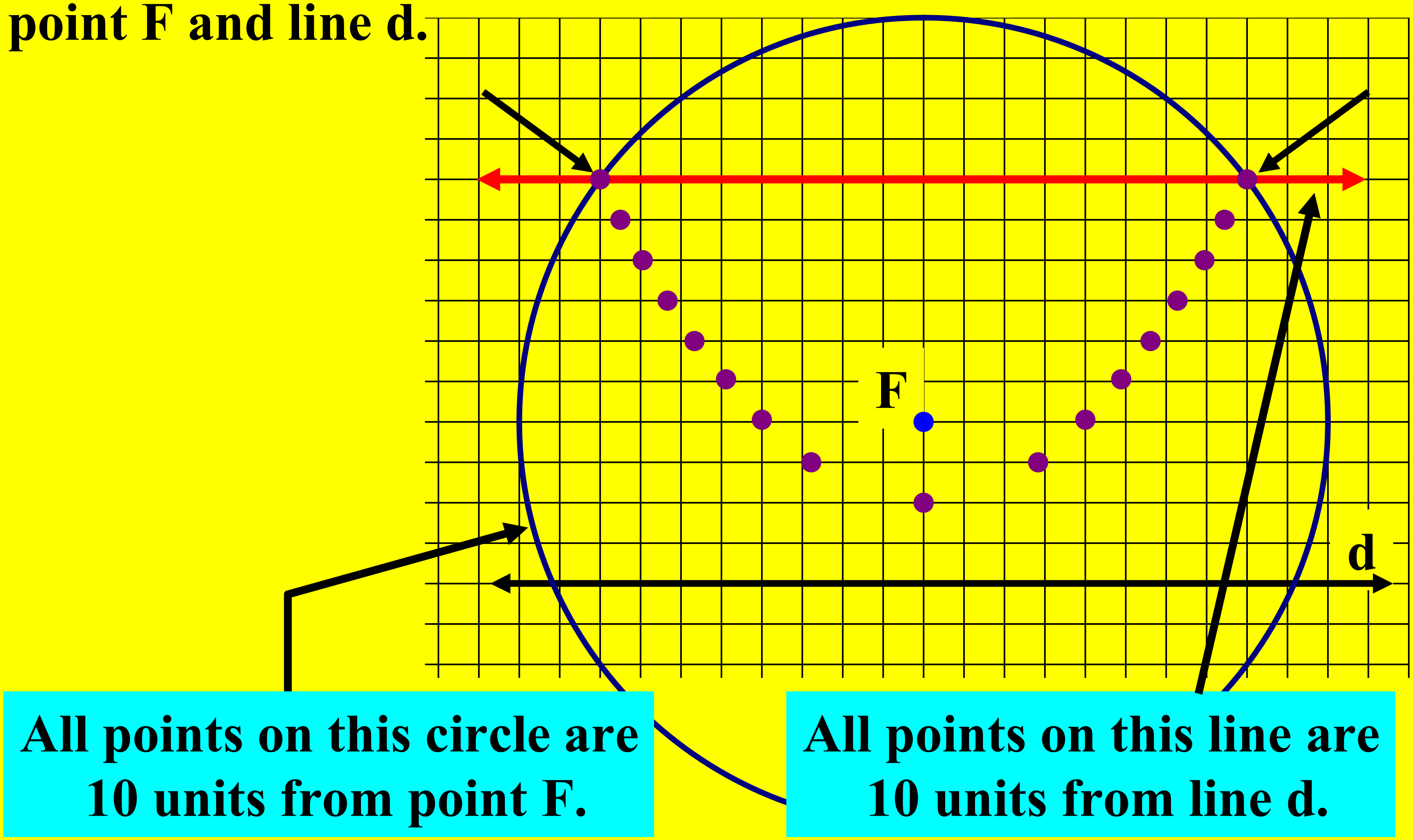
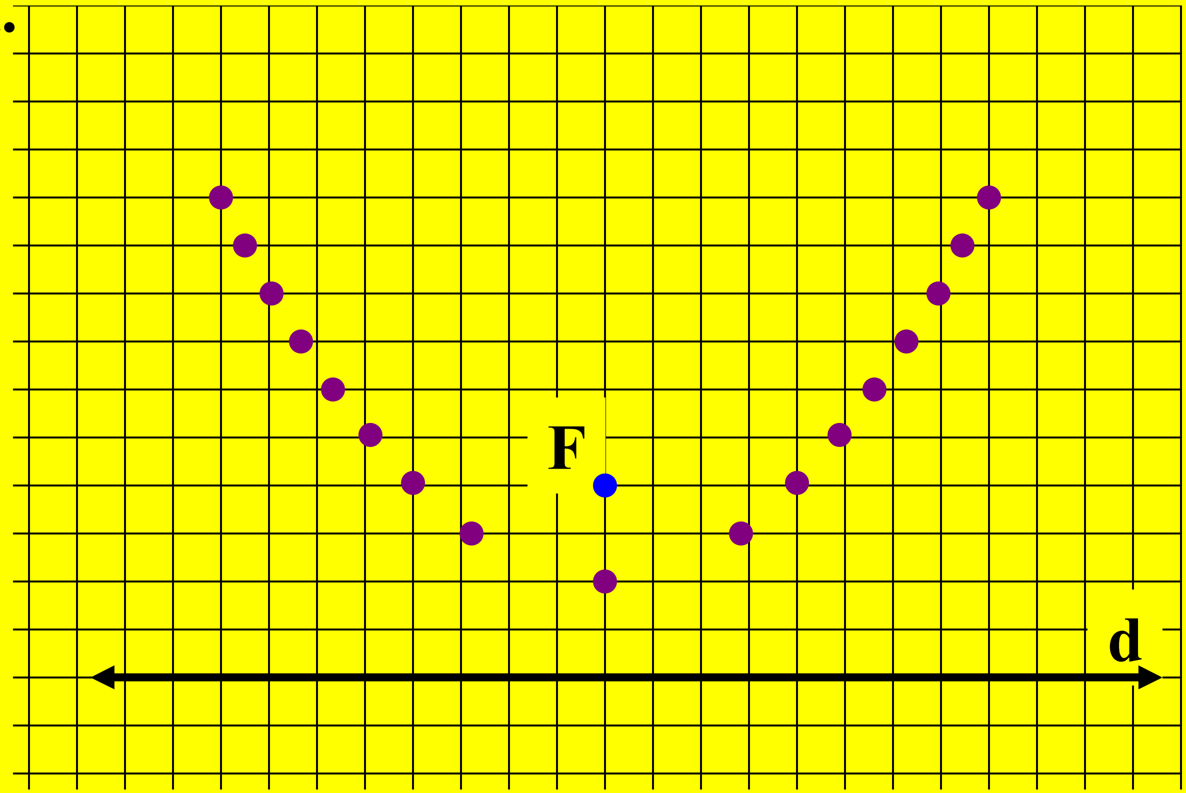


These two points are equidistant from point F and line d.

We are given a line, d, and a point, F, not on that line. We want to consider the set of all points in the plane which are equidistant from point F and line d.



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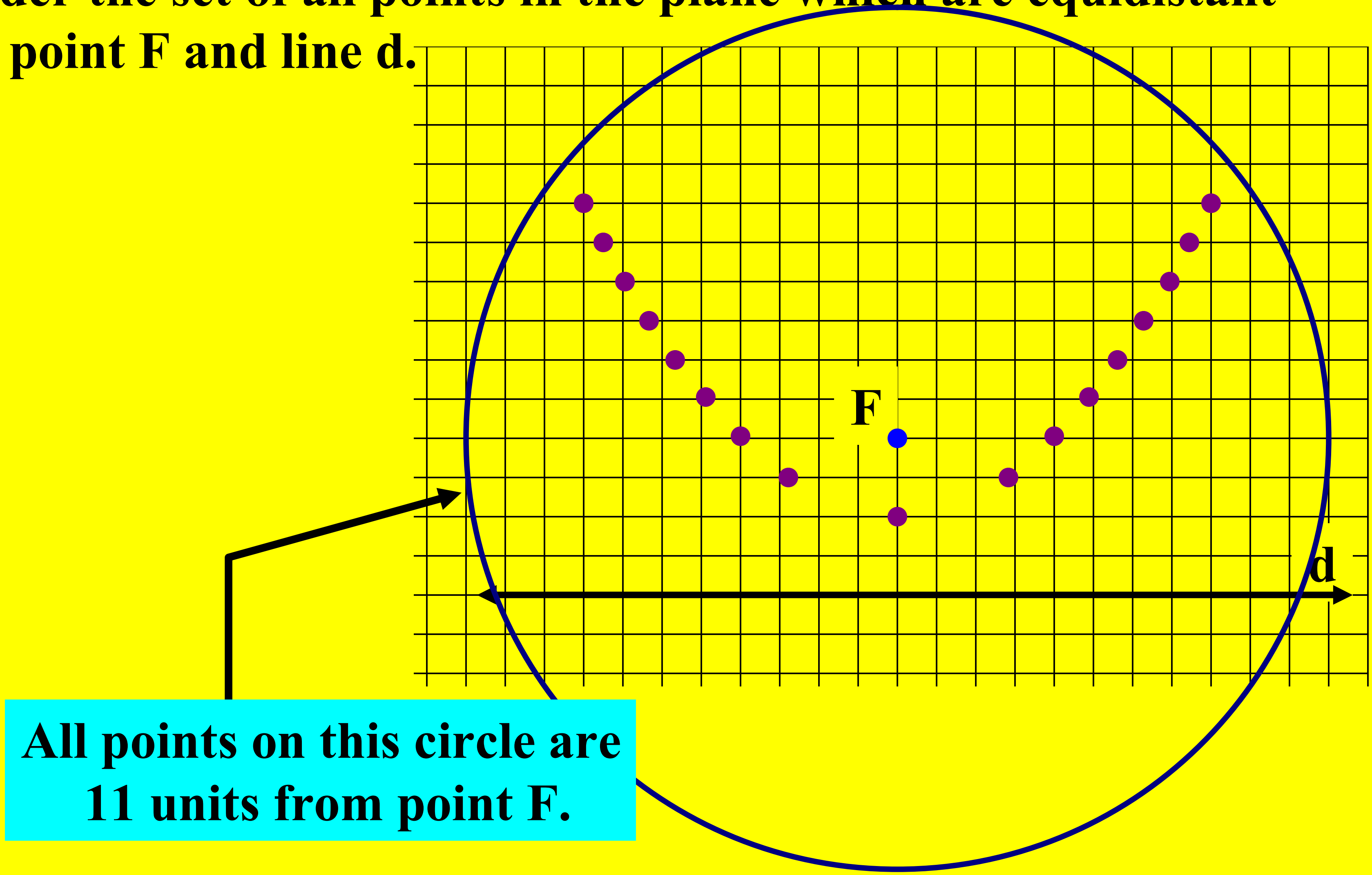

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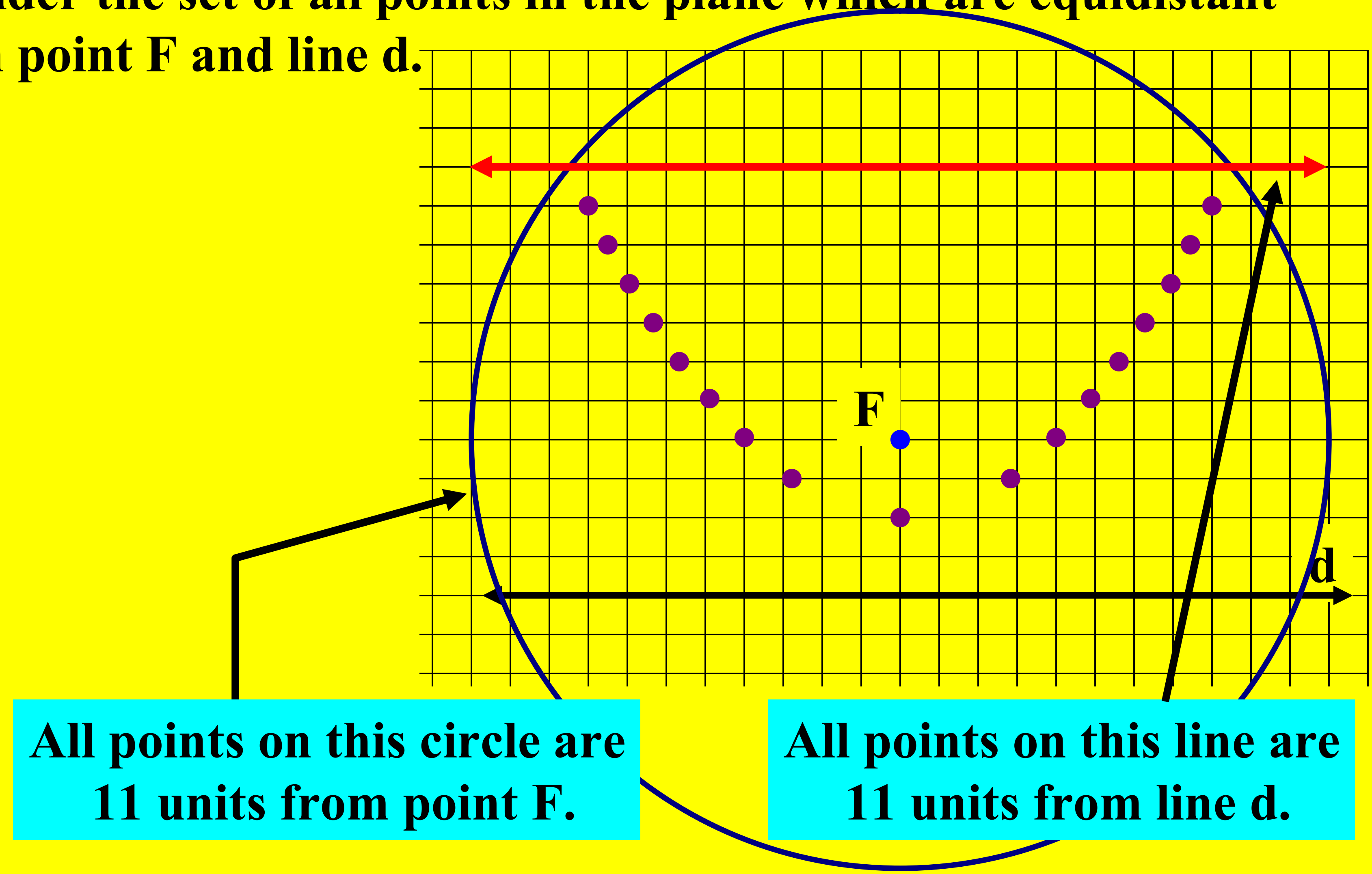

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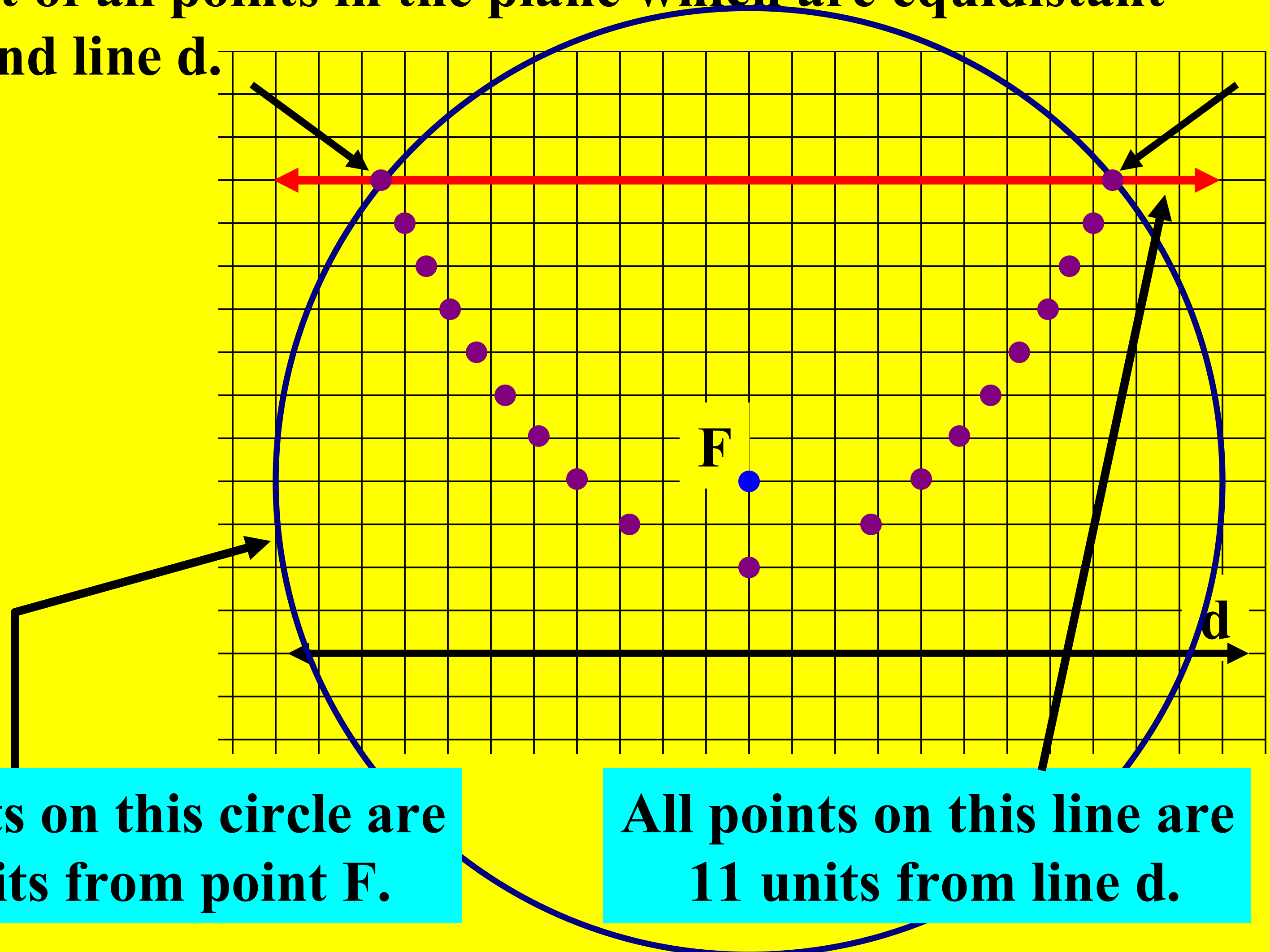
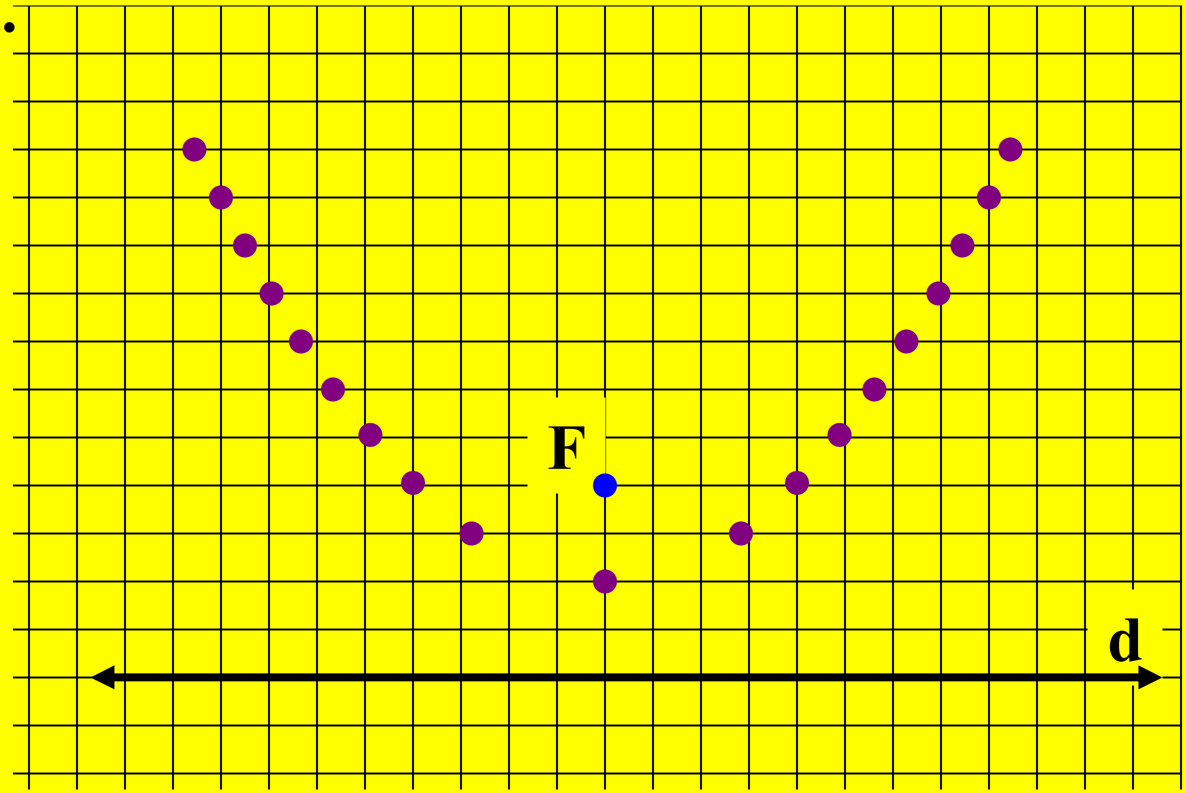


All points on this circle are 11 units from point F.

All points on this line are 11 units from line d.

These two points are equidistant from point F and line d.

We are given a line, d, and a point, F, not on that line. We want to consider the set of all points in the plane which are equidistant from point F and line d.



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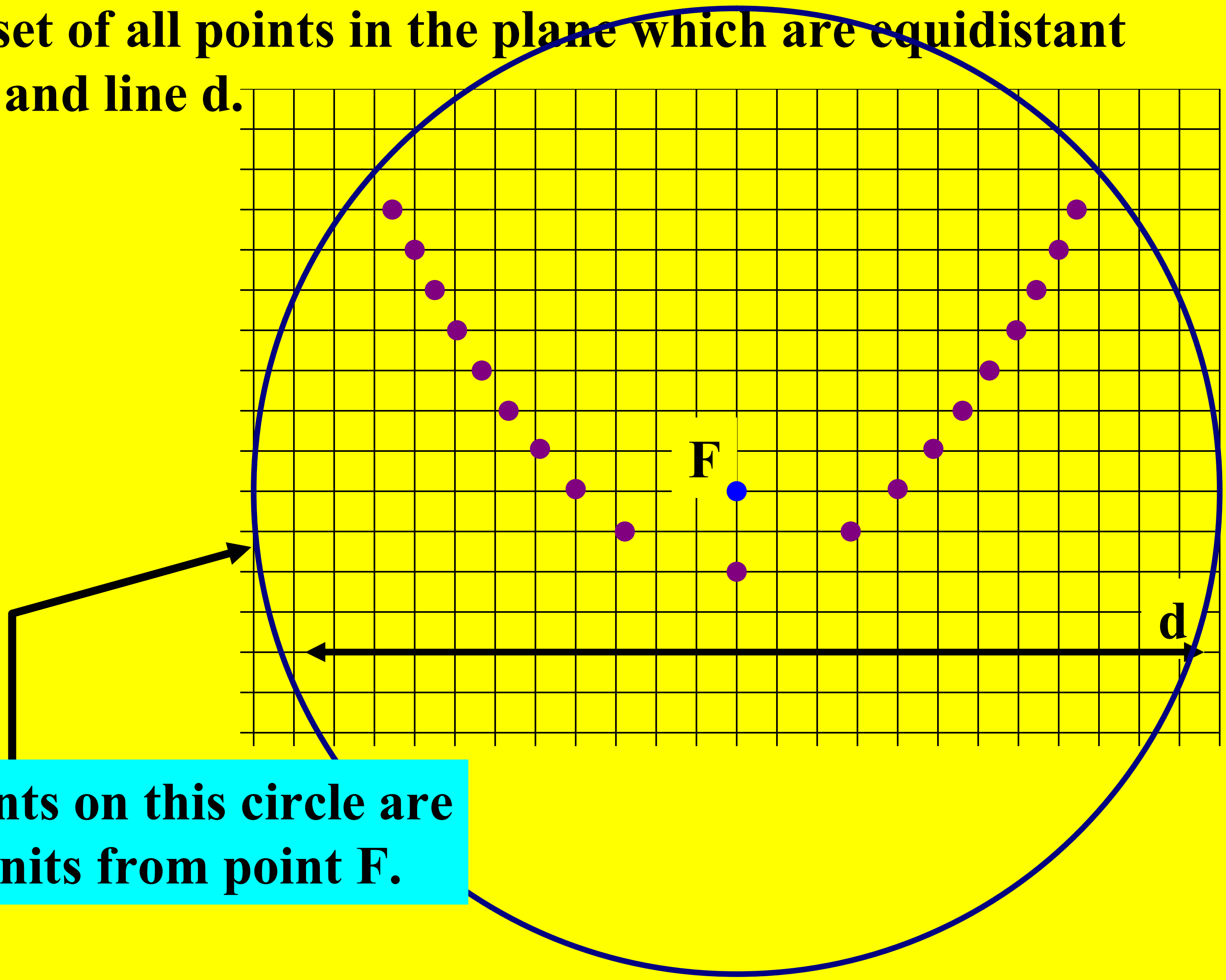
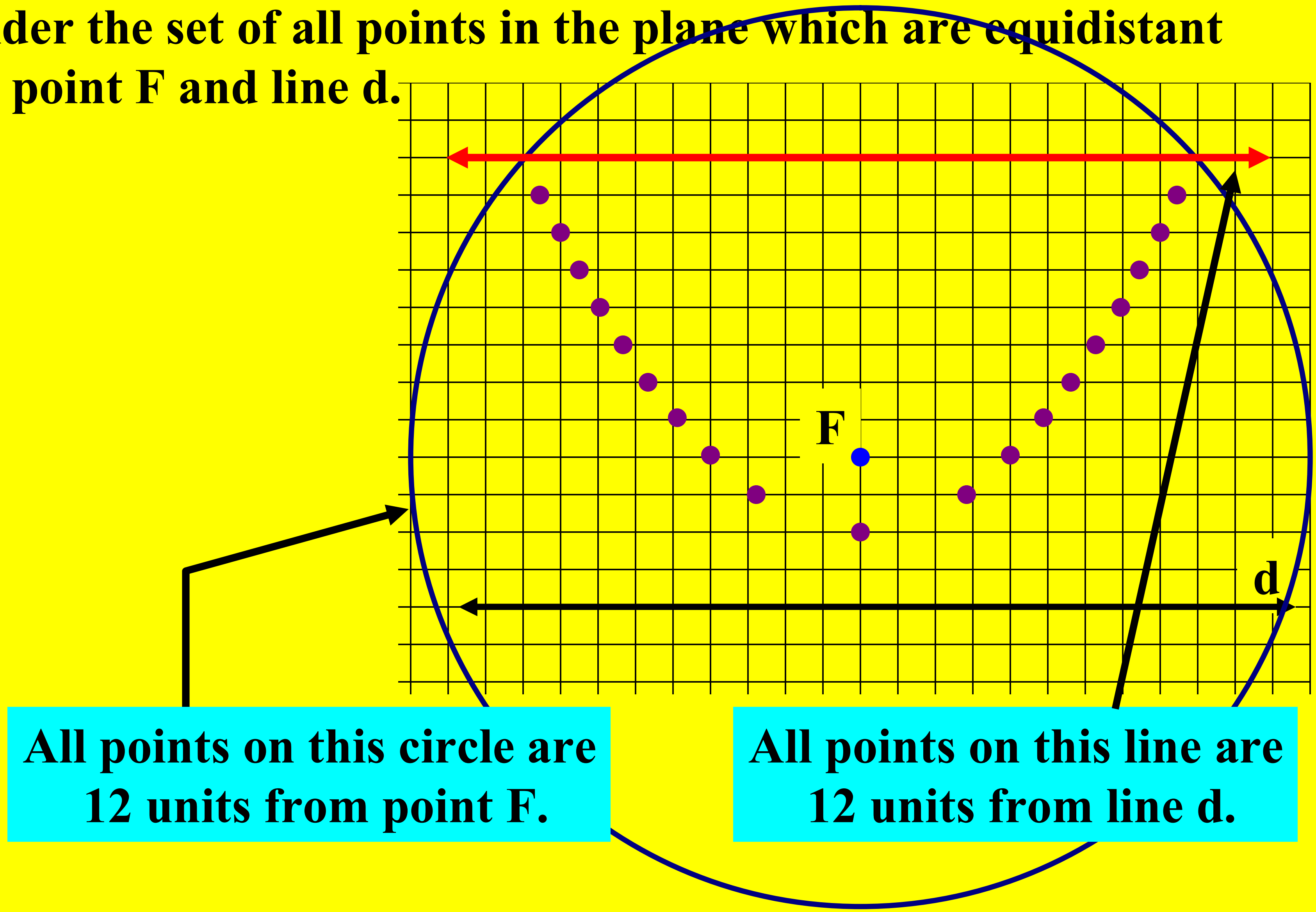
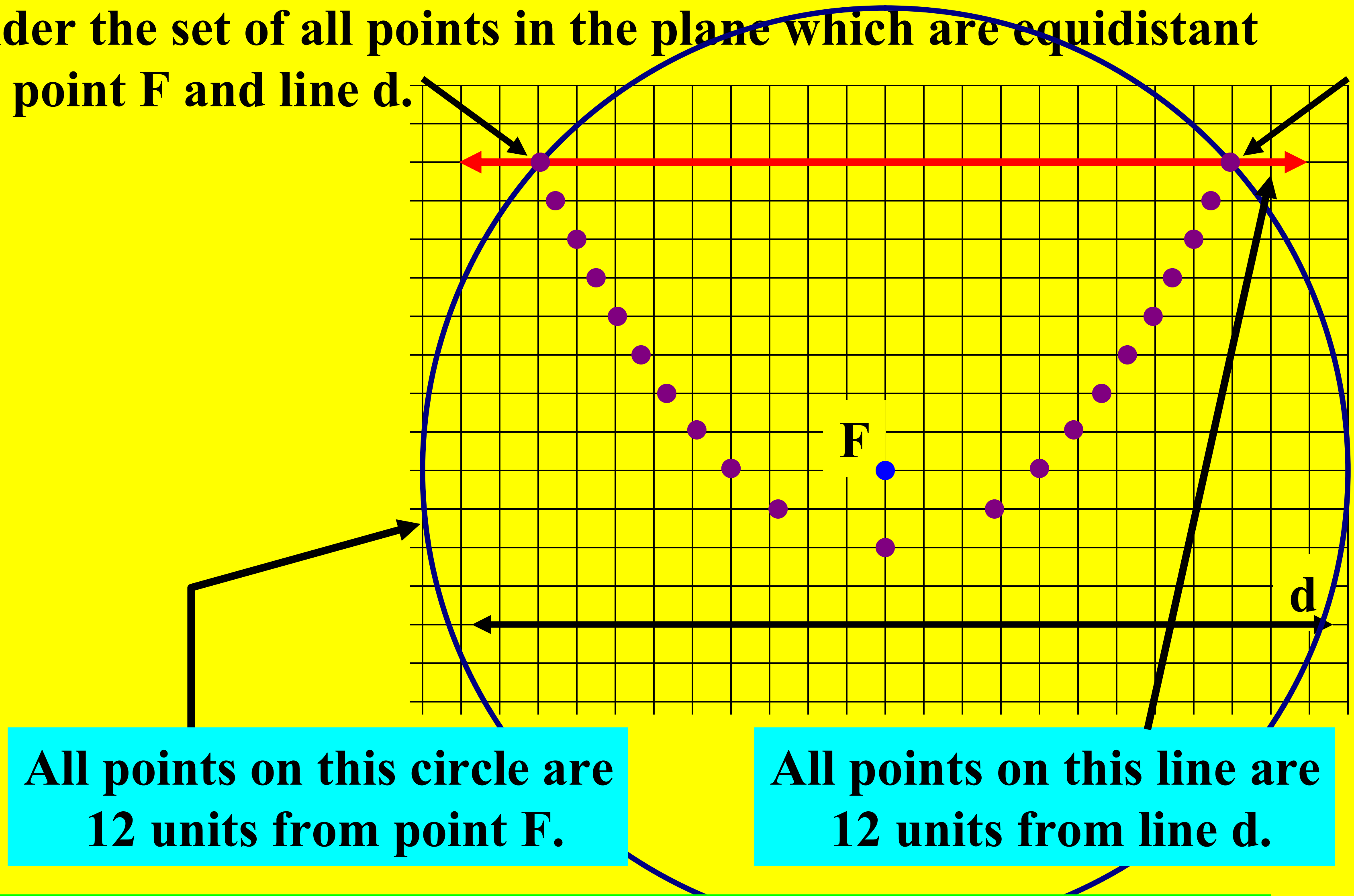


All points on this circle are 12 units from point F.

We are given a line, d, and a point, F, not on that line. We want to consider the set of all points in the plane which are equidistant from point F and line d.

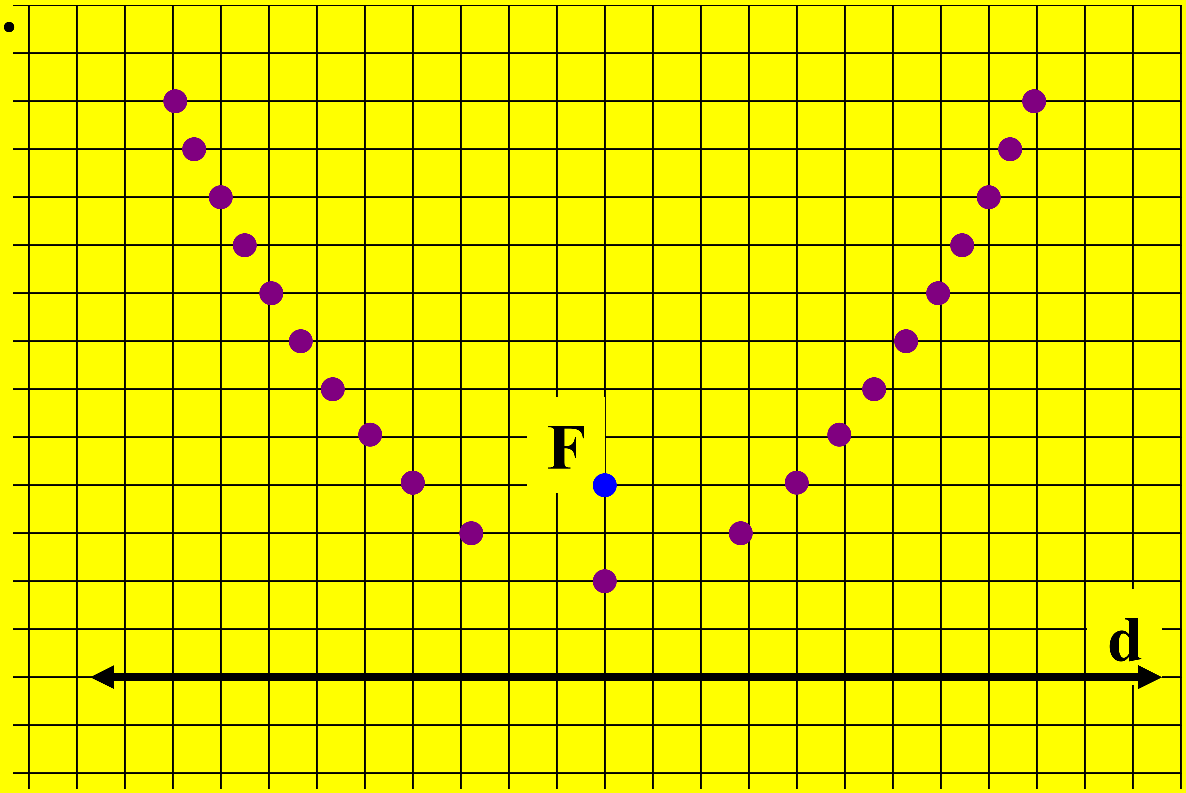


We are given a line, d, and a point, F, not on that line. We want to consider the set of all points in the plane which are equidistant from point F and line d.

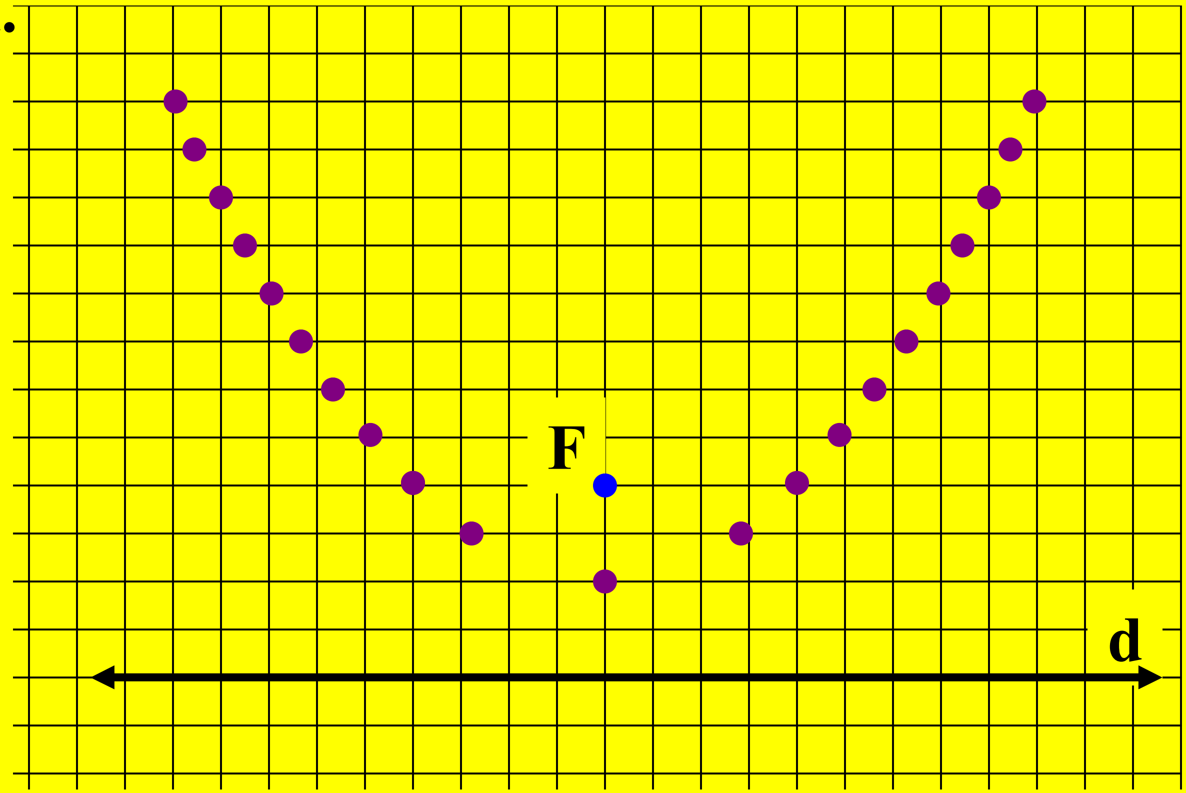


These two points are equidistant from point F and line d.

We are given a line, d, and a point, F, not on that line. We want to consider the set of all points in the plane which are equidistant from point F and line d.

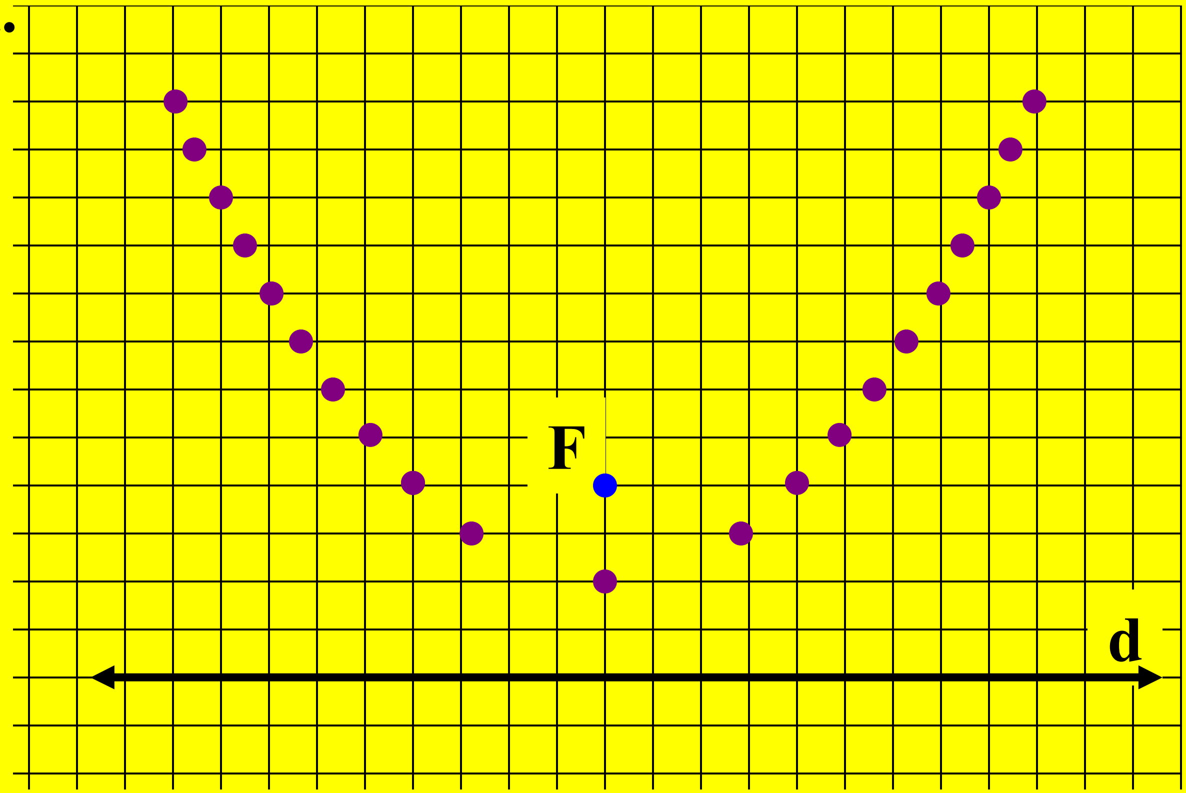


We are given a line, d, and a point, F, not on that line. We want to consider the set of all points in the plane which are equidistant from point F and line d.



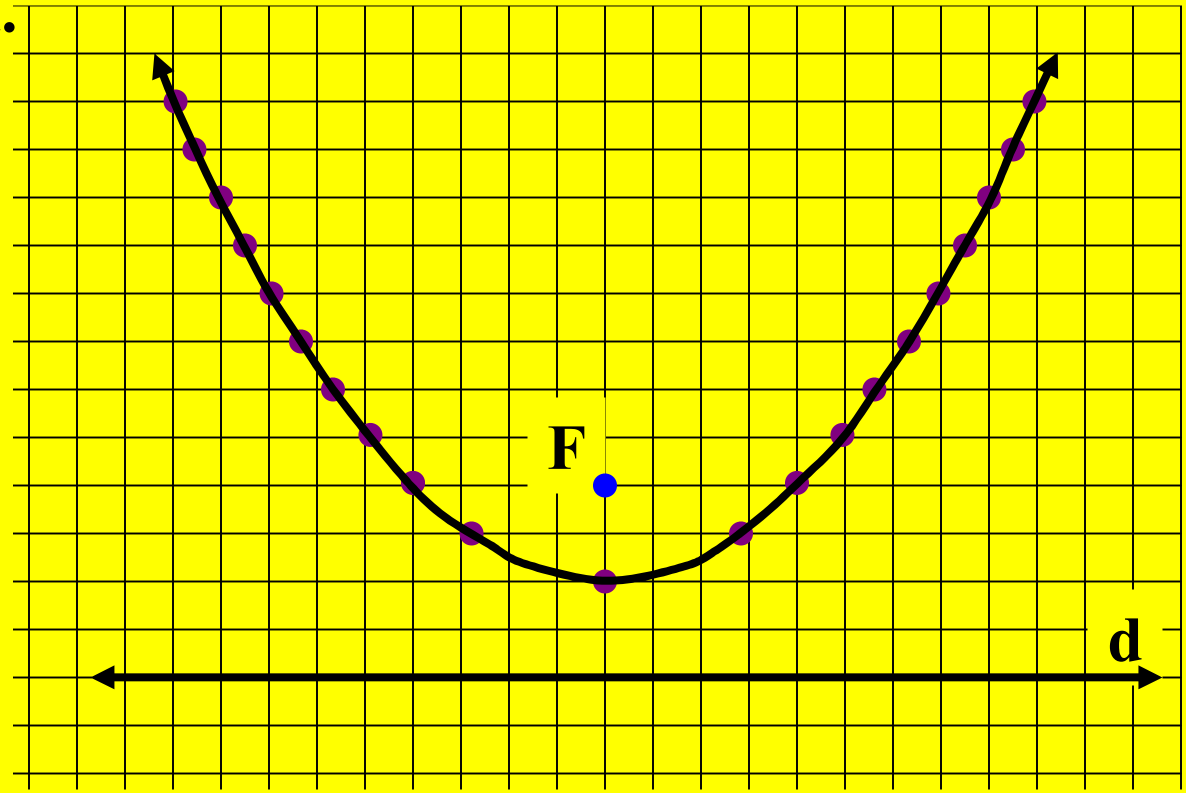
The graph of <u>all points</u> in the plane

We are given a line, d, and a point, F, not on that line. We want to consider the set of all points in the plane which are equidistant from point F and line d.



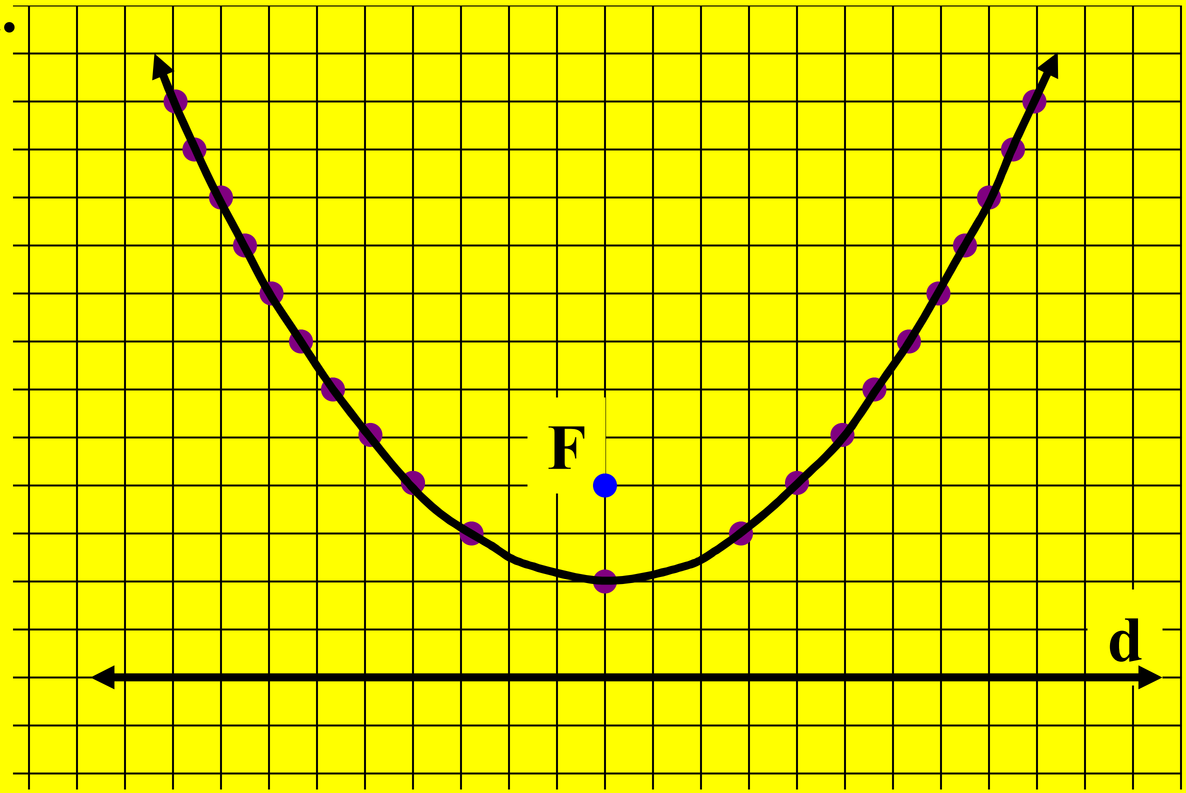
The graph of <u>all points</u> in the plane which are equidistant from point F and line d

We are given a line, d, and a point, F, not on that line. We want to consider the set of all points in the plane which are equidistant from point F and line d.



The graph of all points in the plane which are equidistant from point F and line d looks like this.

We are given a line, d, and a point, F, not on that line. We want to consider the set of all points in the plane which are equidistant from point F and line d.



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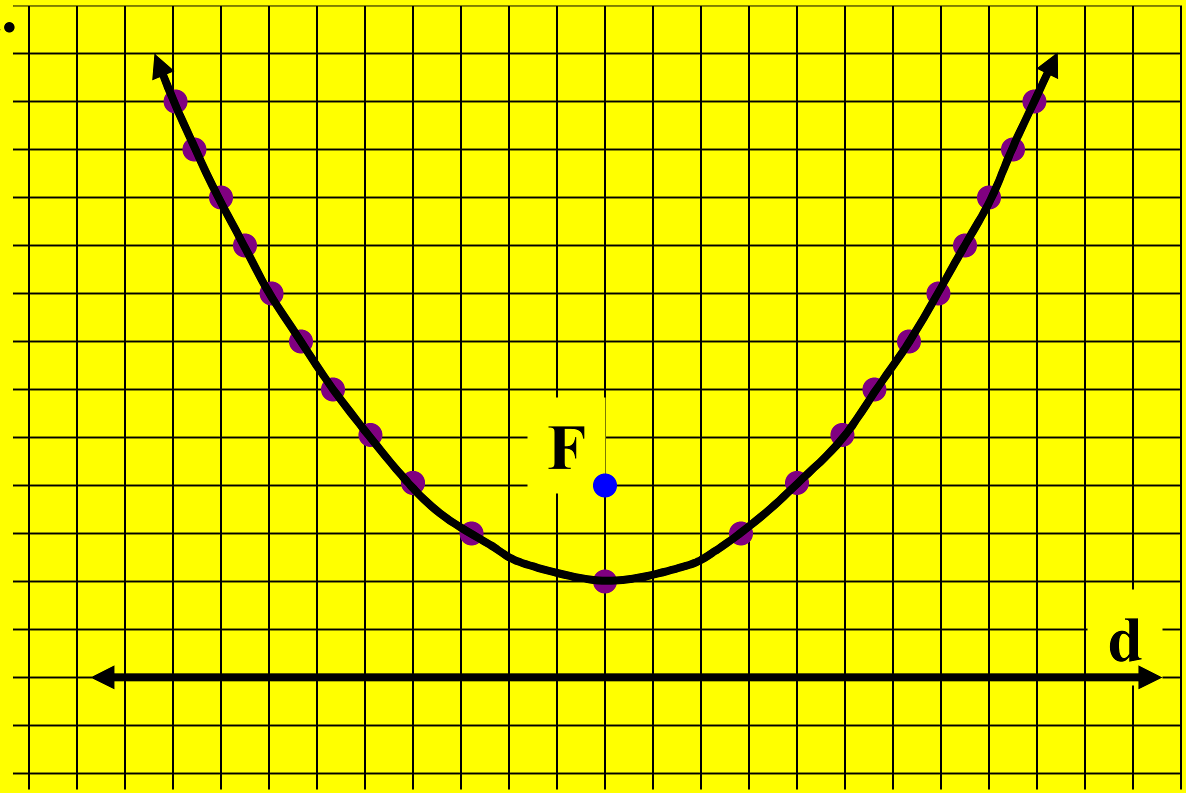
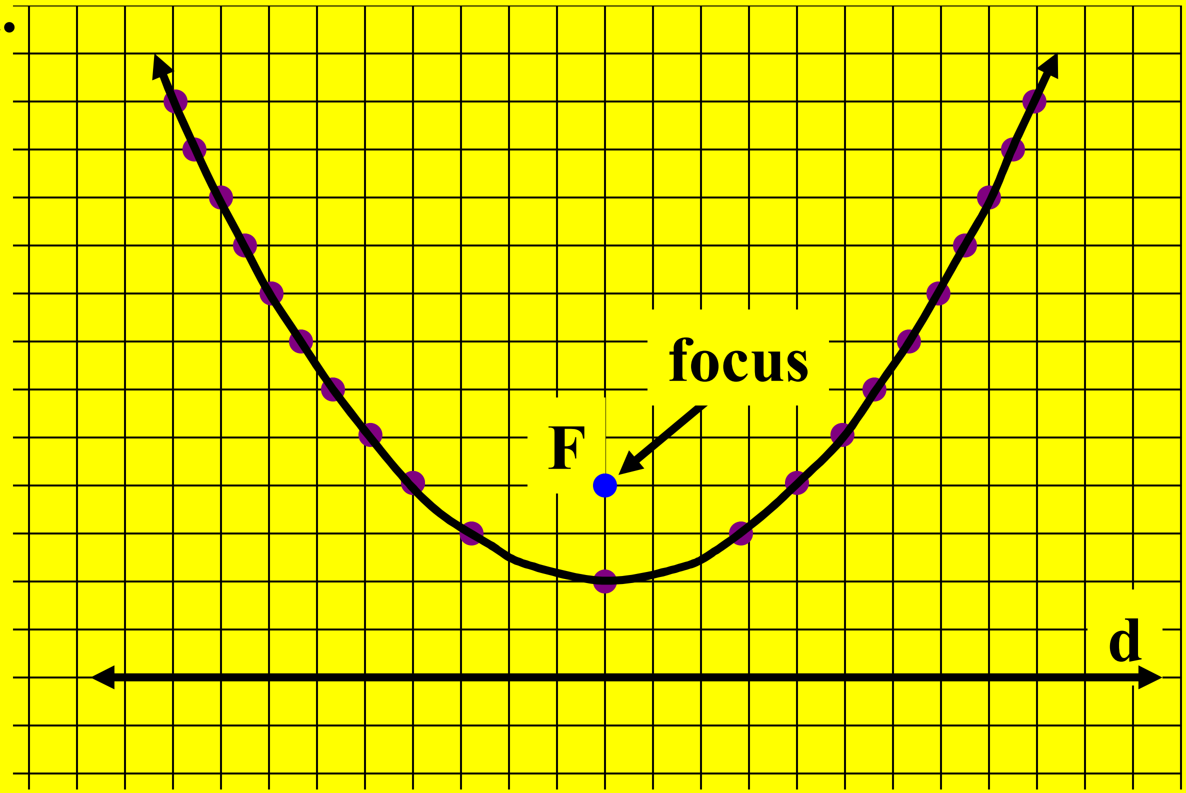


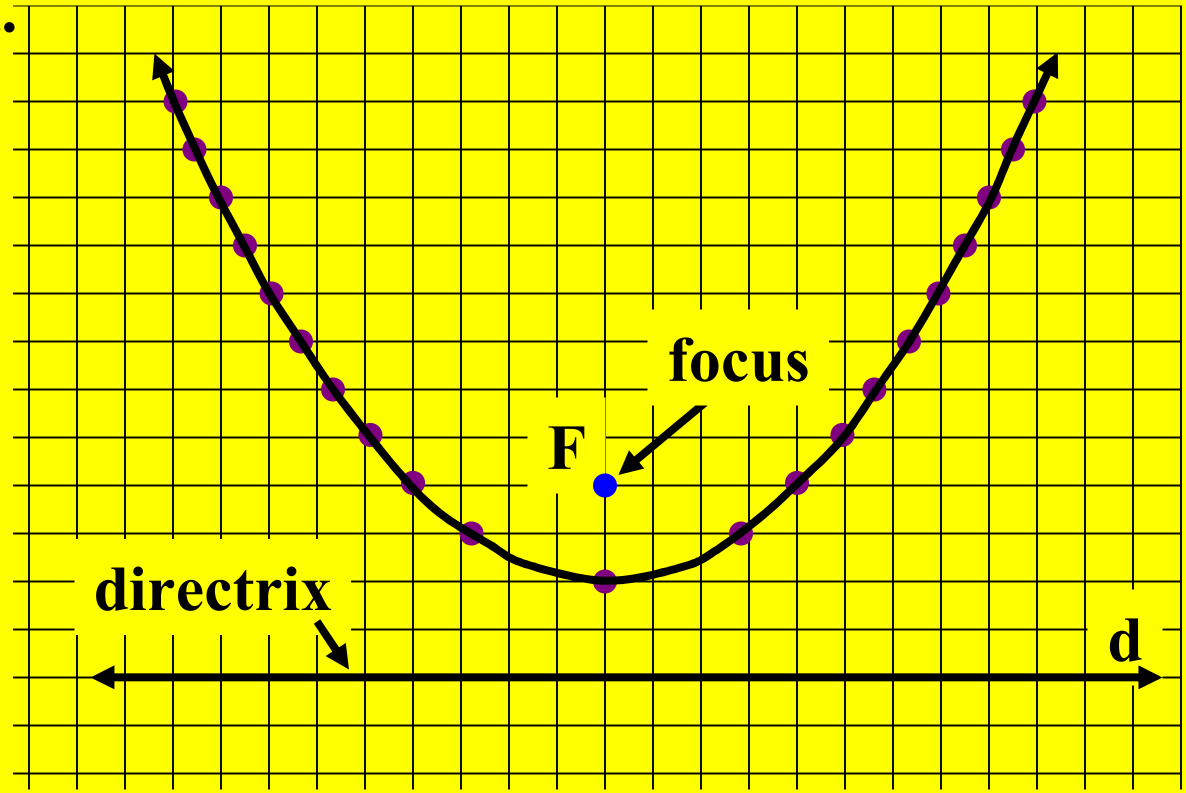
This shape is called a <u>parabola</u>.

We are given a line, d, and a point, F, not on that line. We want to consider the set of all points in the plane which are equidistant from point F and line d.



This shape is called a <u>parabola</u>. Point F is the focus of the parabola.

We are given a line, d, and a point, F, not on that line. We want to consider the set of all points in the plane which are equidistant from point F and line d.



This shape is called a <u>parabola</u>. Point F is the focus of the parabola. Line d is the directrix of the parabola.

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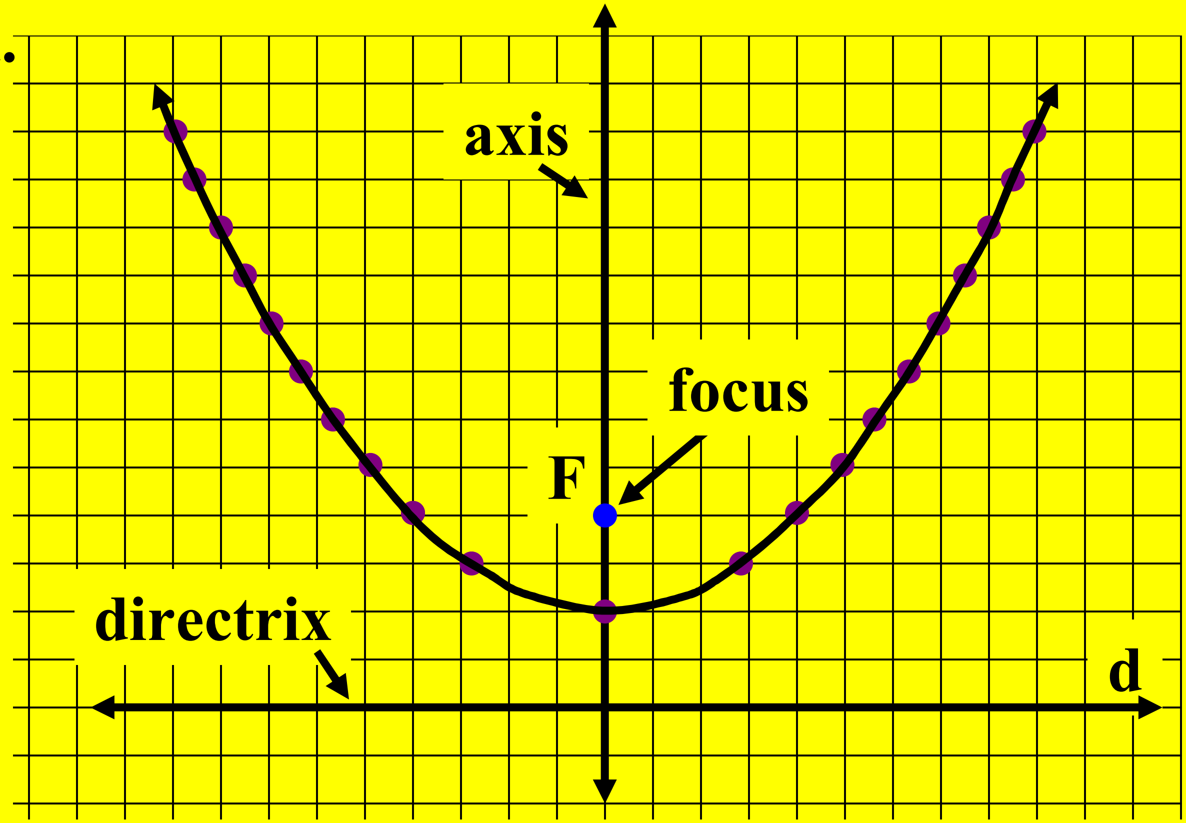

This shape is called a <u>parabola</u>. Point F is the focus of the parabola. Line d is the directrix of the parabola. The vertical line through the focus is the axis of the parabola.

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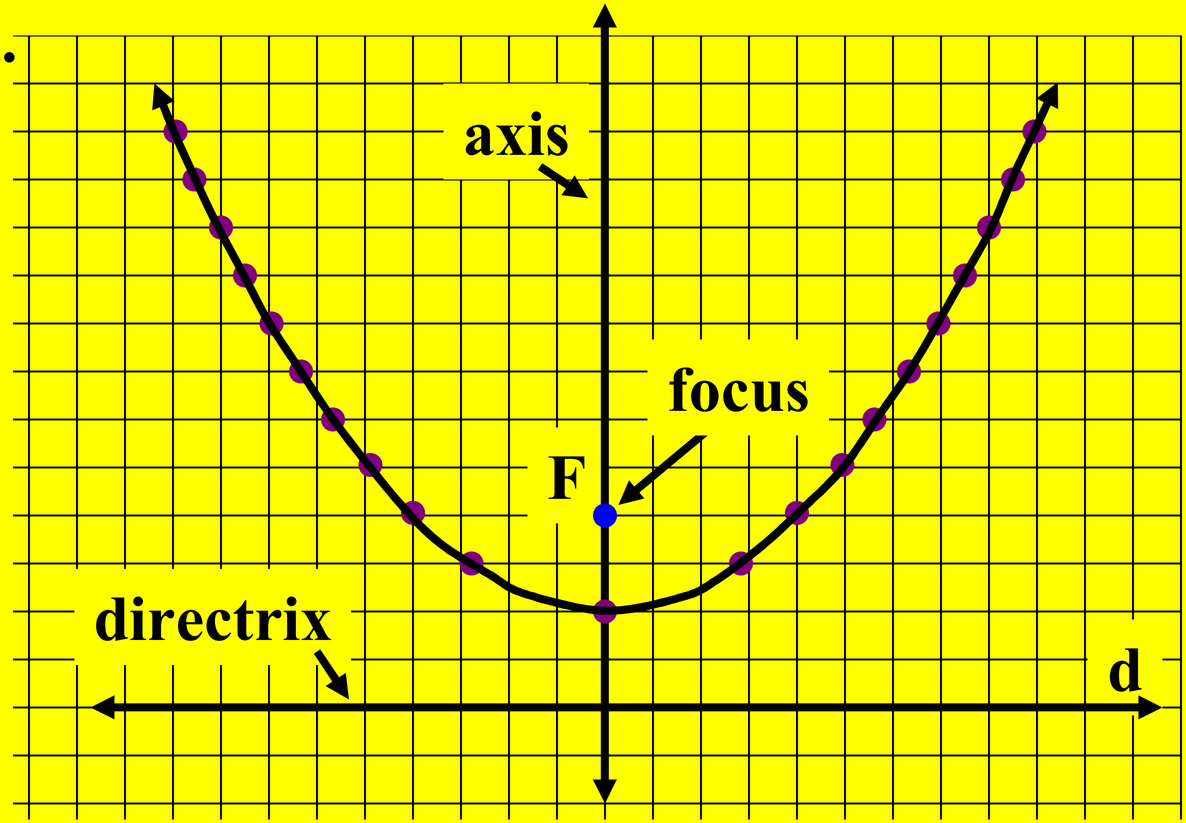

This shape is called a <u>parabola</u>. Point F is the focus of the parabola. Line d is the directrix of the parabola. The vertical line through the focus is the axis of the parabola. It is the axis of symmetry.

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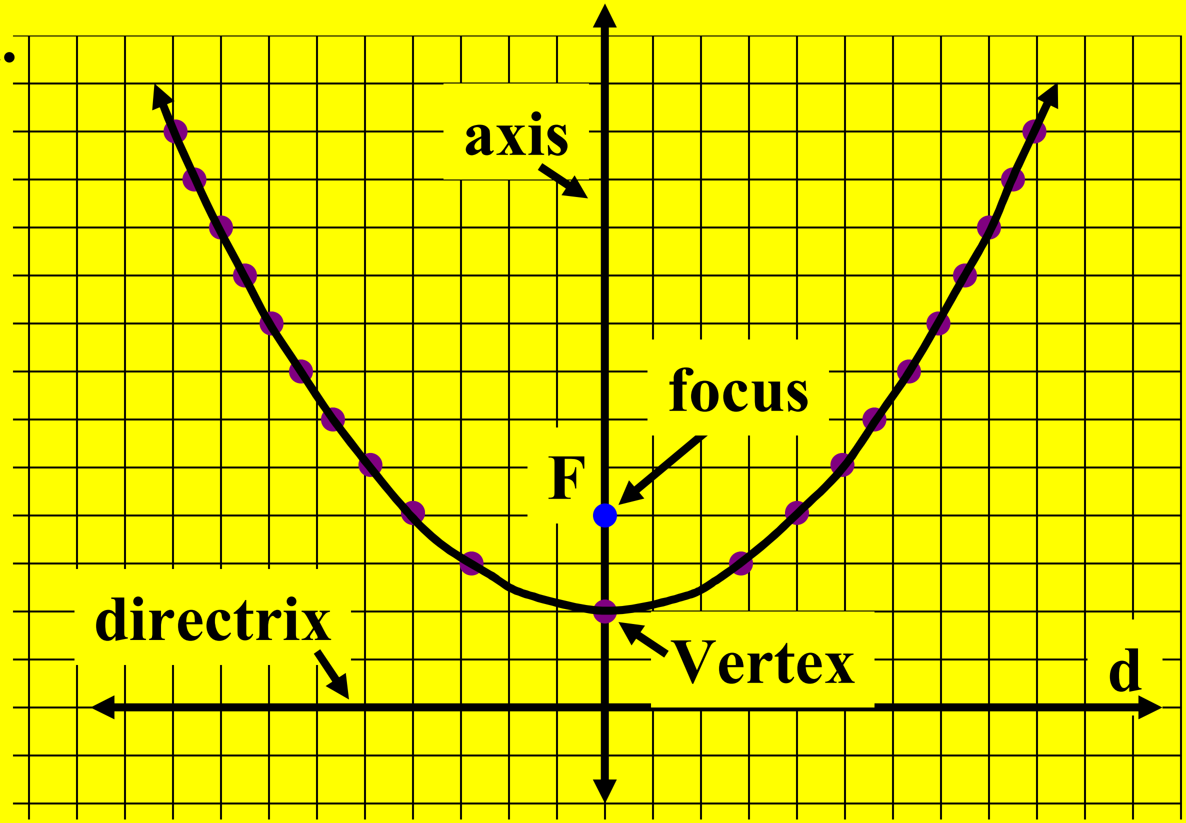

This shape is called a <u>parabola</u>. Point F is the focus of the parabola. Line d is the directrix of the parabola. The vertical line through the focus is the axis of the parabola. It is the axis of symmetry. The point where the axis intersects the parabola is the vertex

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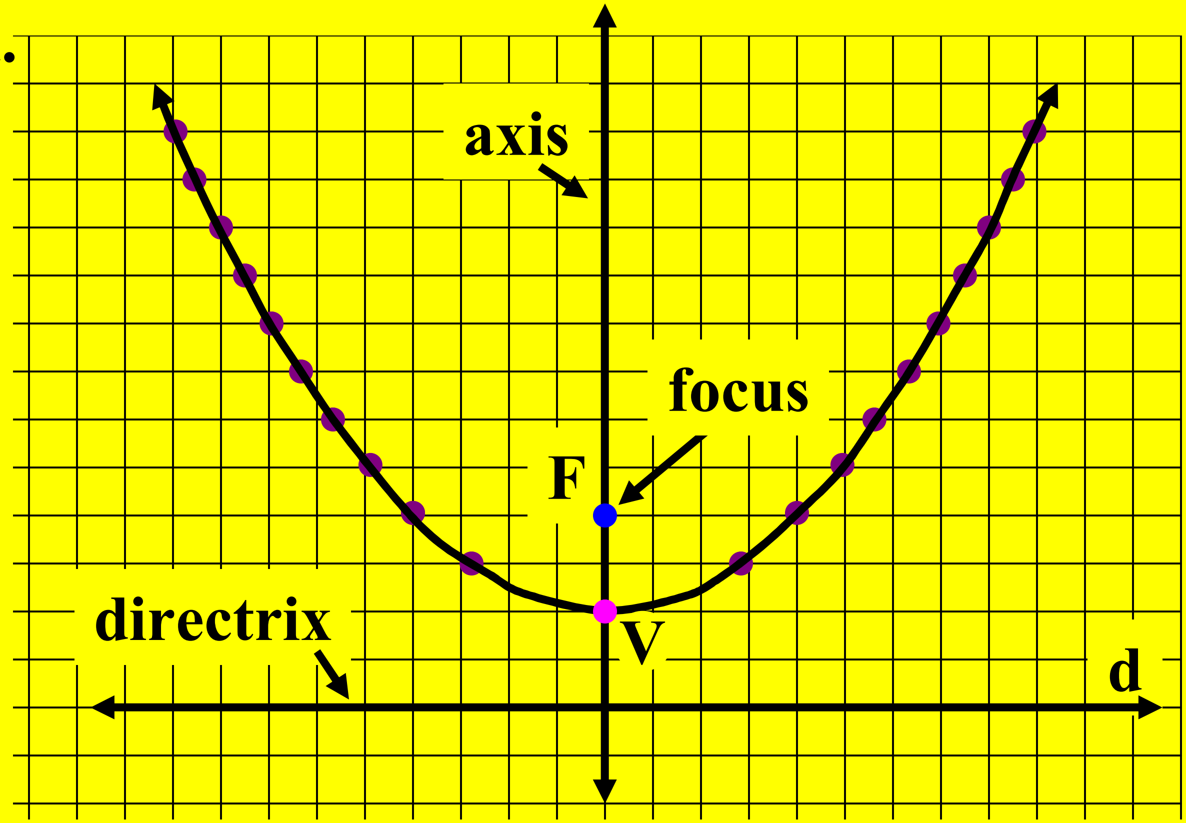

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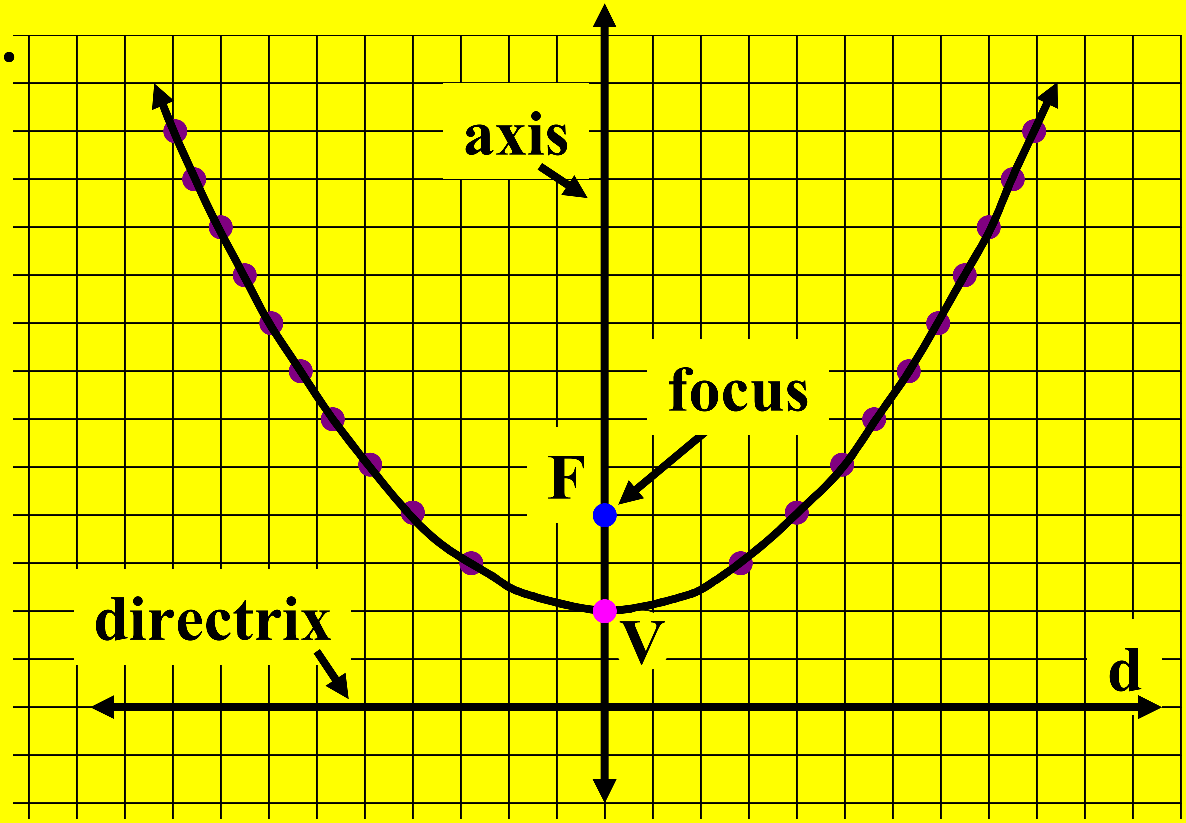
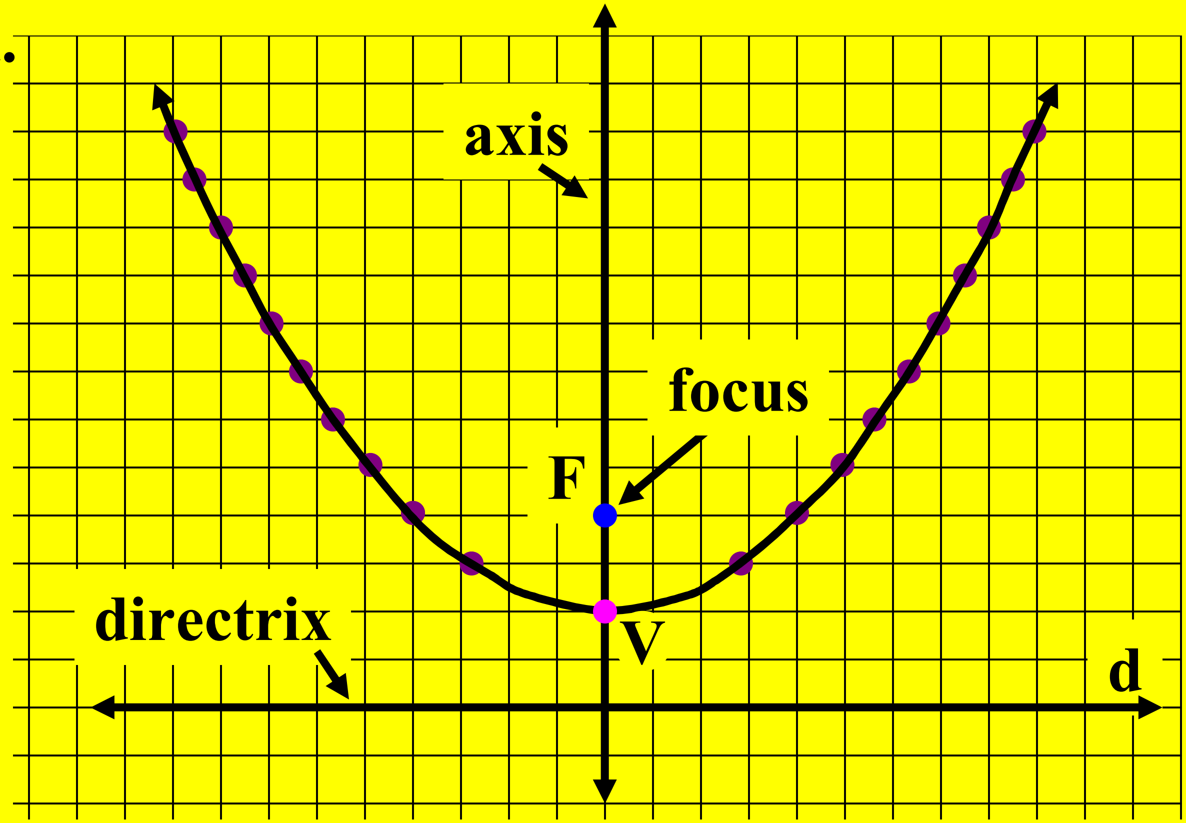


This shape is called a parabola. Point F is the focus of the parabola. Line d is the directrix of the parabola. The vertical line through the focus is the axis of the parabola. It is the axis of symmetry. The point where the axis intersects the parabola is the vertex, point V, of the parabola.

We are given a line, d, and a point, F, not on that line. We want to consider the set of all points in the plane which are equidistant from point F and line d.

Next, we will add the coordinate axes to the diagram



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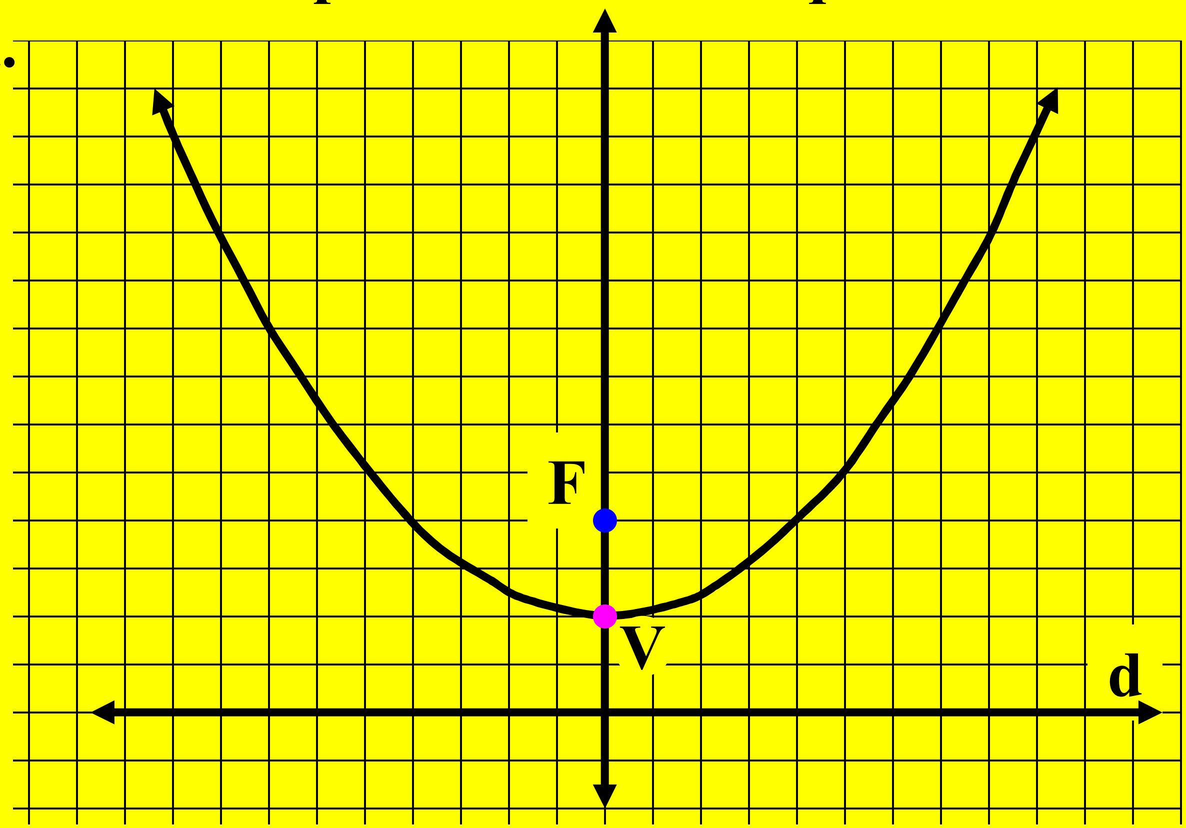

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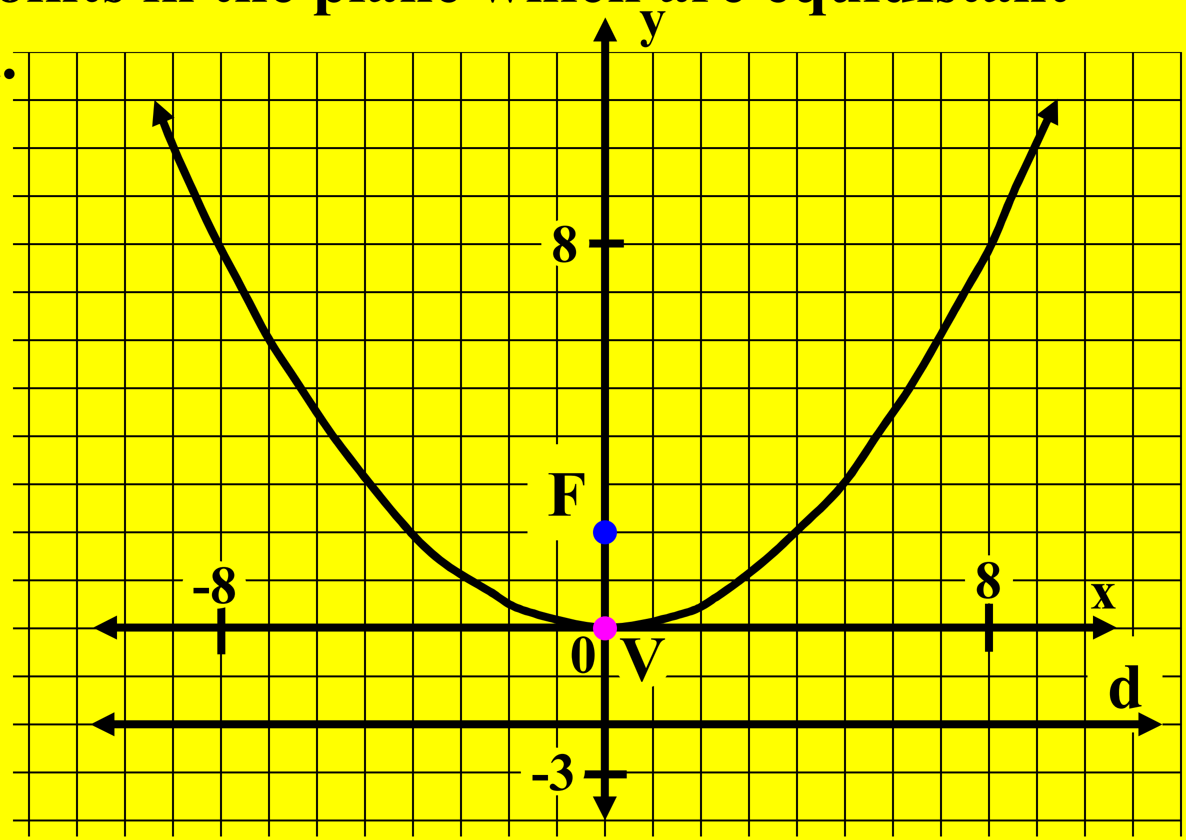
Next, we will add the coordinate axes to the diagram



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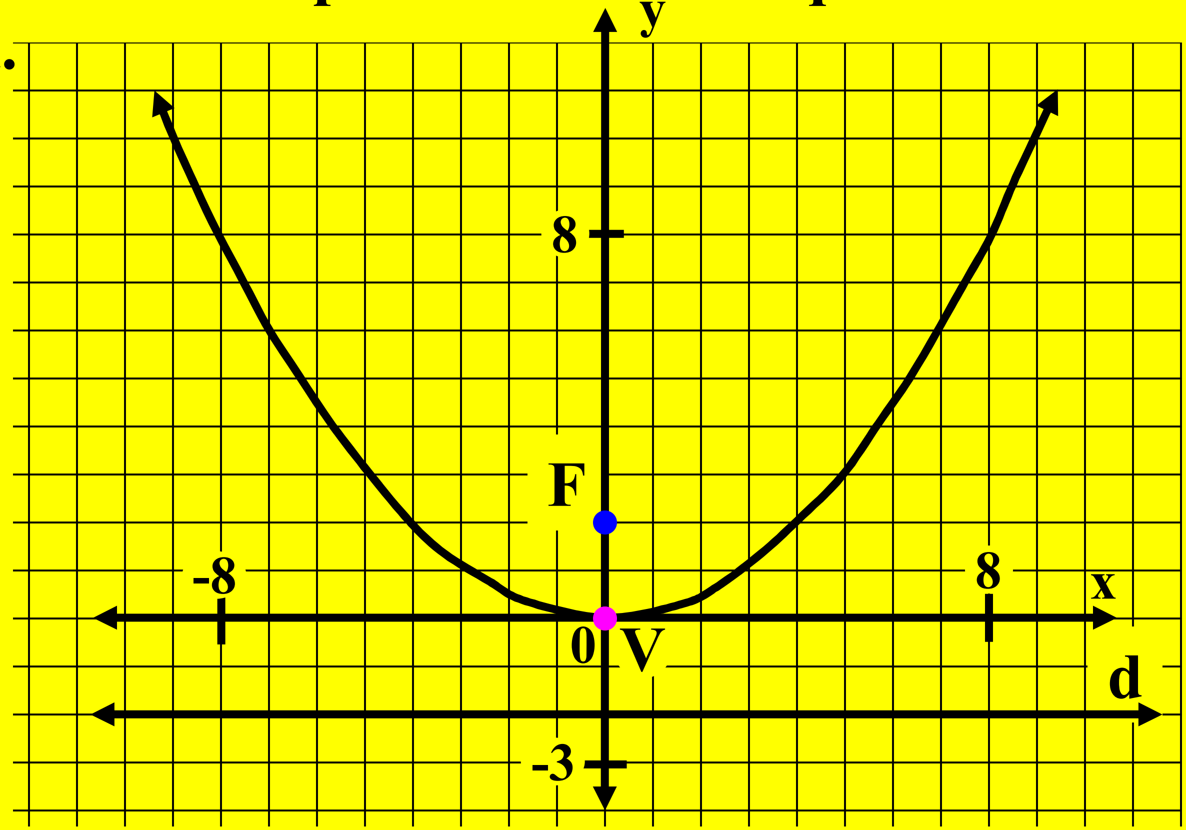
We are given a line, d, and a point, F, not on that line. We want to consider the set of all points in the plane which are equidistant from point F and line d.

Next, we will add the coordinate axes to the diagram and derive the equations of the parabola.



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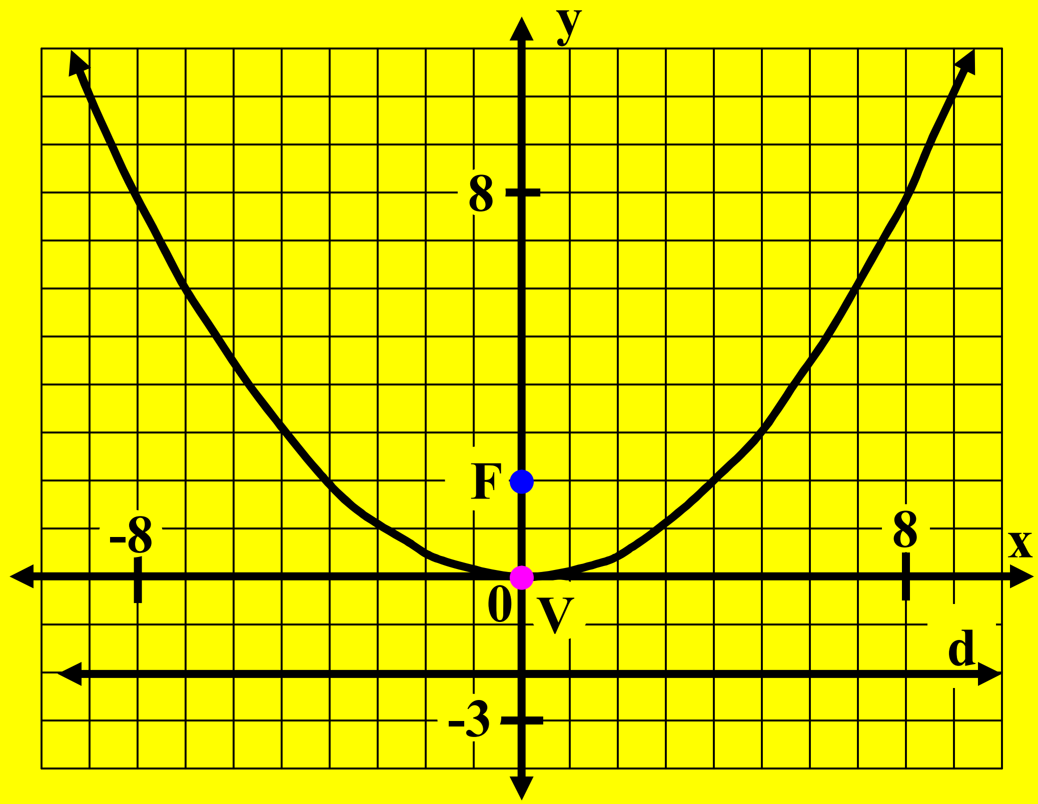
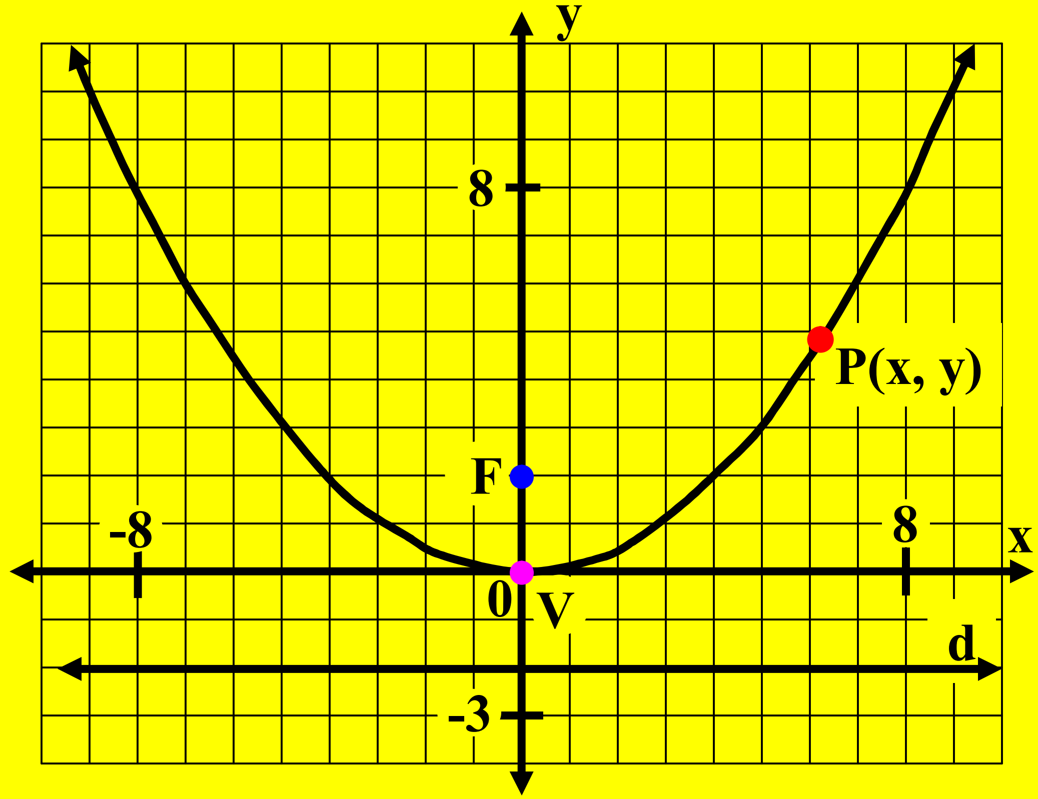
The Equations of a Parabola.



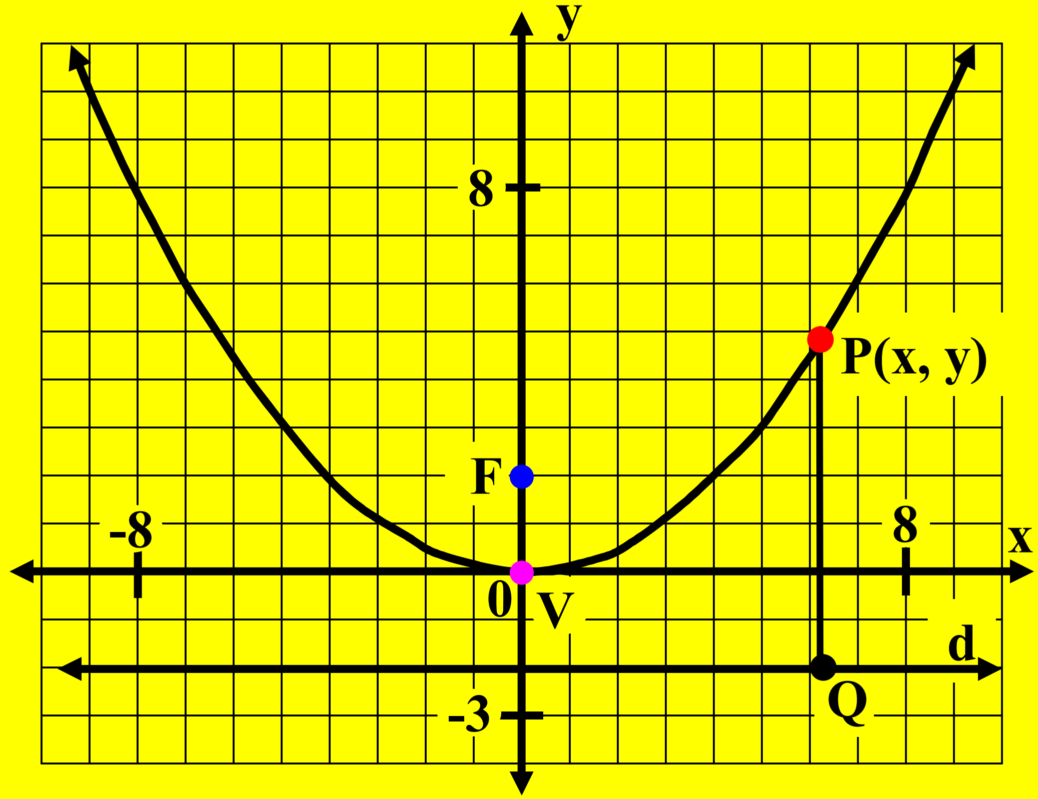
The Equations of a Parabola.

Let point P(x, y) represent any point on this parabola.



The Equations of a Parabola.

Let point P(x, y) represent any point on this parabola. Let point Q be the <u>perpendicular projection</u> of point P onto line d.



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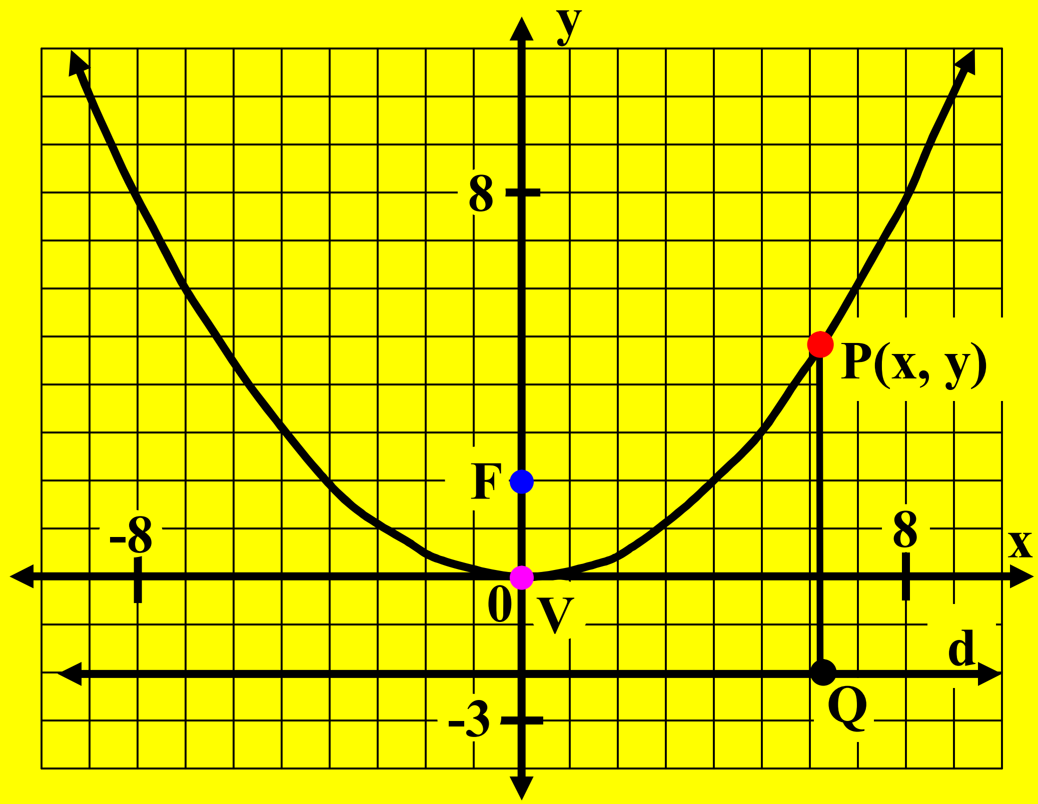
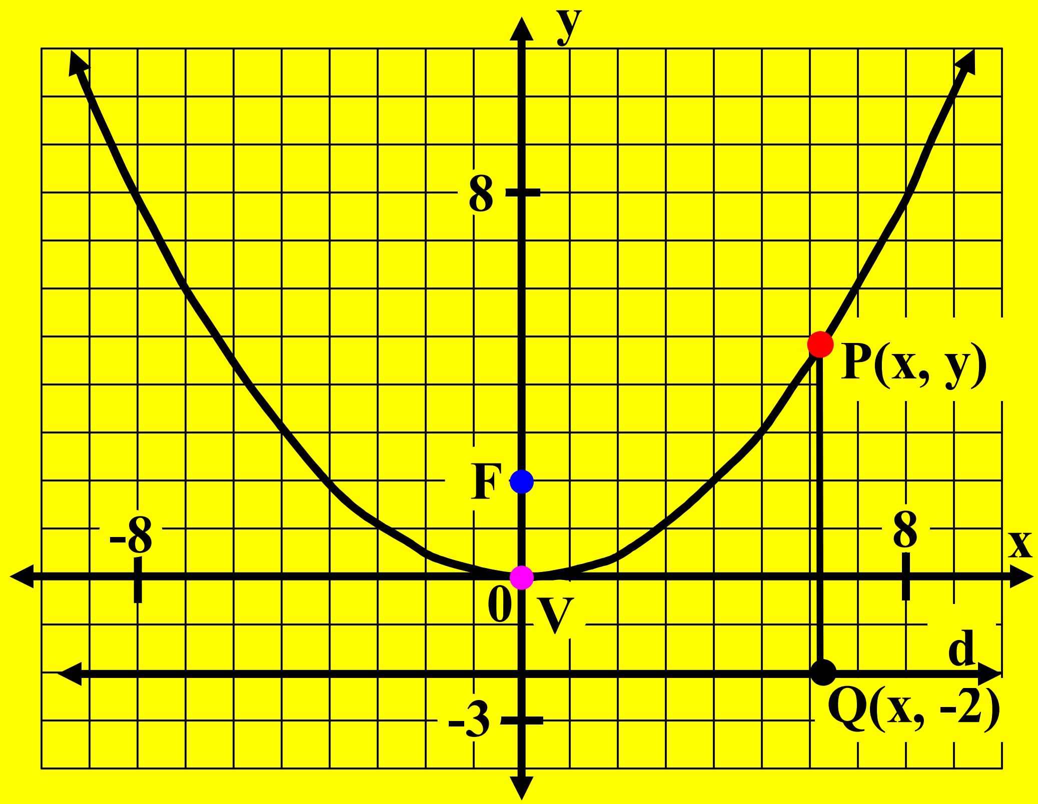


The Equations of a Parabola.

Let point P(x, y) represent any point on this parabola. Let point Q be the <u>perpendicular projection</u> of point P onto line d. Since the equation of line d is y = -2, the coordinates of point Q are (x, -2).



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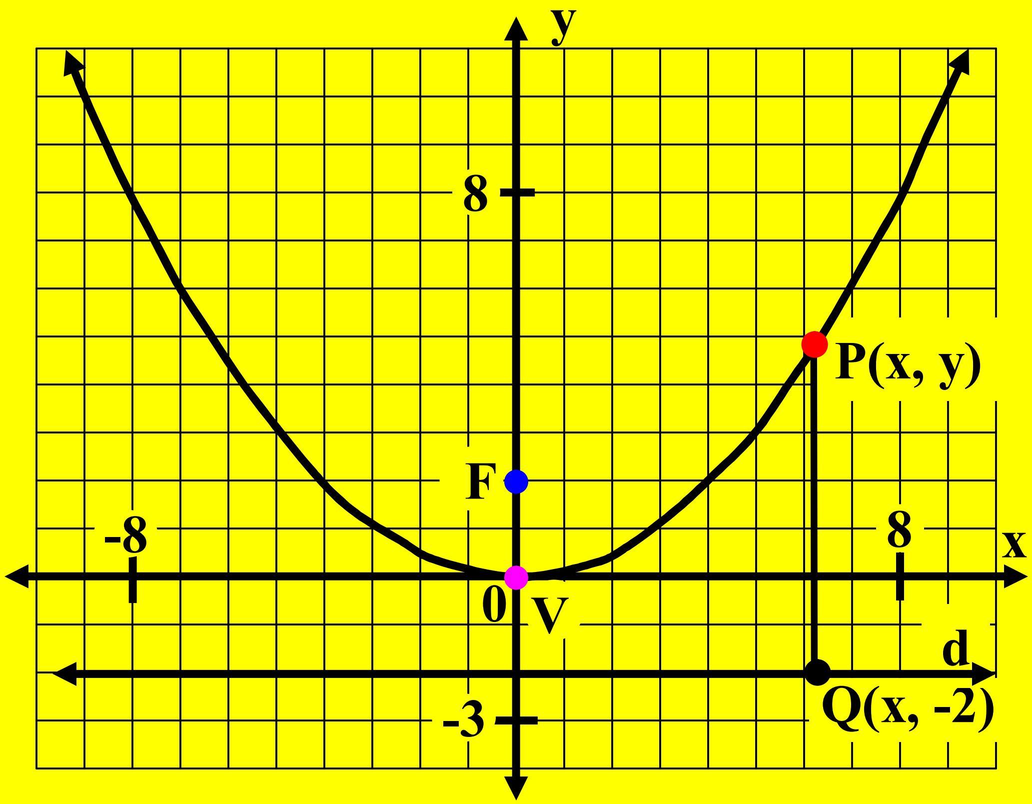

Since points P and Q are on a vertical line, they have the same x-coordinate.

The Equations of a Parabola.

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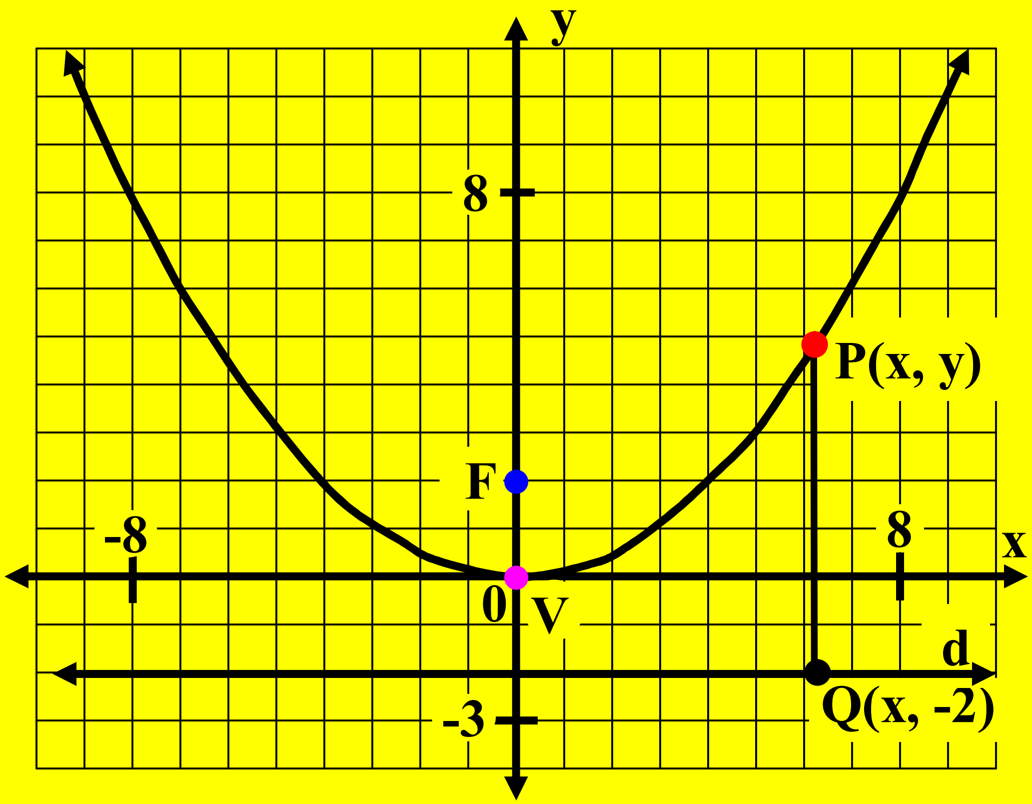
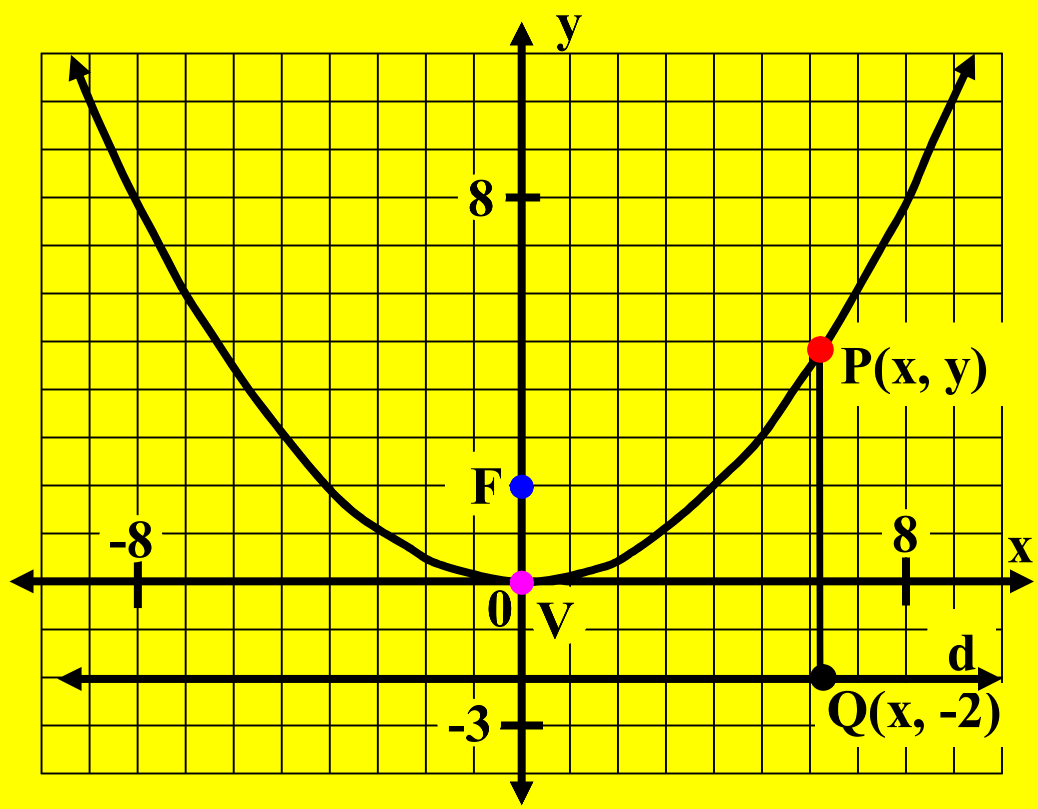


Since points P and Q are on a vertical line, they have the same x-coordinate.

Since point Q is on the directrix, its y coordinate is -2.

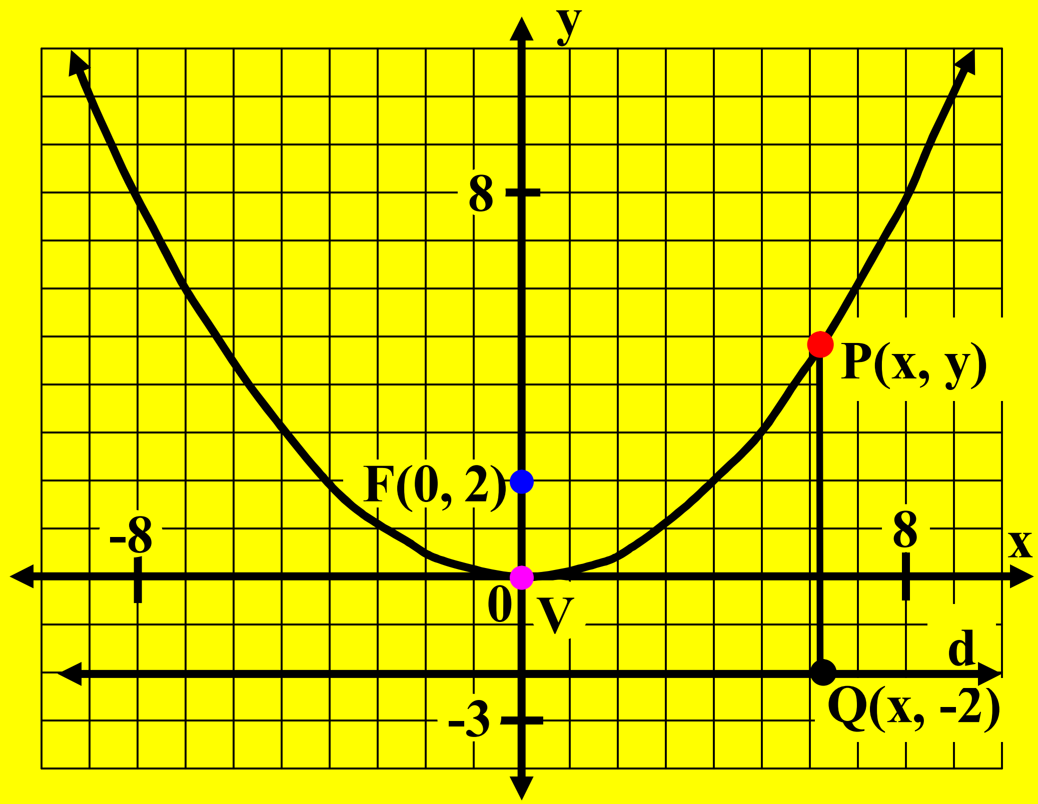
The Equations of a Parabola.

Let point P(x, y) represent any point on this parabola. Let point Q be the <u>perpendicular projection</u> of point P onto line d. Since the equation of line d is y = -2, the coordinates of point Q are (x, -2).



The Equations of a Parabola.

Let point P(x, y) represent any point on this parabola. Let point Q be the <u>perpendicular projection</u> of point P onto line d. Since the equation of line d is y = -2, the coordinates of point Q are (x, -2). The coordinates point F are (0, 2).



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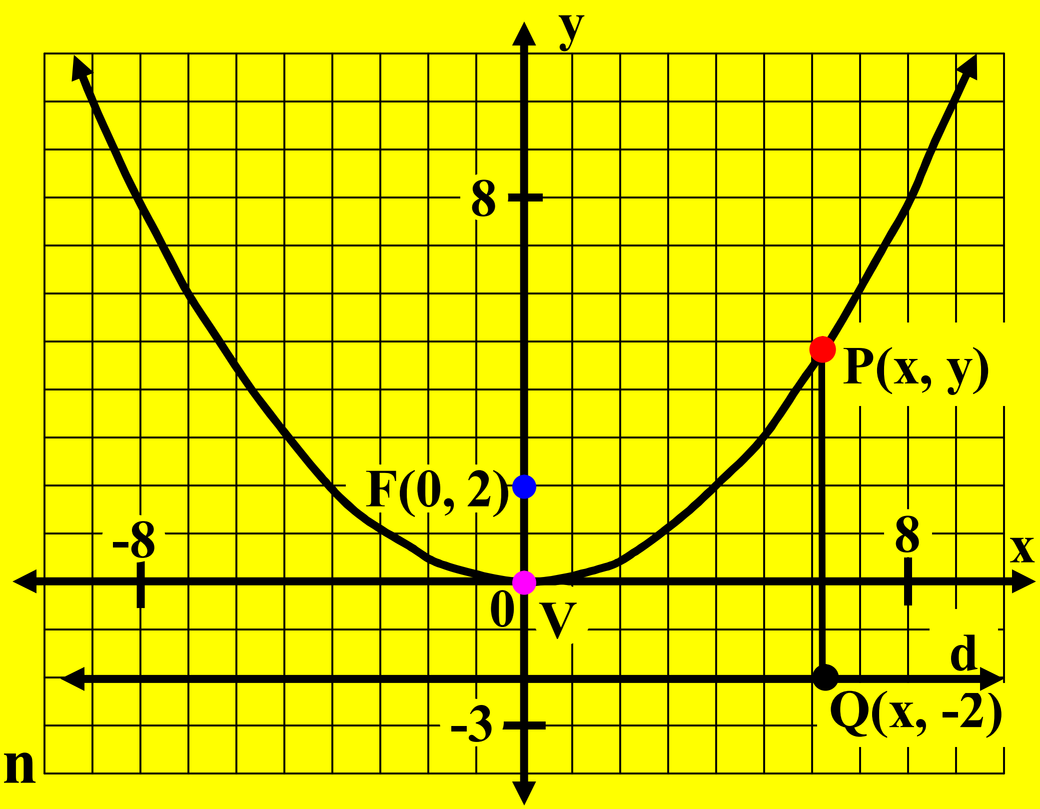

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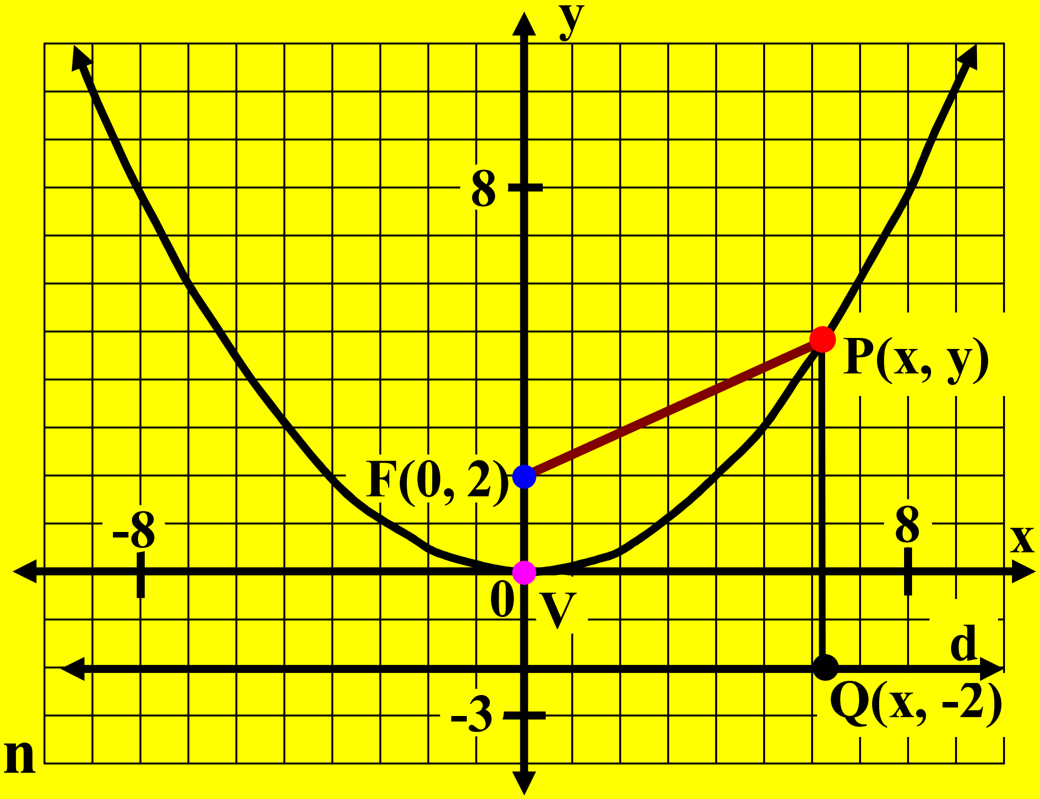

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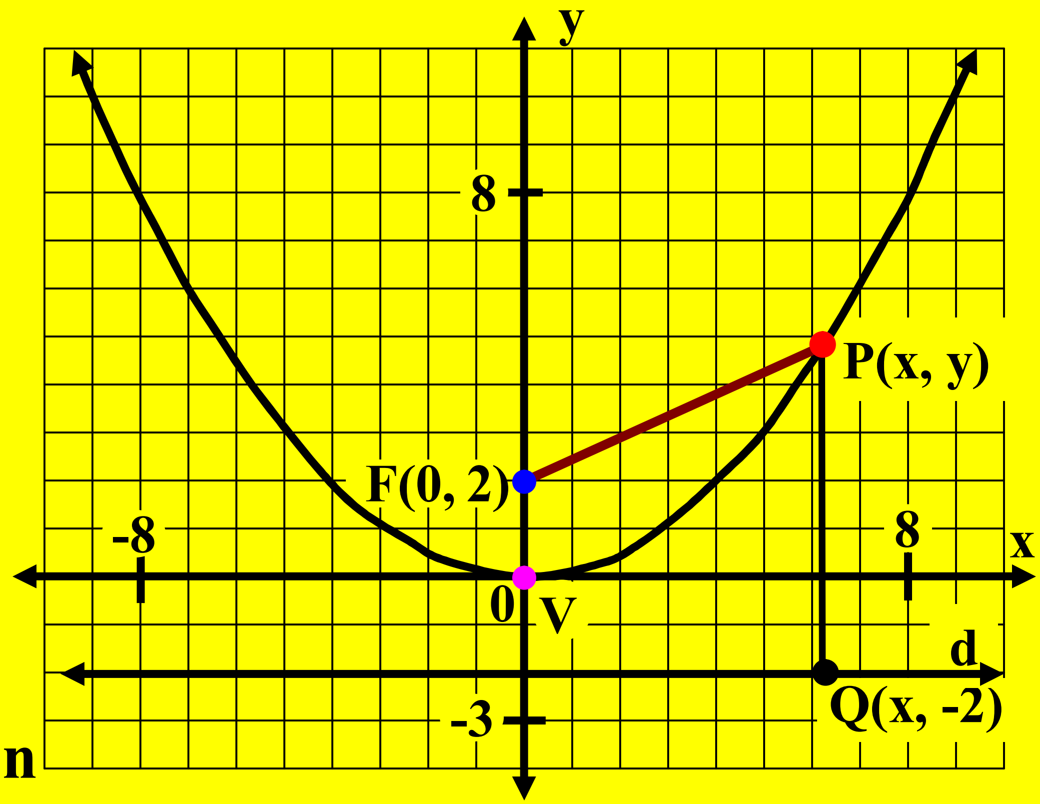

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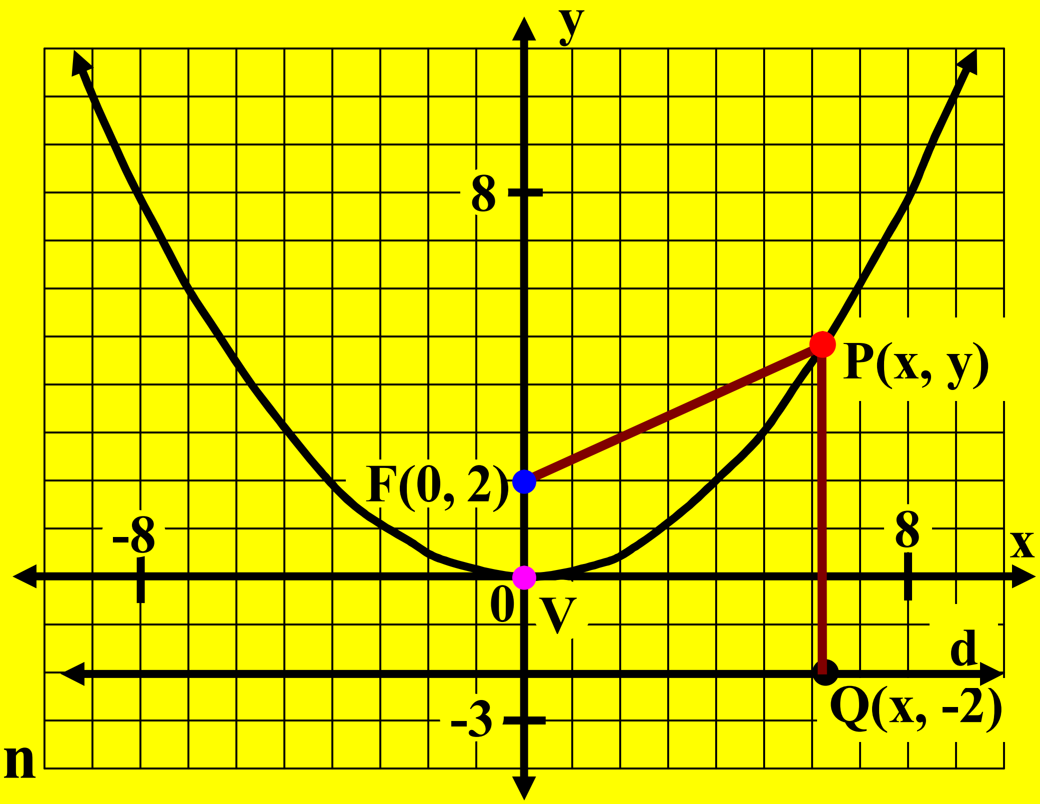

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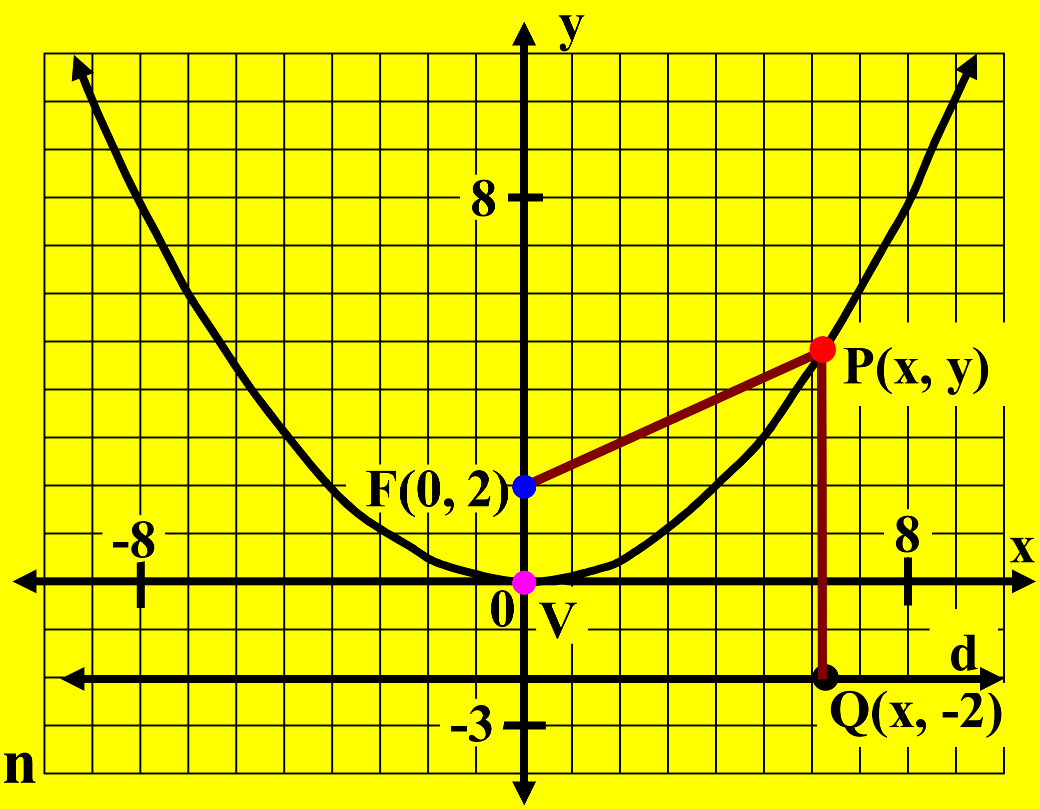
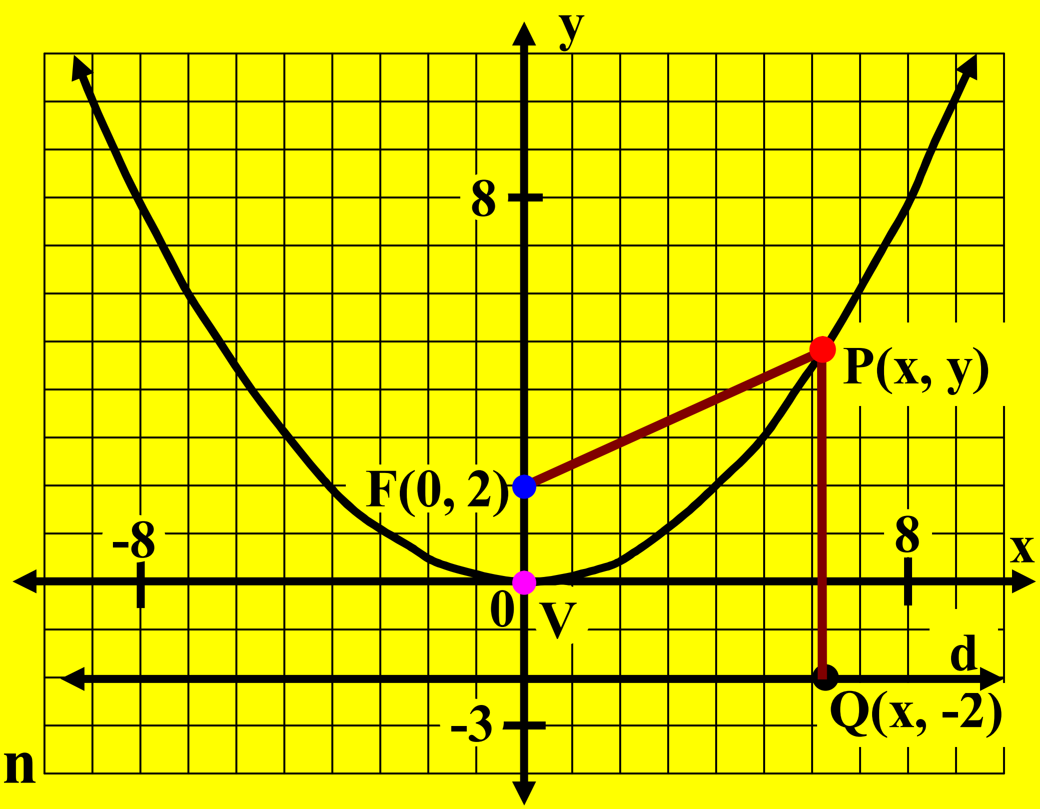


PF =

The Equations of a Parabola.



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$$PF = \sqrt{}$$

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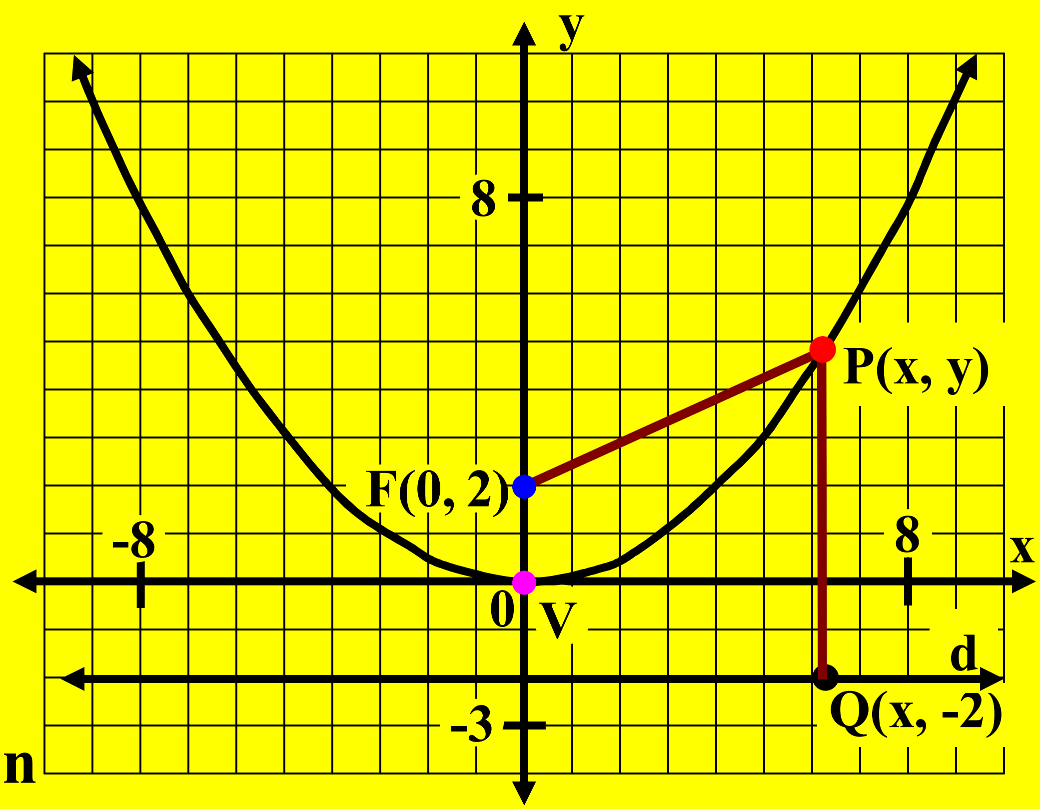
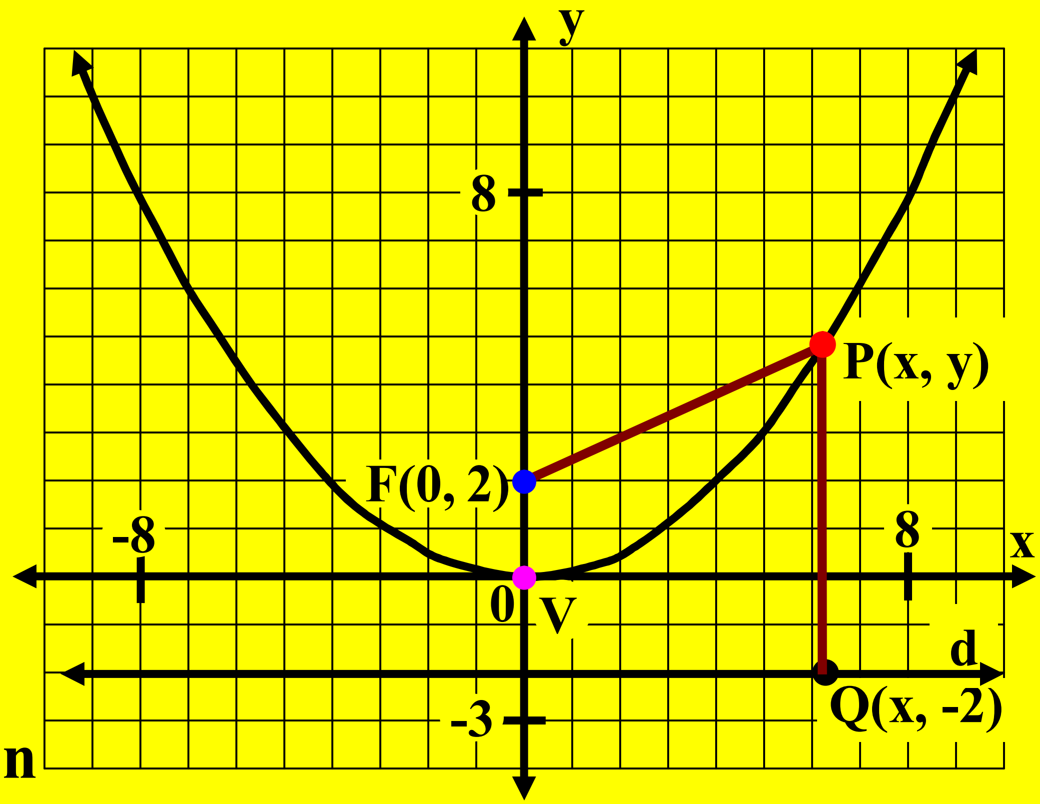


$$PF = \sqrt{(x - 0)^2 \qquad\qquad}$$

The Equations of a Parabola.

Let point P(x, y) represent any point on this parabola. Let point Q be the <u>perpendicular projection</u> of point P onto line d. Since the equation of line d is y = -2, the coordinates of point Q are (x, -2). The coordinates point F are (0, 2). Since any point on the parabola is equidistant from point F and line d, PF = PQ.



$$PF = \sqrt{(x - 0)^2 + \qquad}$$

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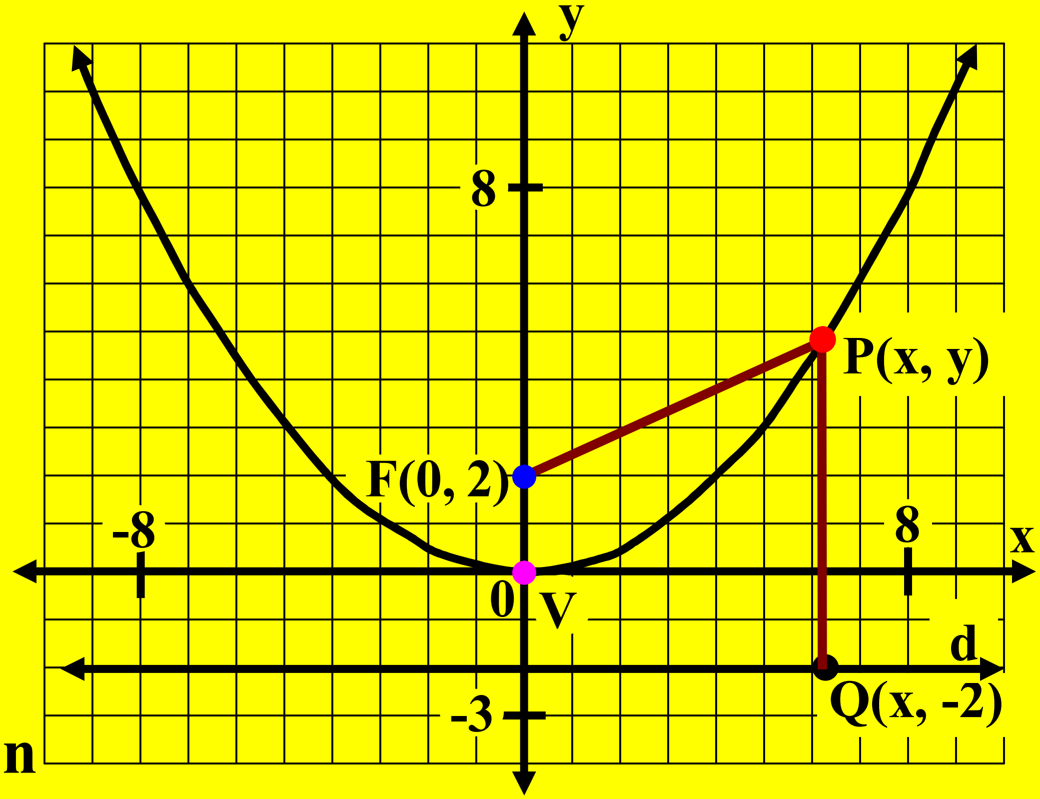

$$PF = \sqrt{(x - 0)^2 + (y - 2)^2}$$

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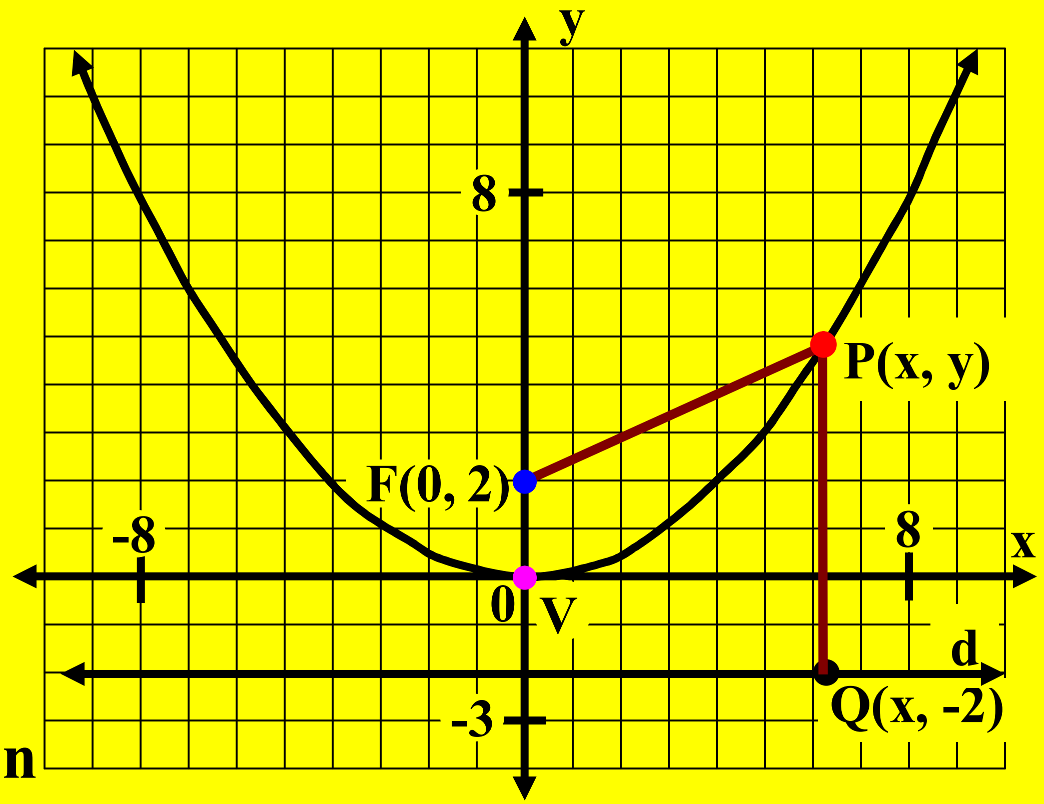
Let point P(x, y) represent any point on this parabola. Let point Q be the <u>perpendicular projection</u> of point P onto line d. Since the equation of line d is y = -2, the coordinates of point Q are (x, -2). The coordinates point F are (0, 2). Since any point on the parabola is equidistant from point F and line d, PF = PQ.



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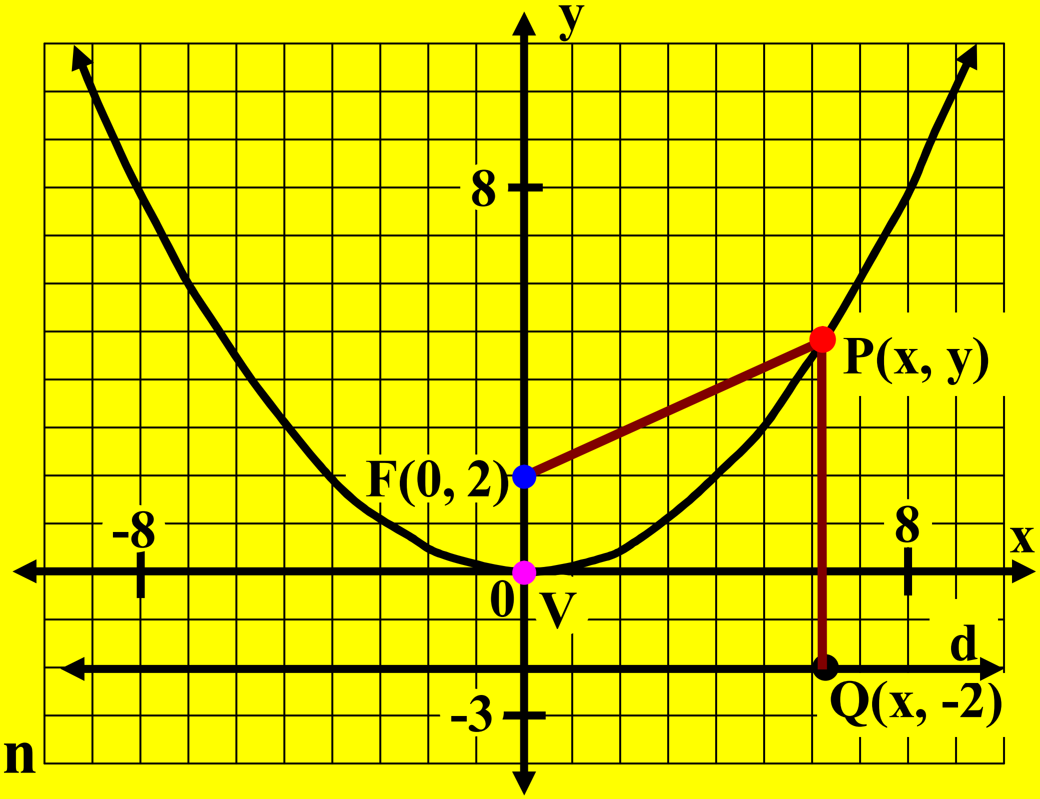
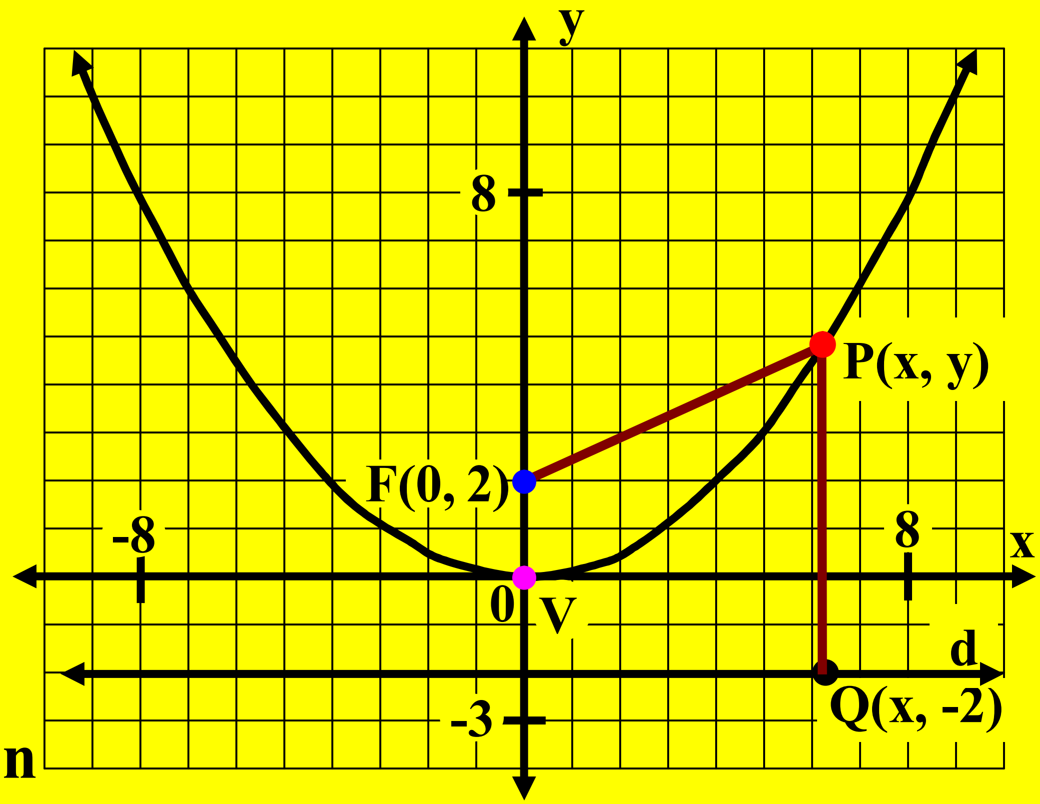


$$PF = \sqrt{(x-0)^2 + (y-2)^2} = \sqrt{}$$

The Equations of a Parabola.



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$$PF = \sqrt{(x - 0)^2 + (y - 2)^2} = \sqrt{x^2 \qquad\qquad}$$

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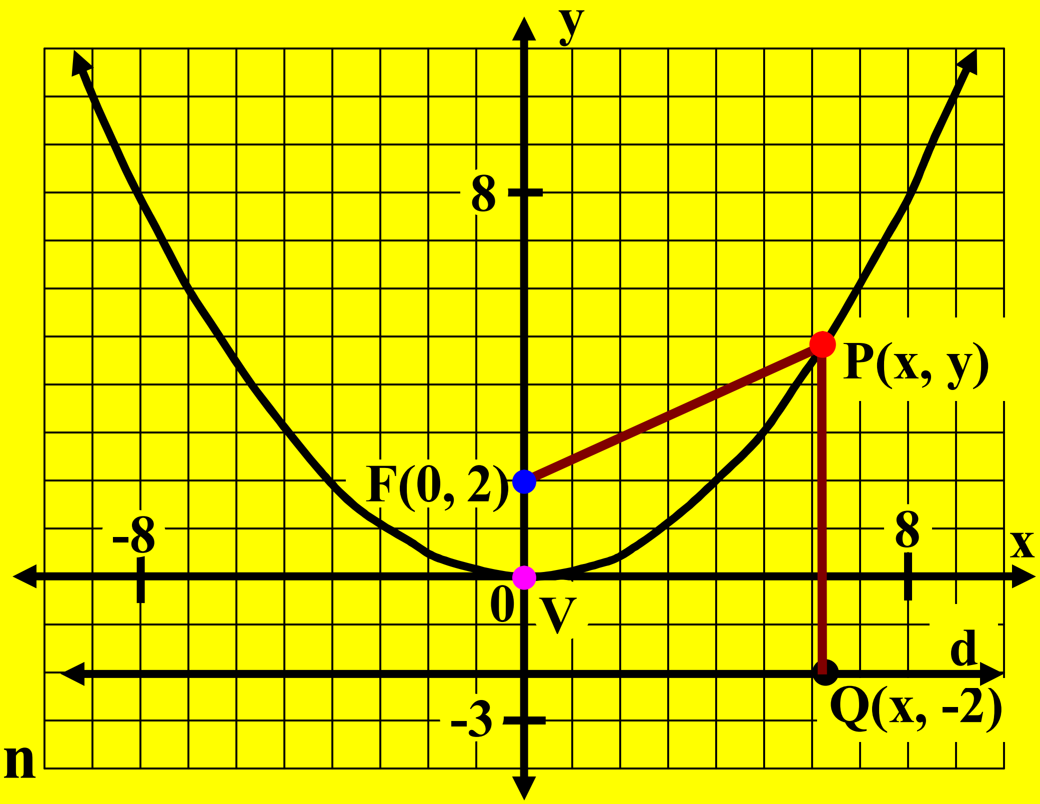

$$PF = \sqrt{(x - 0)^2 + (y - 2)^2} = \sqrt{x^2 + }$$

The Equations of a Parabola.

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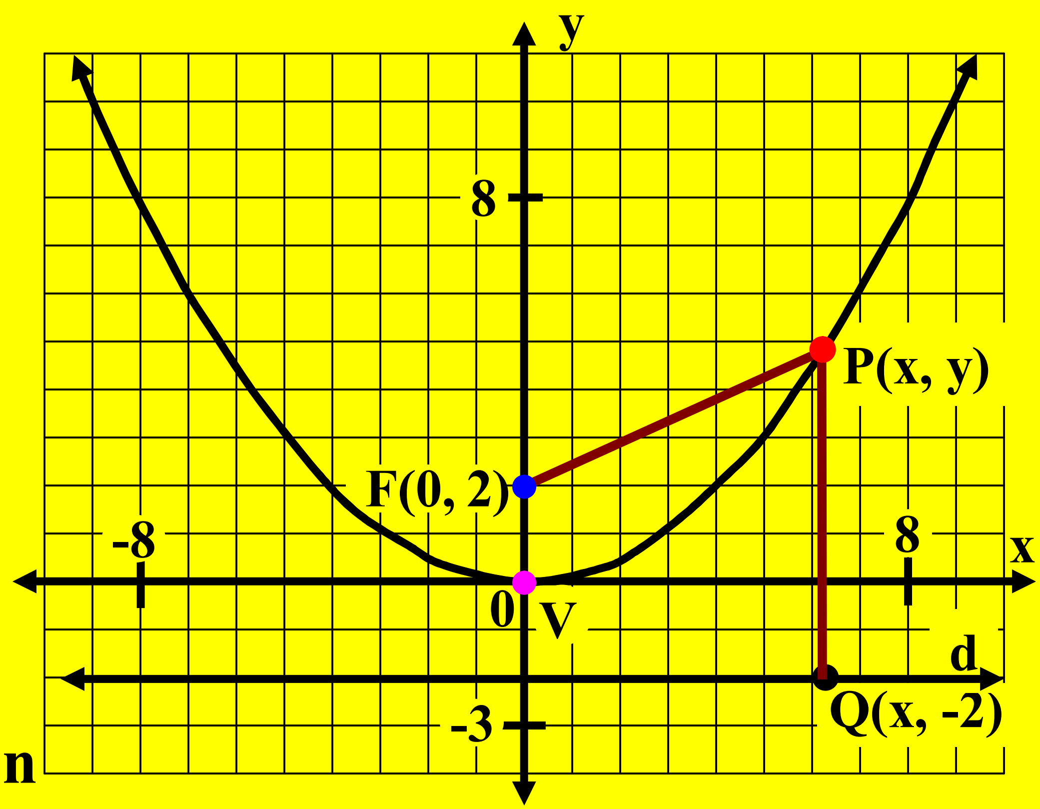
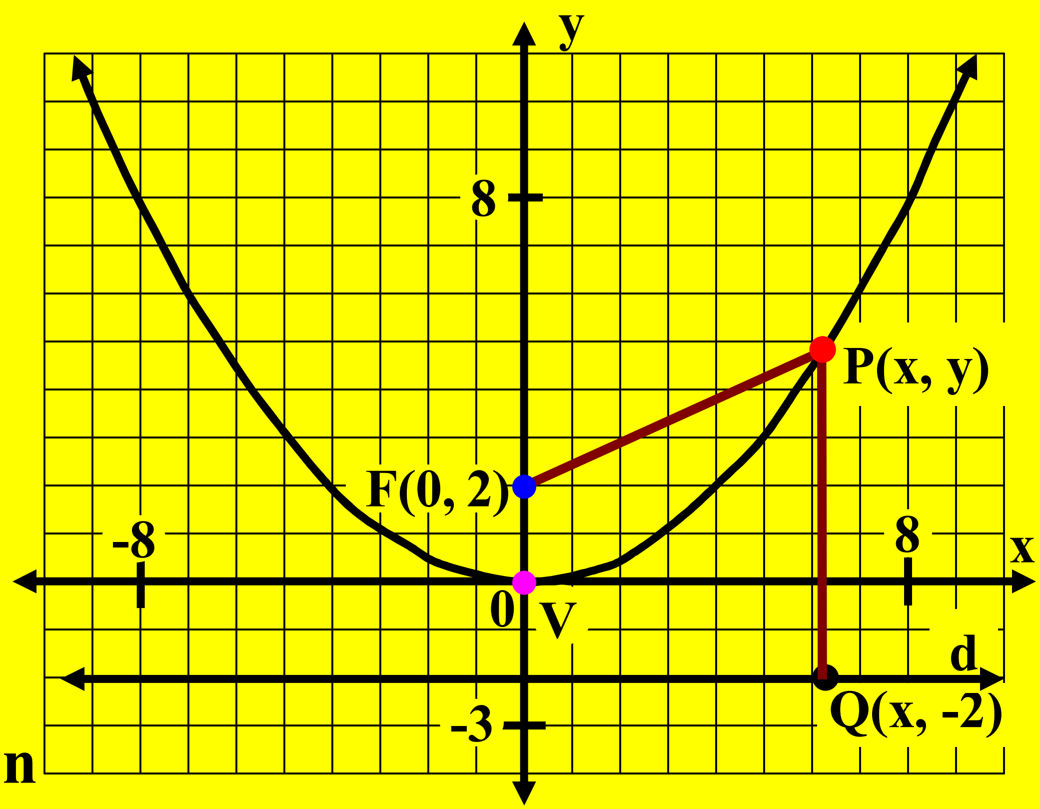


$$PF = \sqrt{(x - 0)^2 + (y - 2)^2} = \sqrt{x^2 + (y - 2)^2}$$

The Equations of a Parabola.



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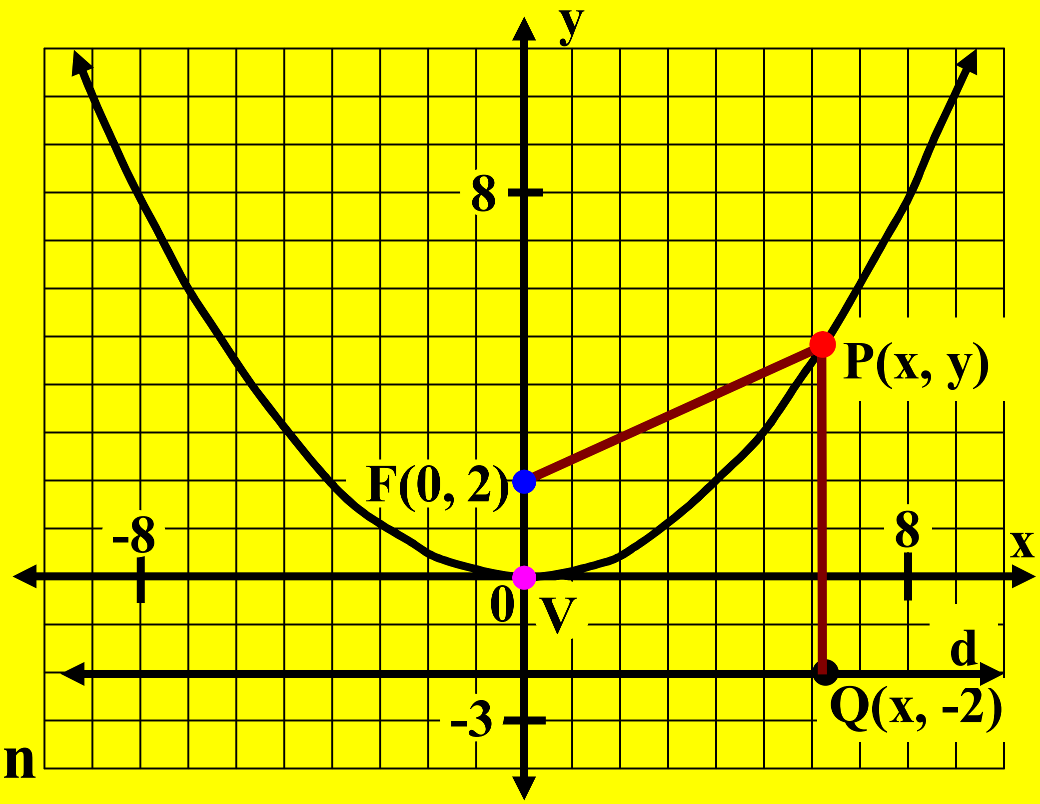
The Equations of a Parabola.



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$$PF = \sqrt{(x-0)^2 + (y-2)^2} = \sqrt{x^2 + (y-2)^2}$$

PQ =

The Equations of a Parabola.

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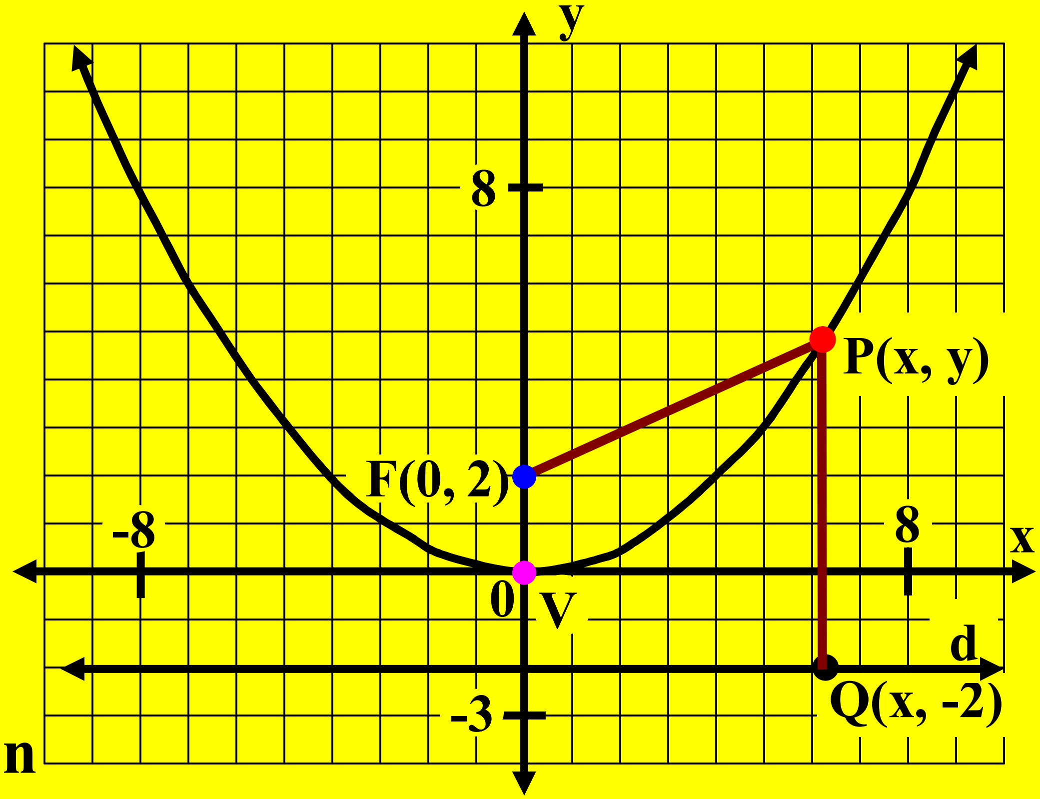
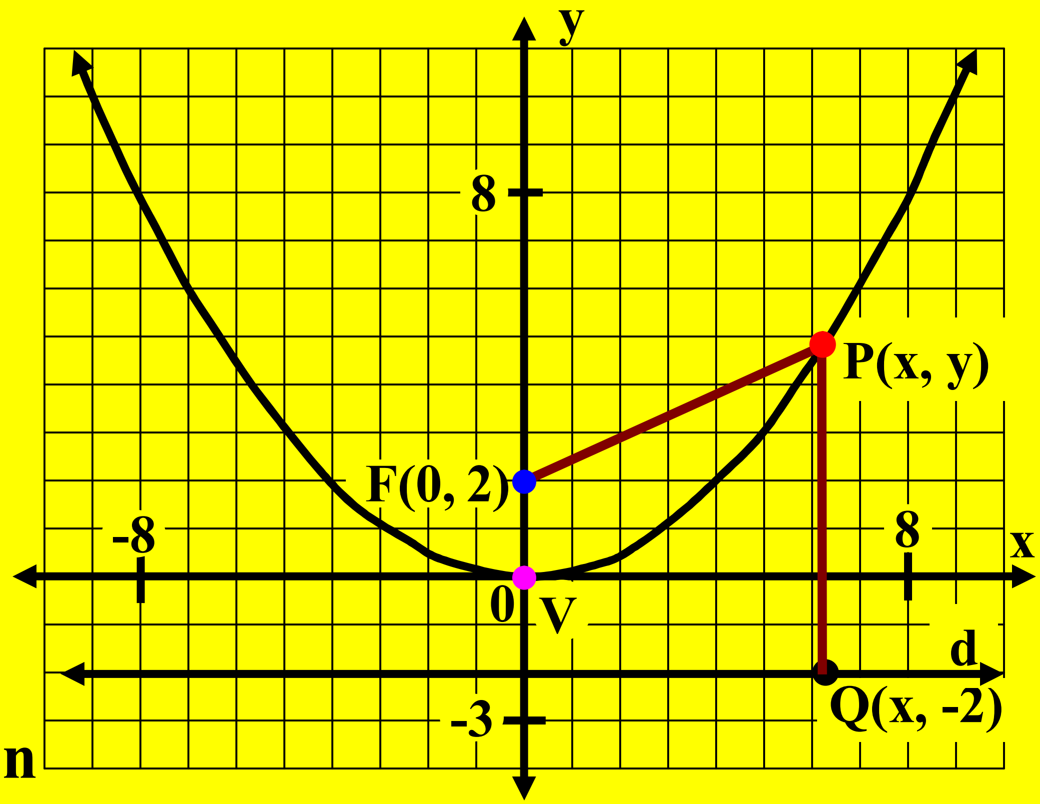


$$PF = \sqrt{(x - 0)^2 + (y - 2)^2} = \sqrt{x^2 + (y - 2)^2}$$

$$PQ = \sqrt{}$$

The Equations of a Parabola.



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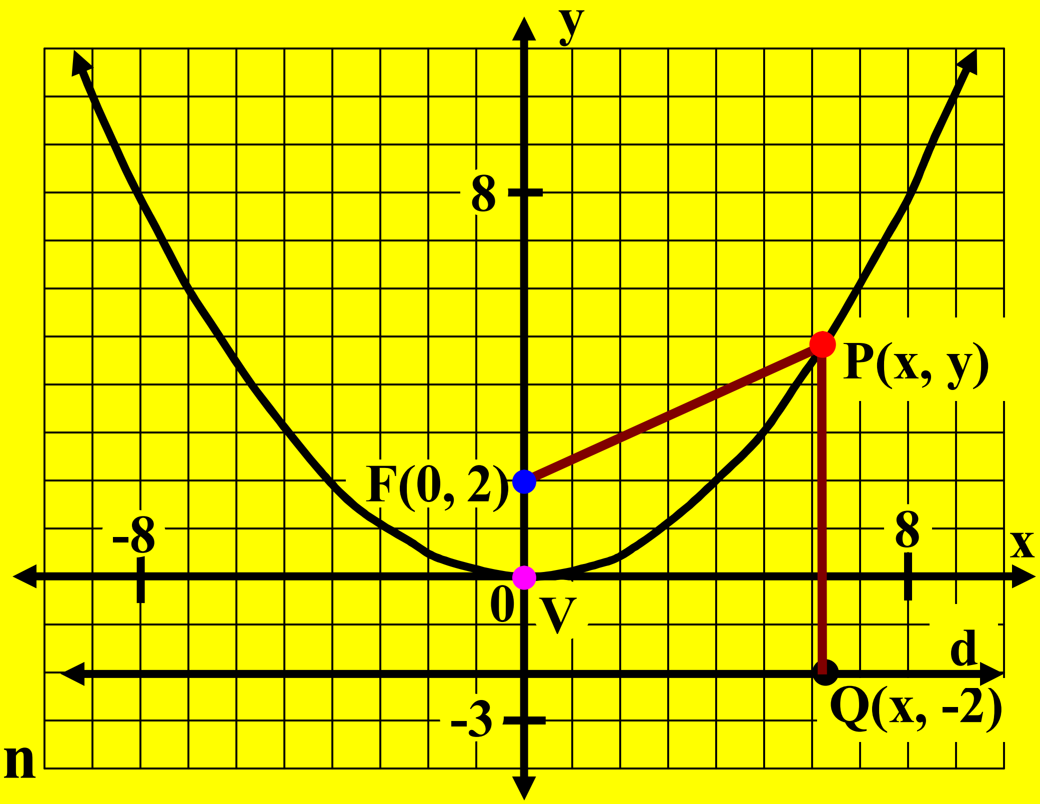
The Equations of a Parabola.



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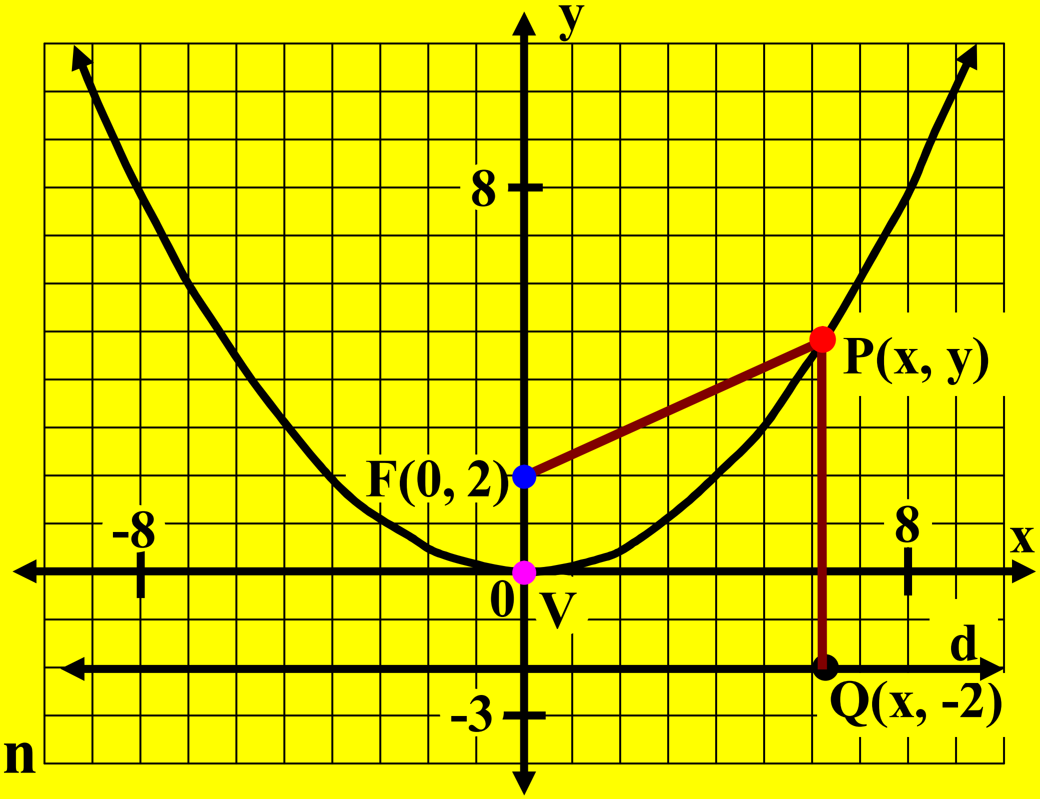

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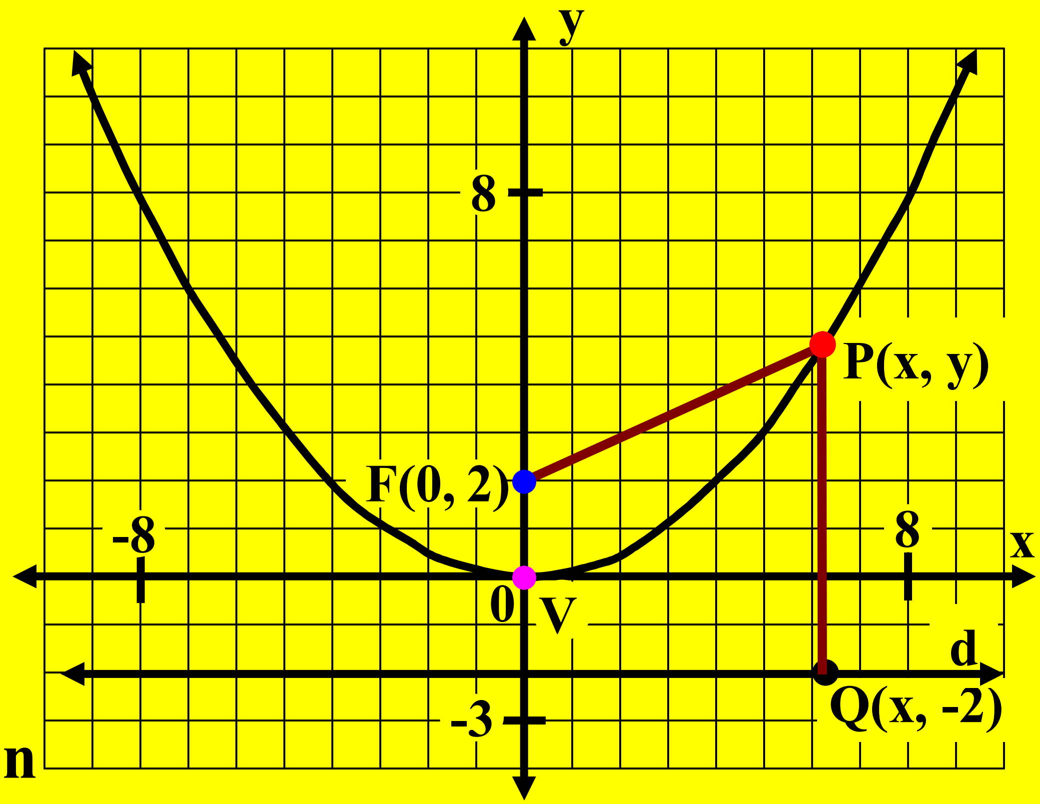
The Equations of a Parabola.



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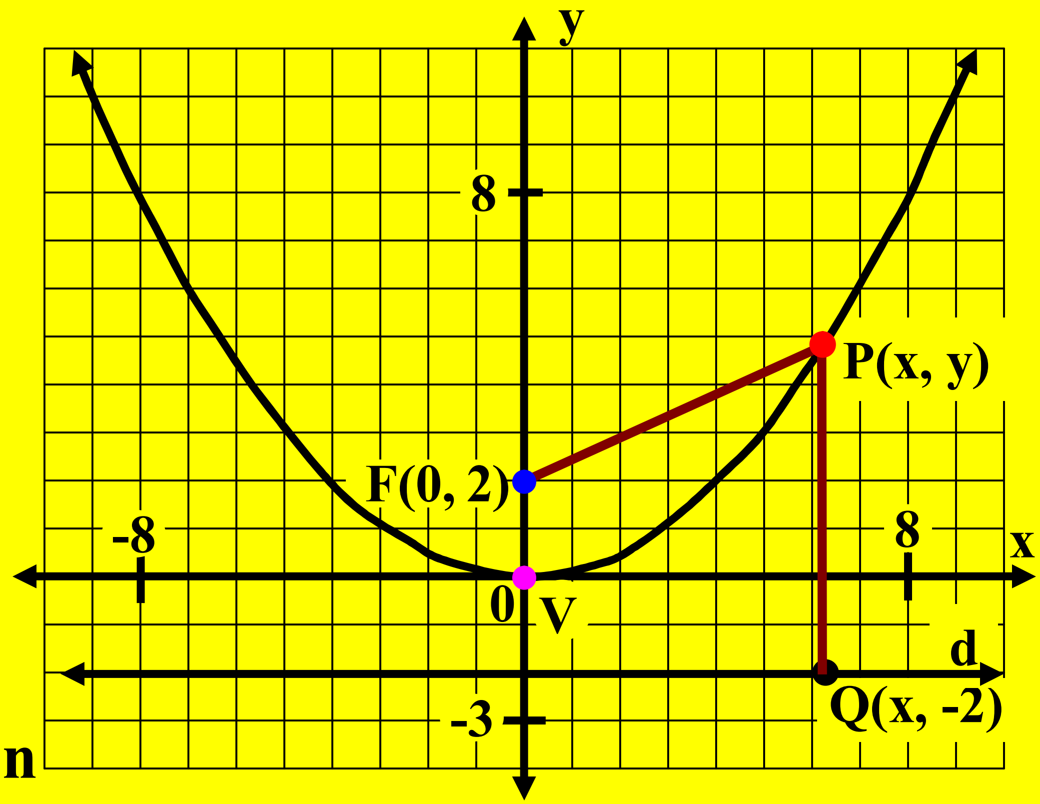

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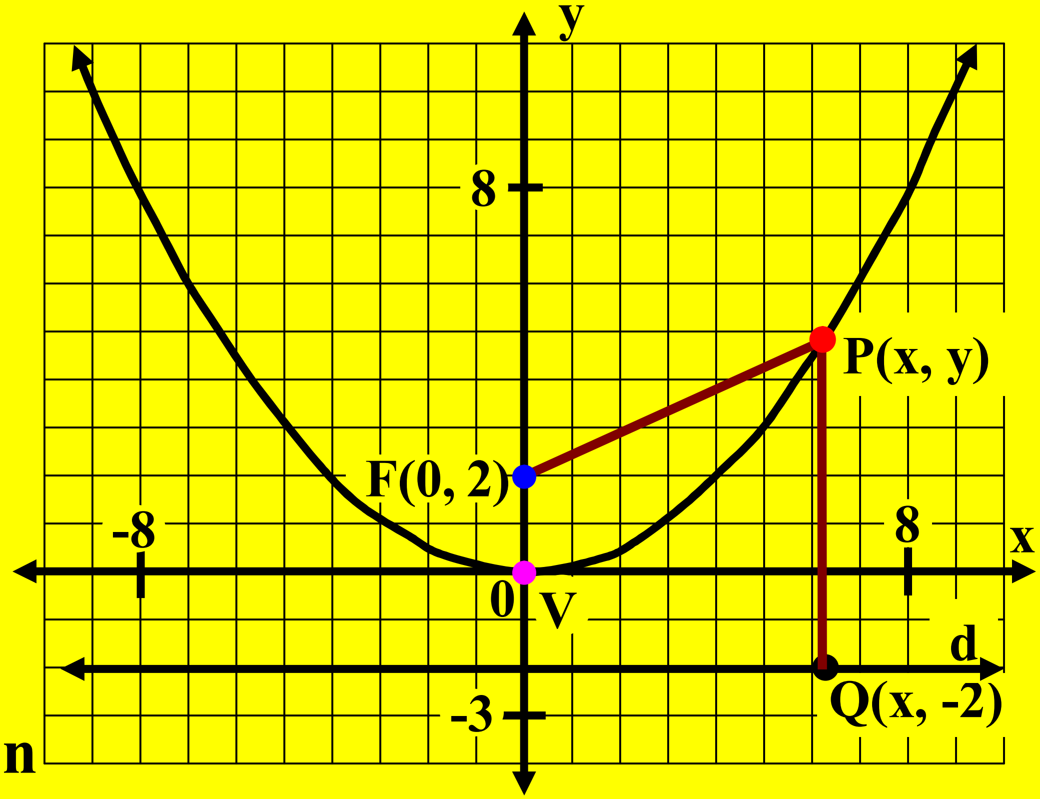

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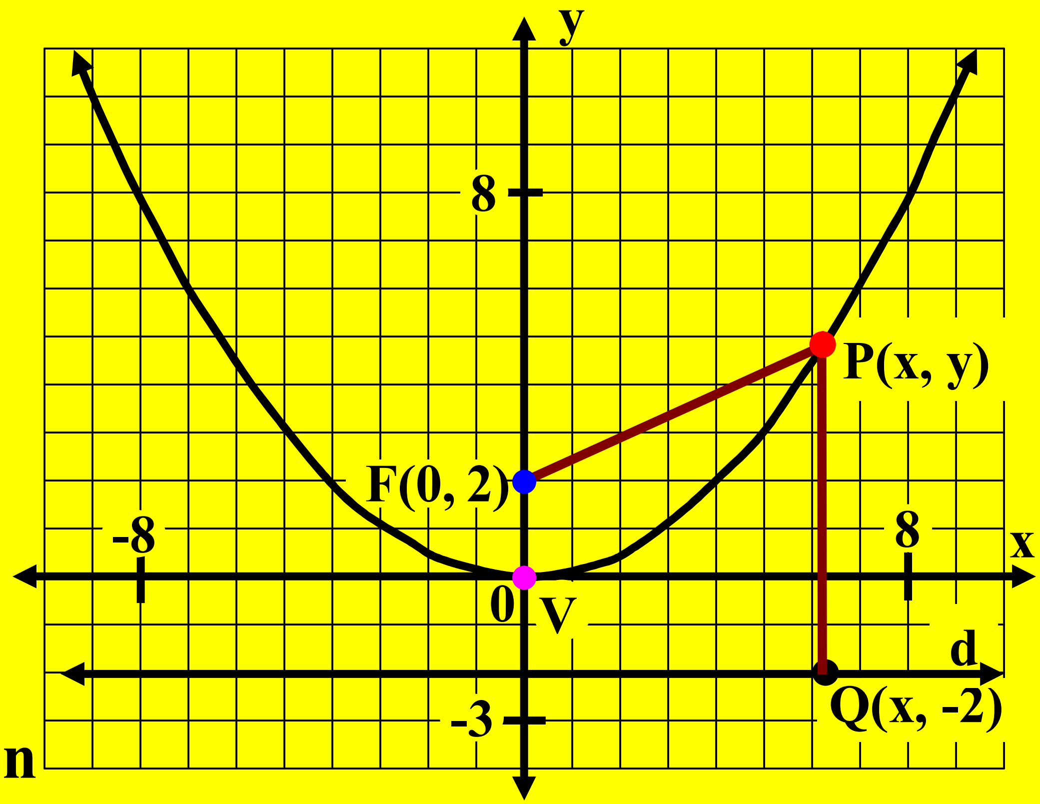

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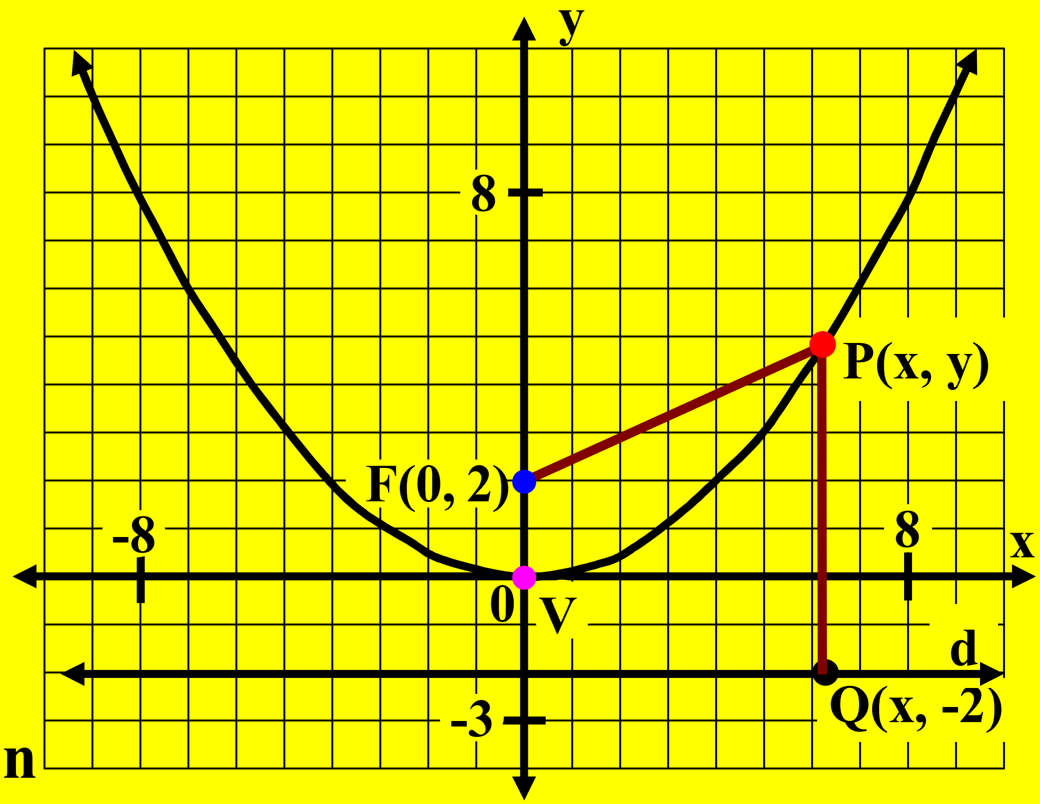

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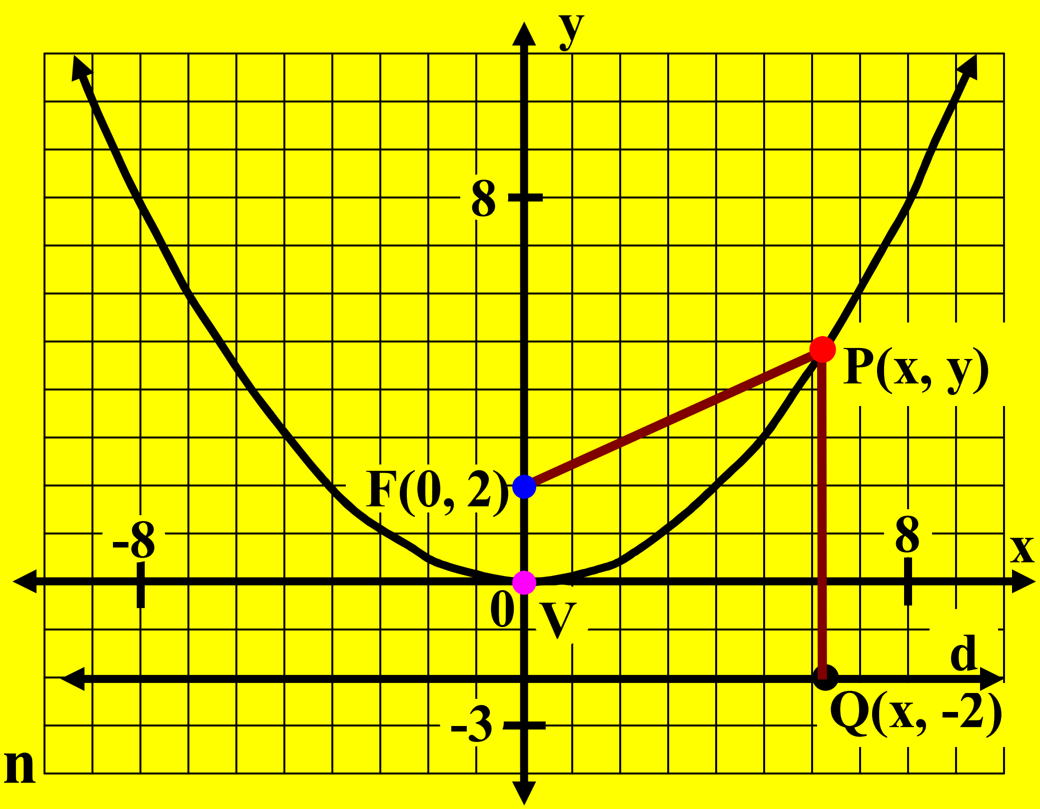

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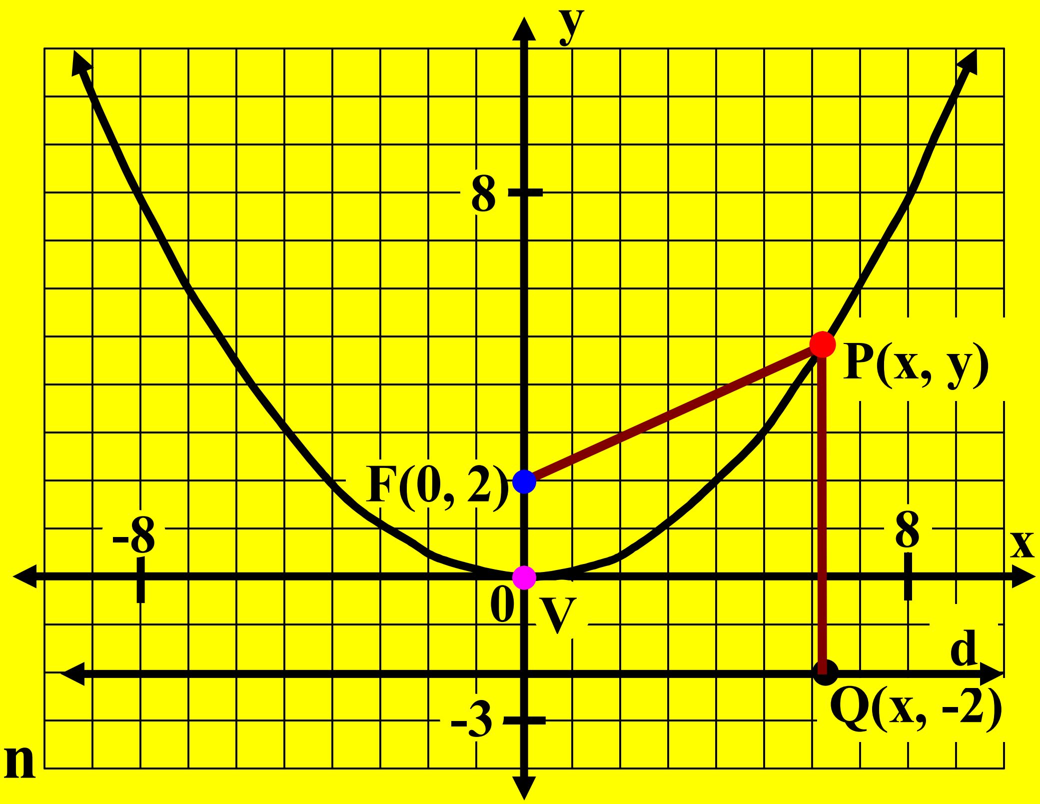

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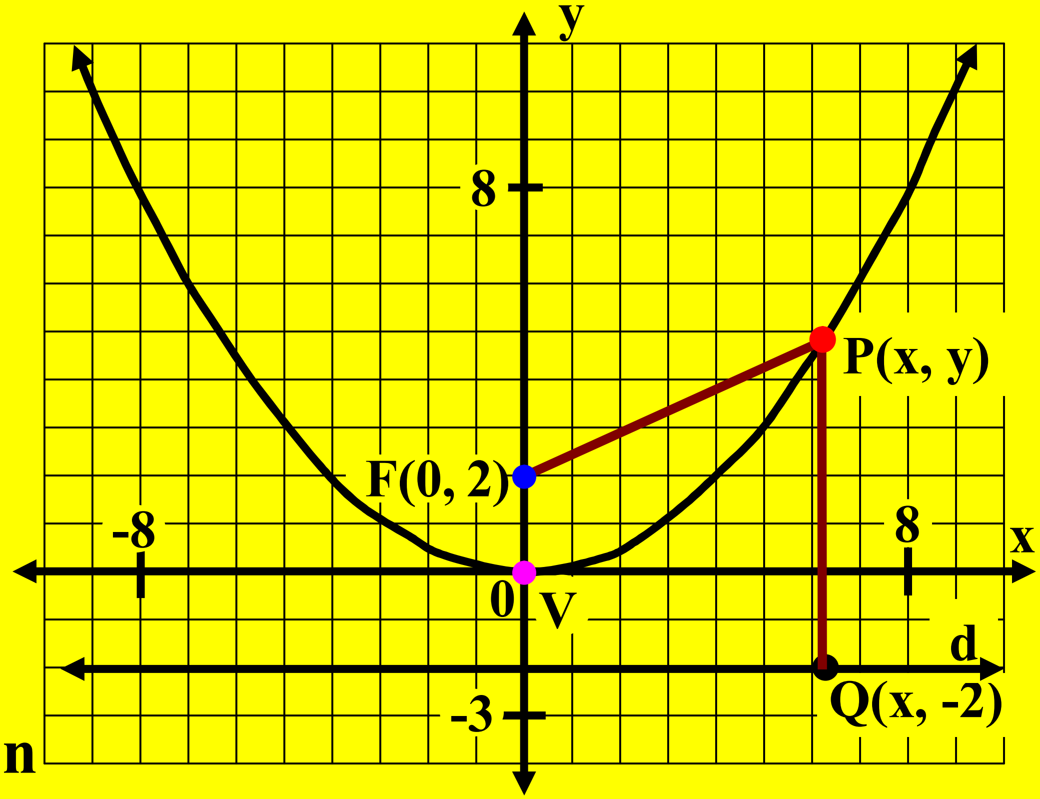

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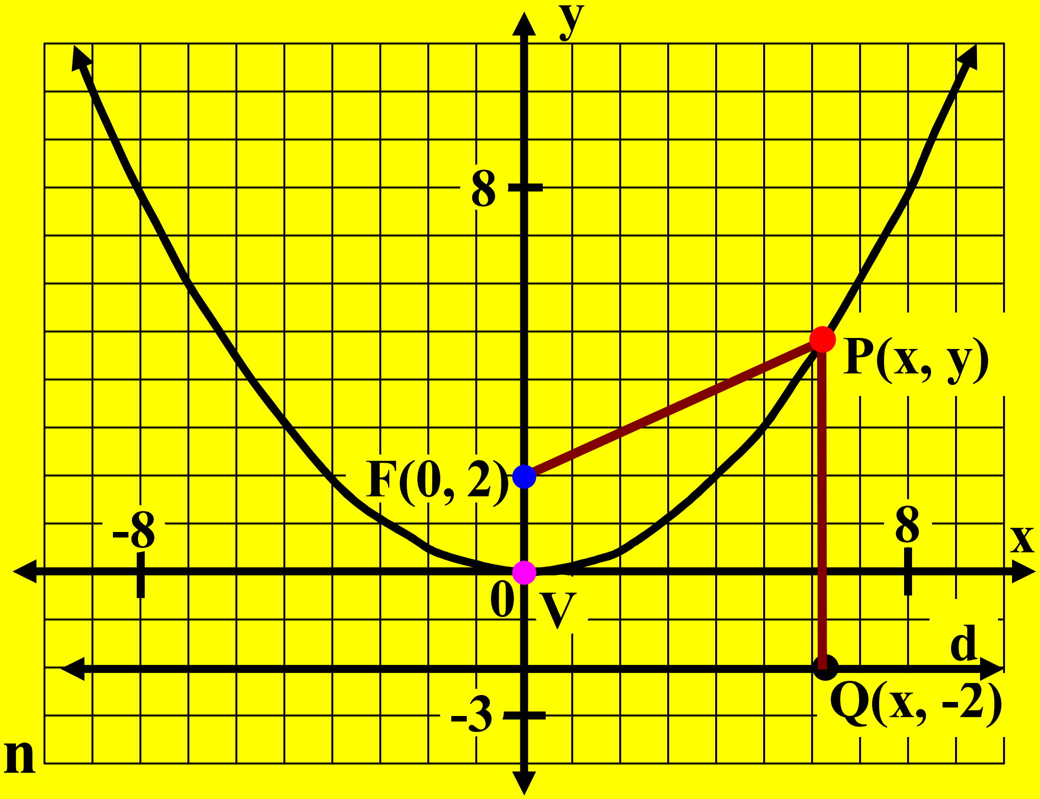

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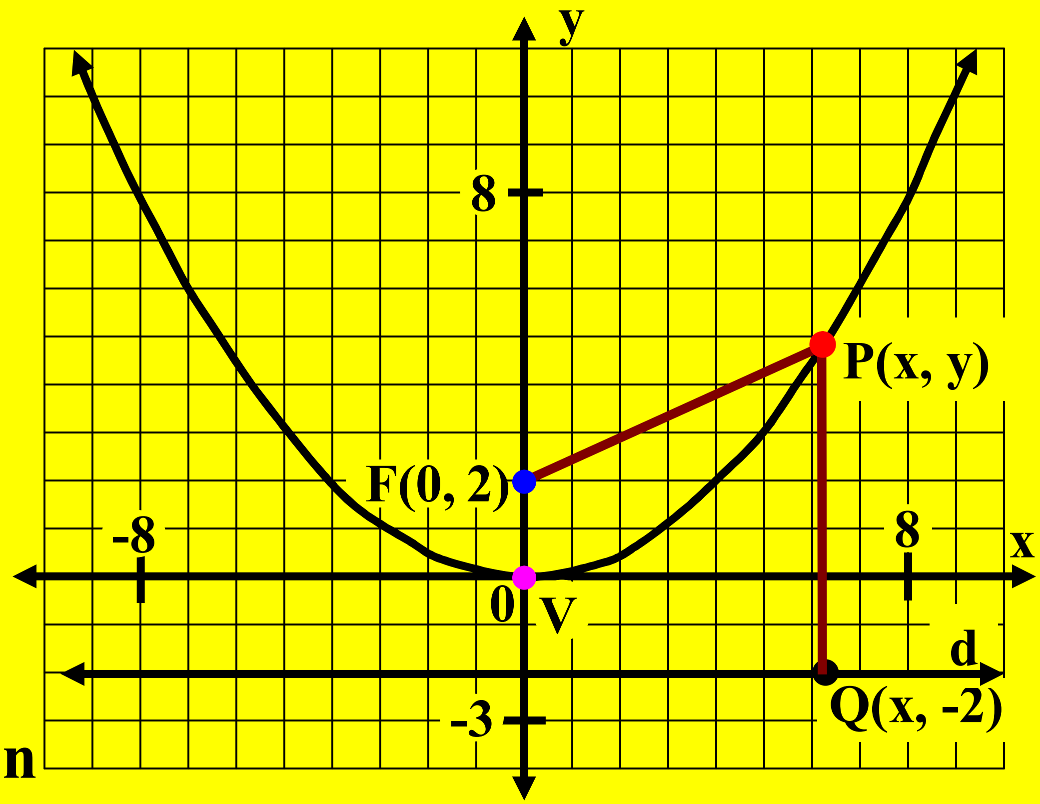

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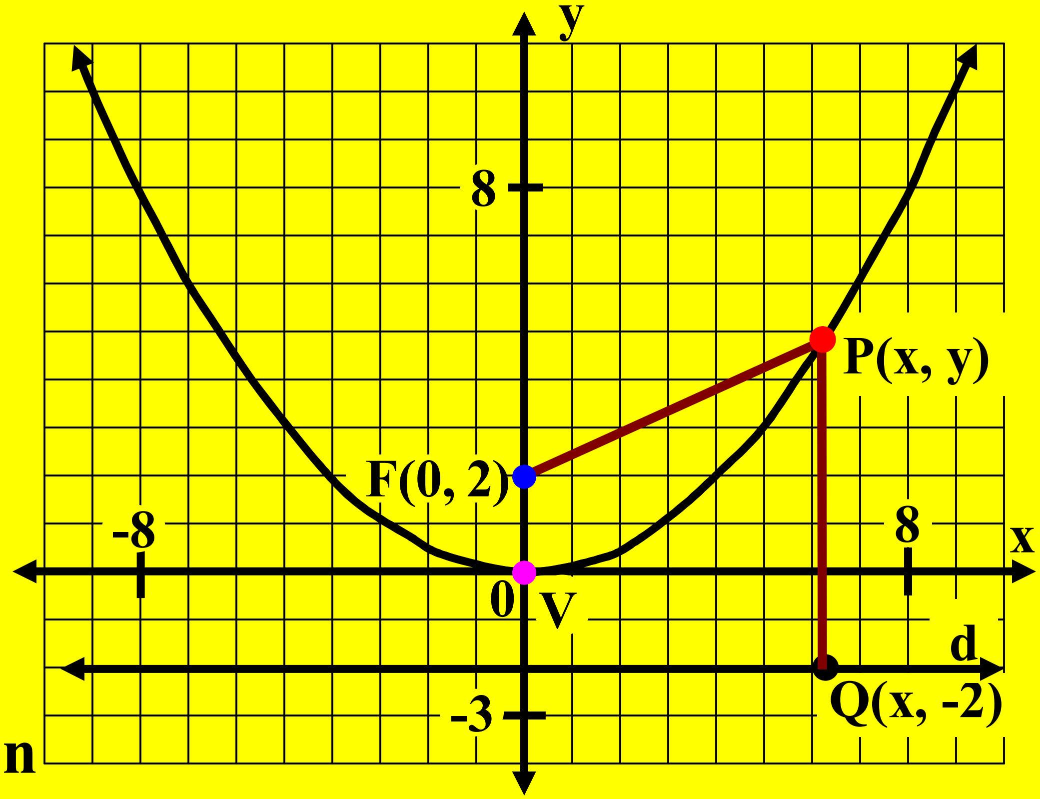

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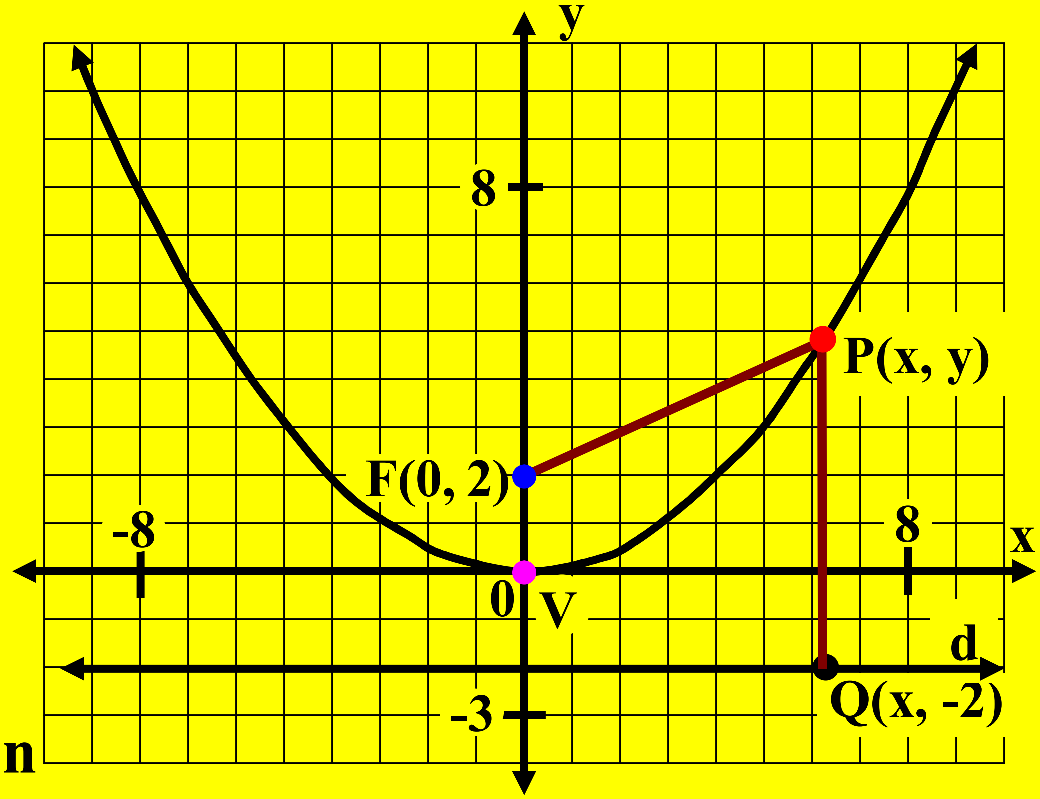

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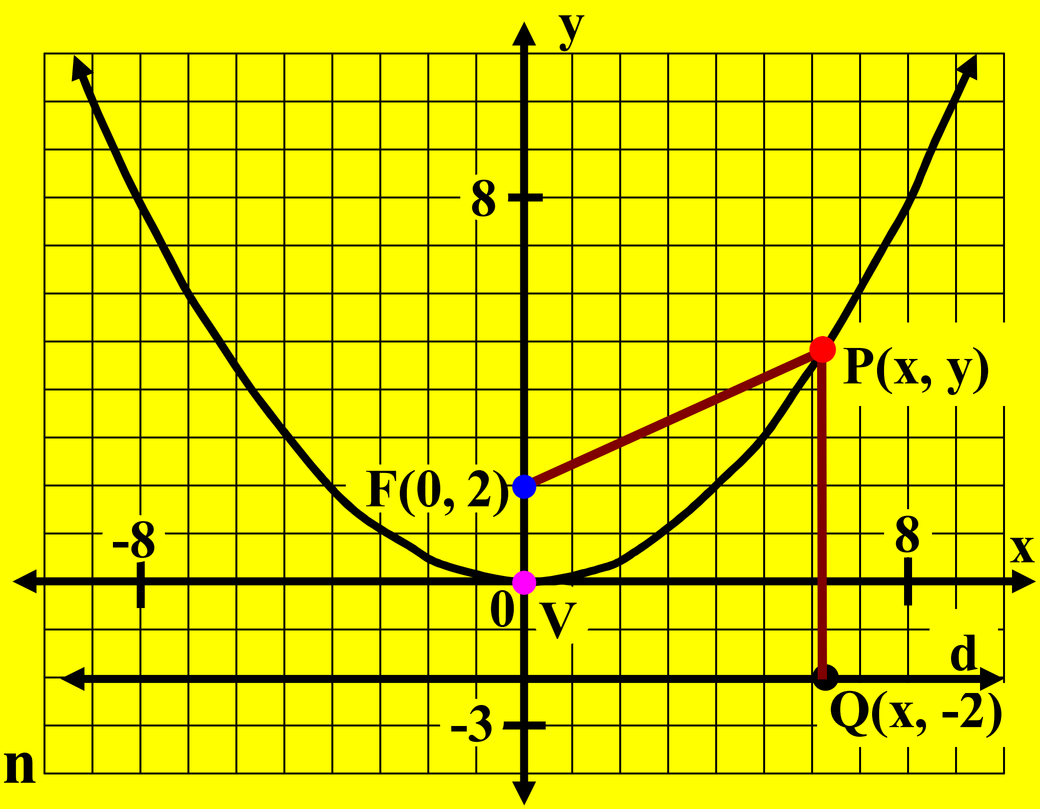

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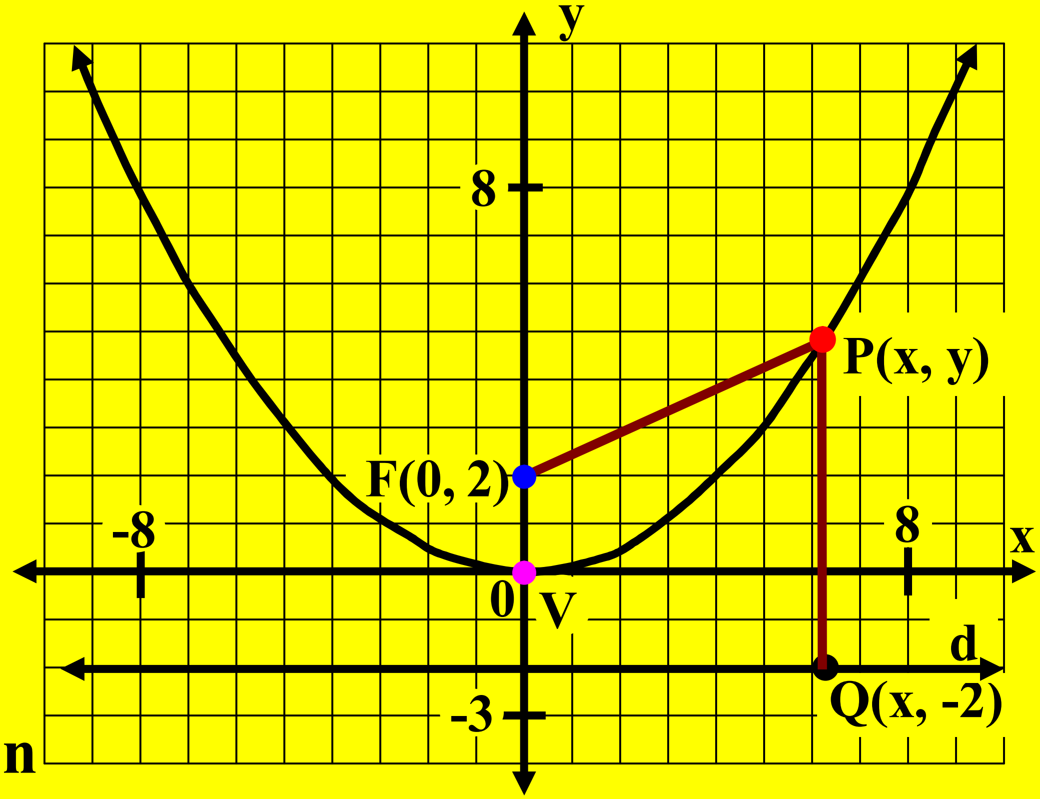

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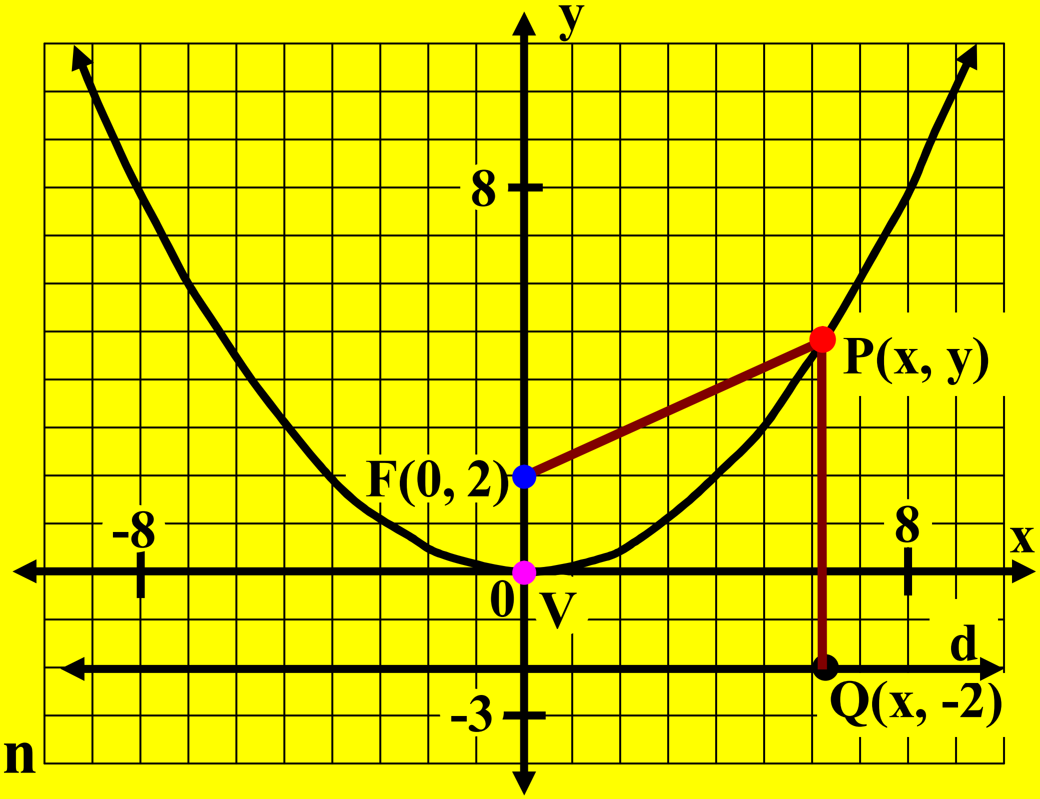

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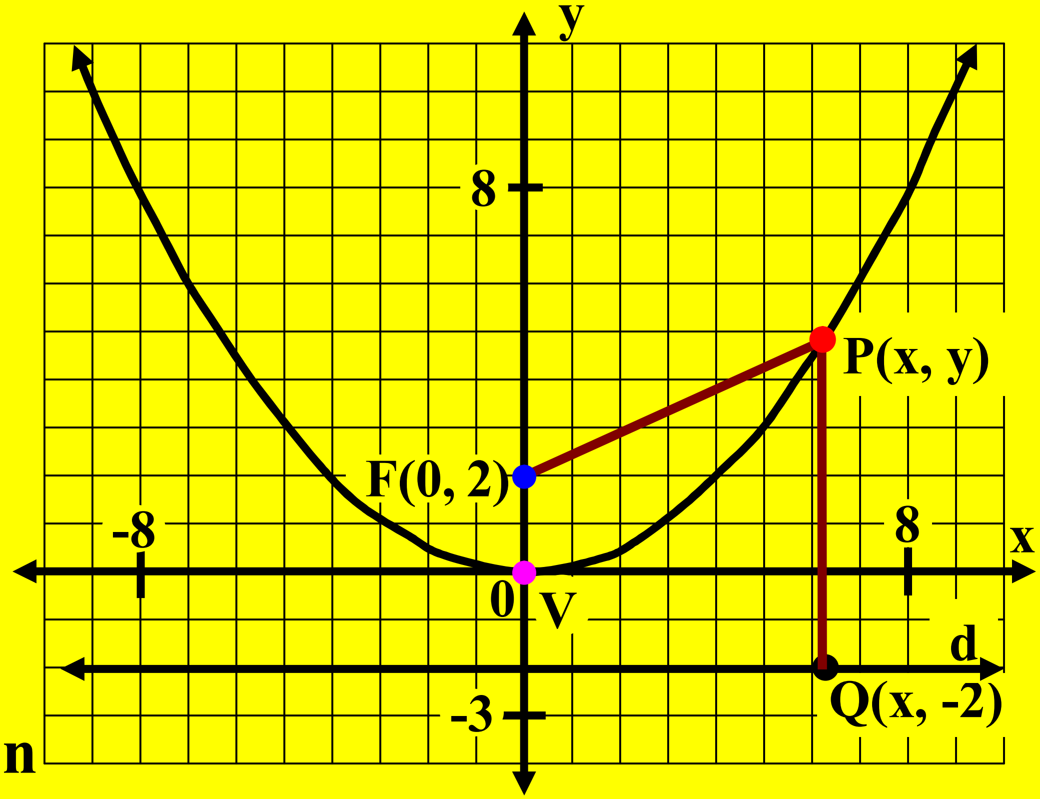

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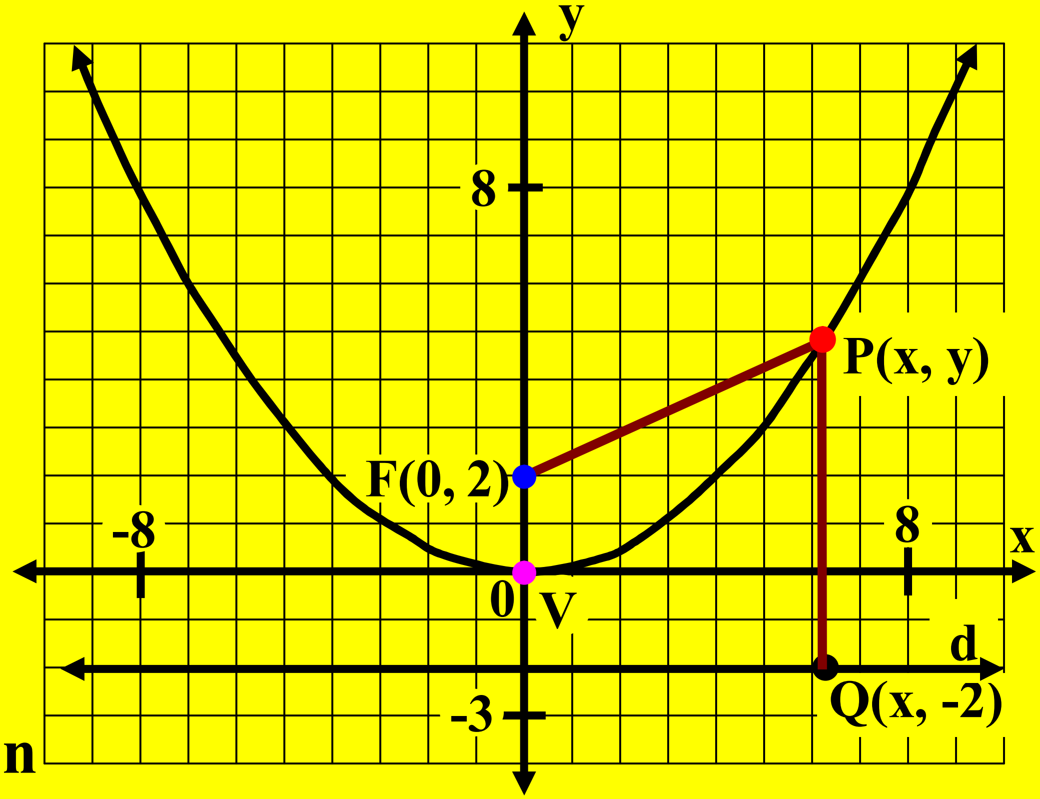

$$\sqrt{x^2 + (y - 2)^2} = \sqrt{(y + 2)^2}$$

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Square both sides of the equation.

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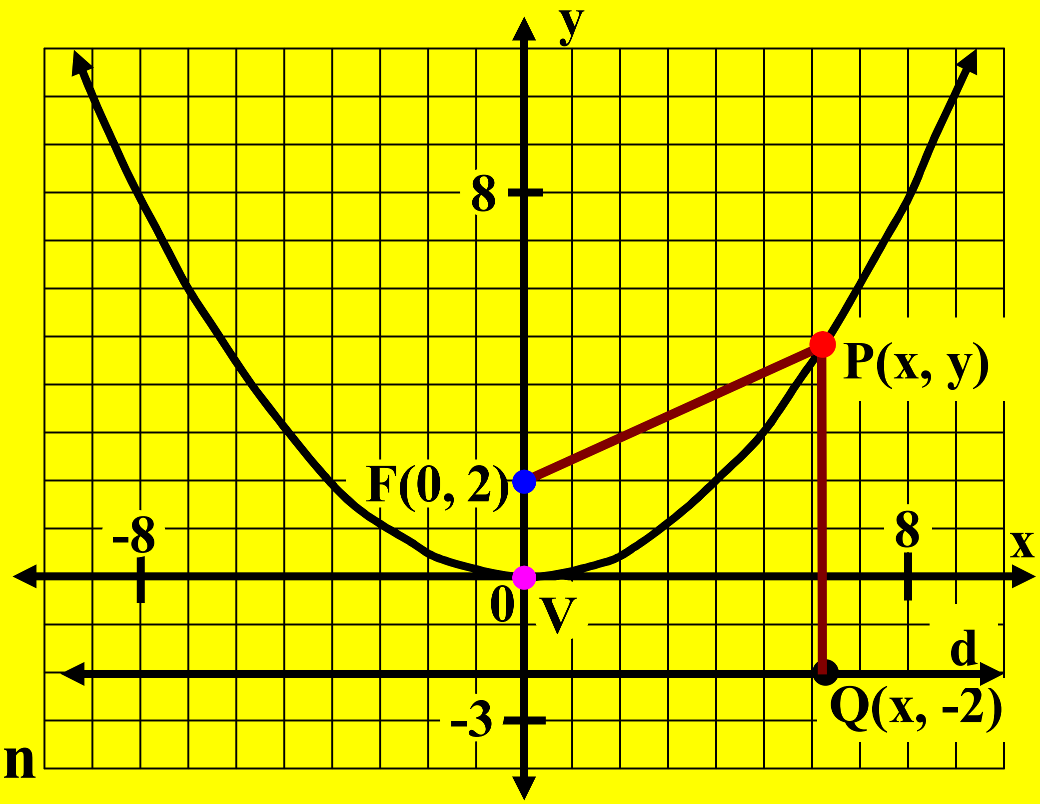

$$PF = \sqrt{x^2 + (y-2)^2}$$

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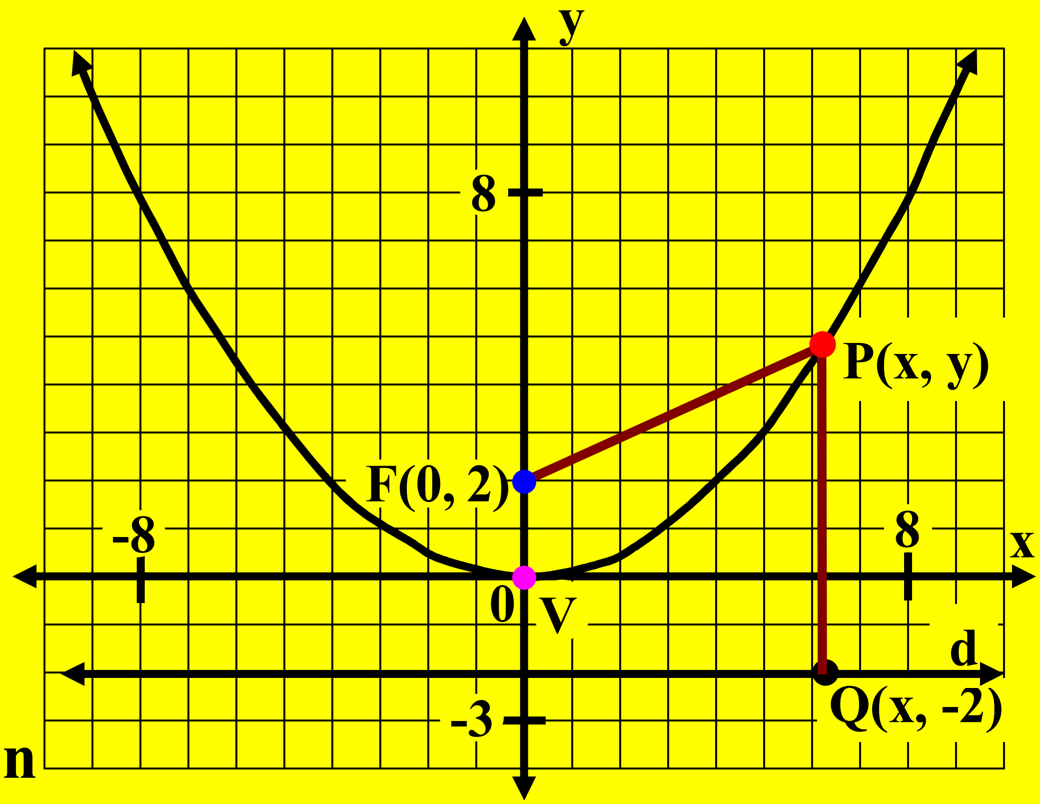

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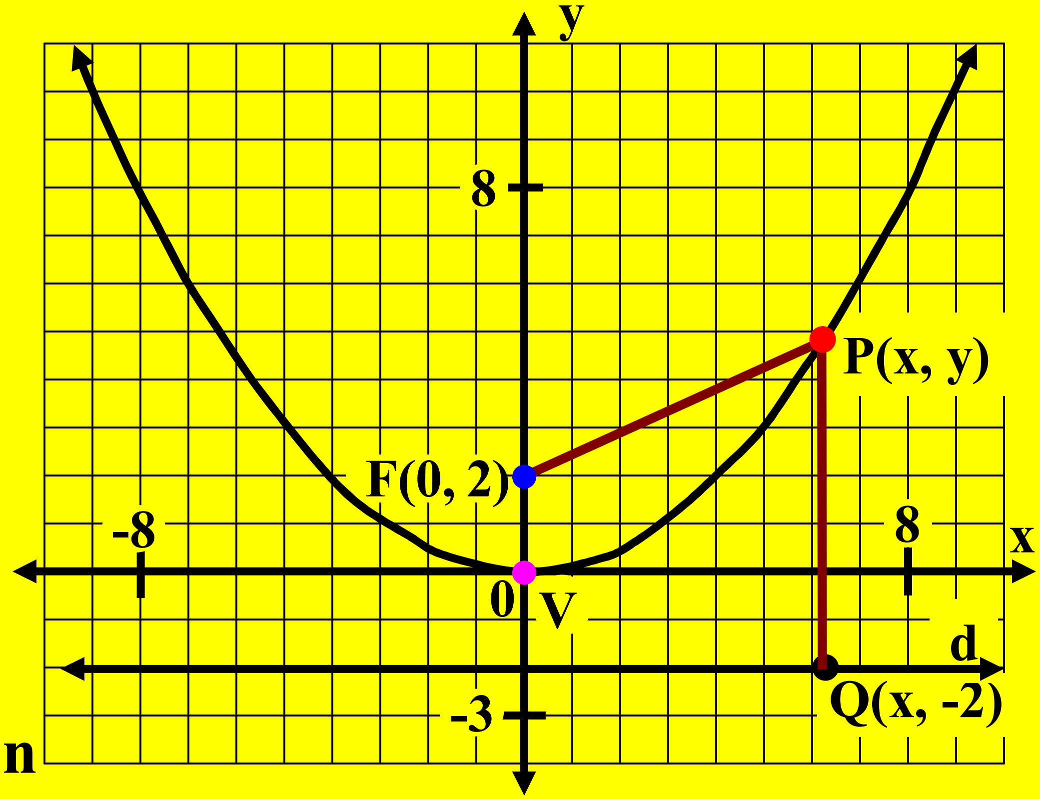

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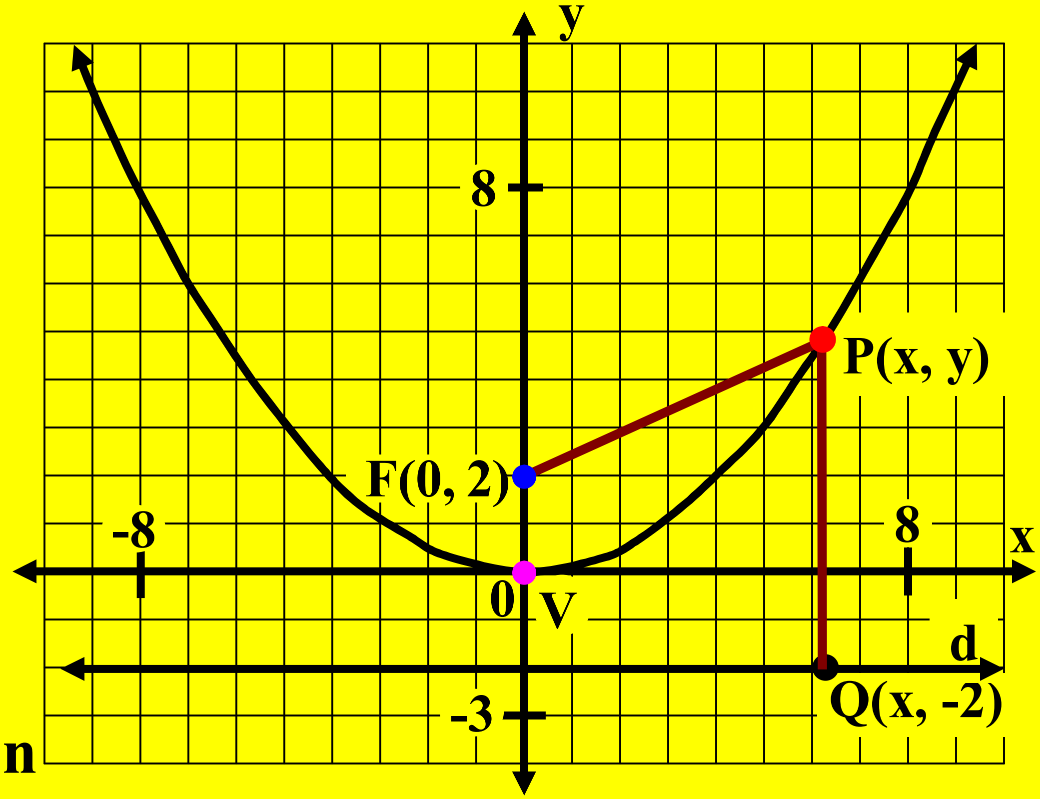

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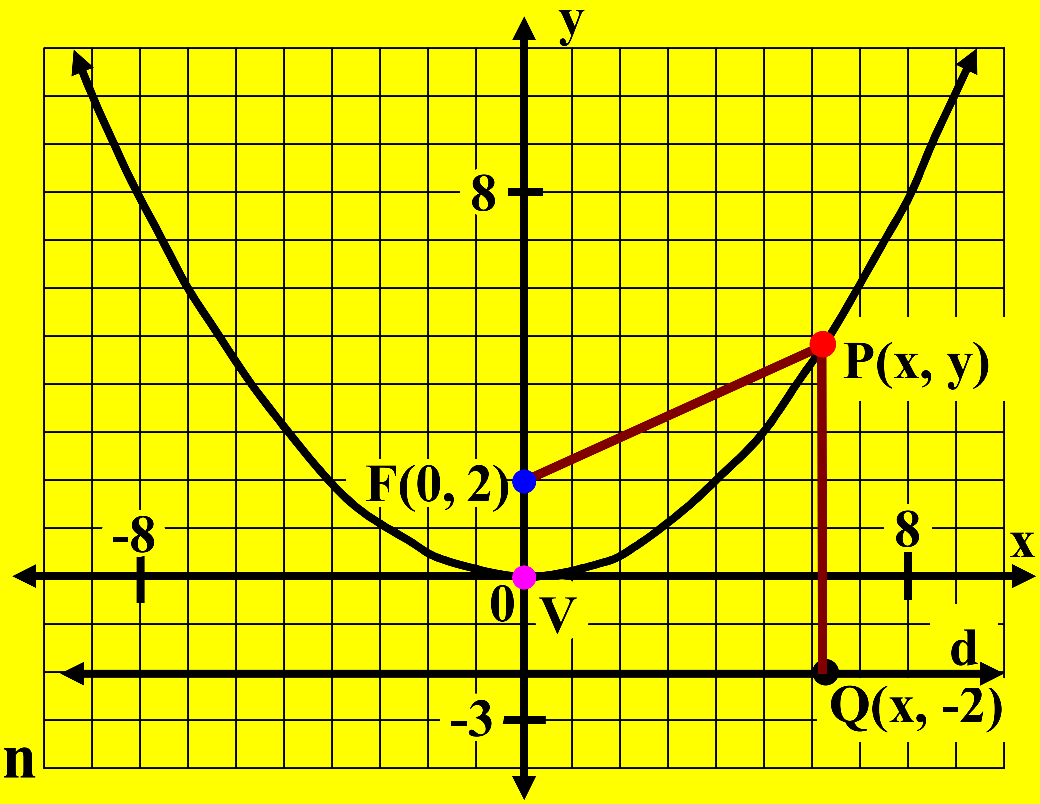

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⇨

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Square the binomials.

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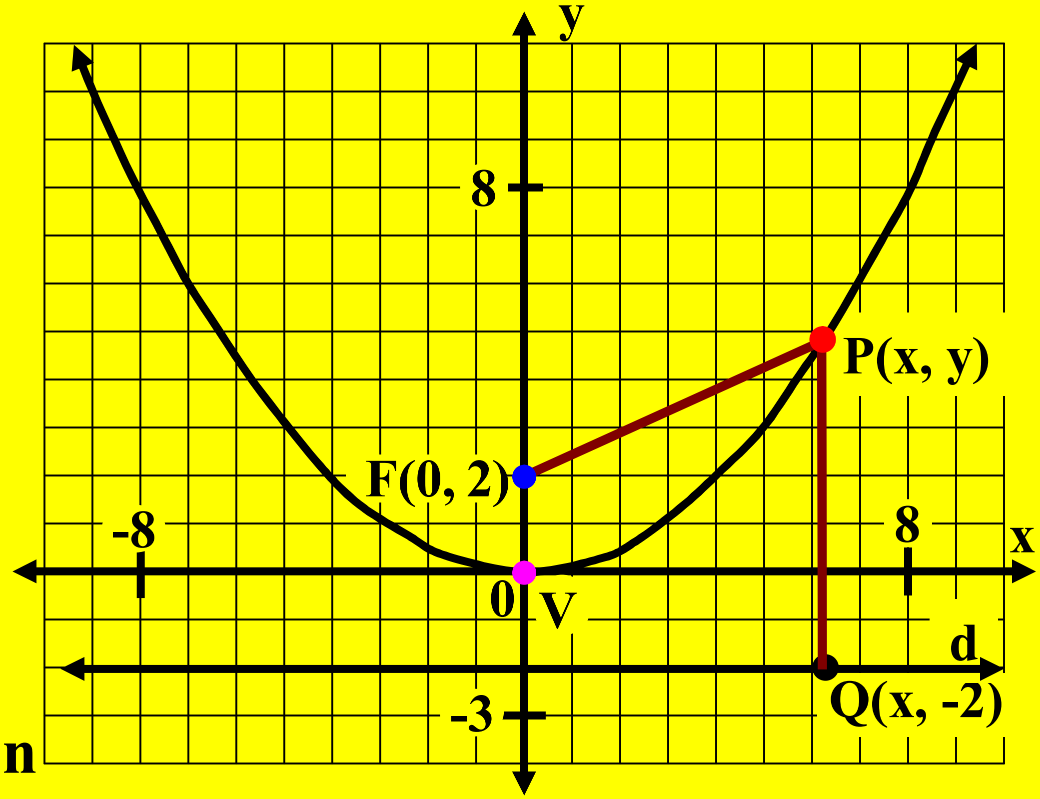

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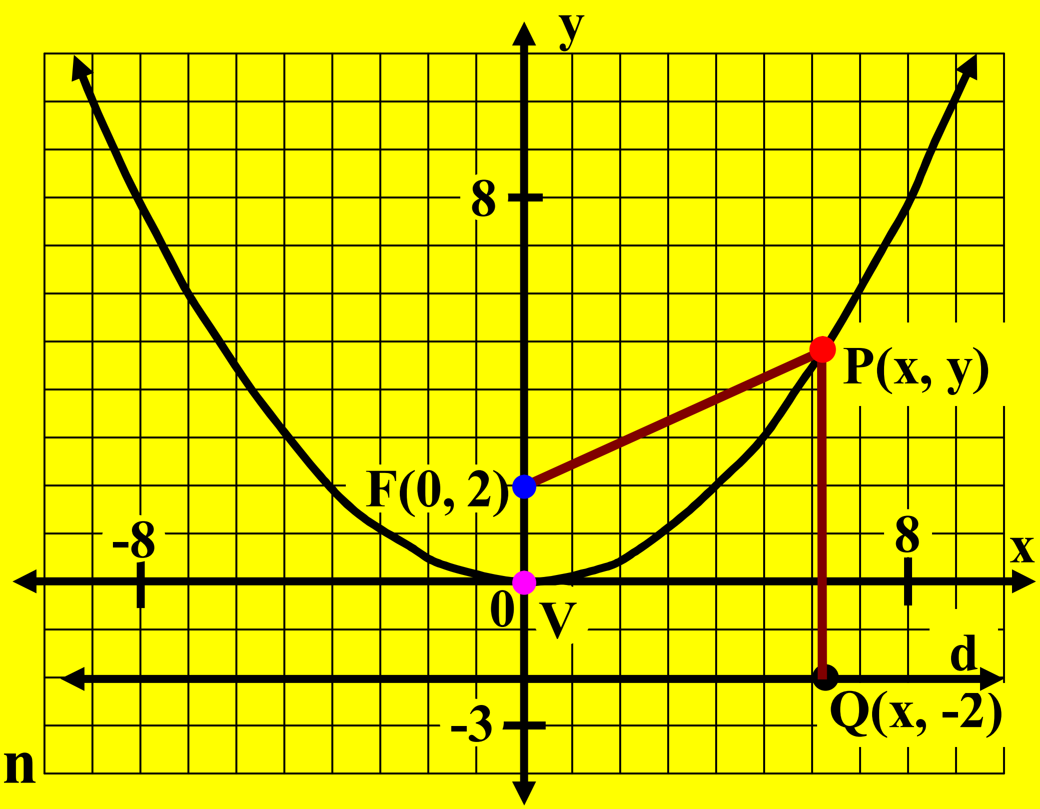

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x^2

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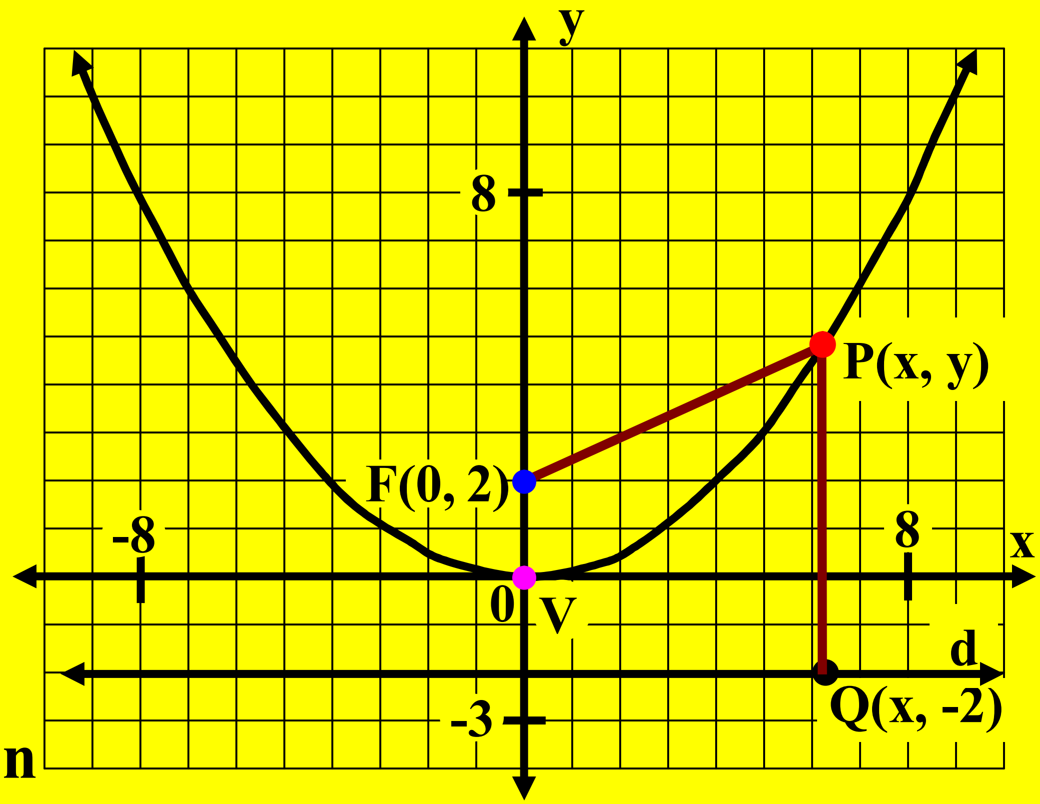

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$$x^2 + (y - 2)^2 = (y + 2)^2$$

$$x^2 +$$

Square the binomials.

The Equations of a Parabola.

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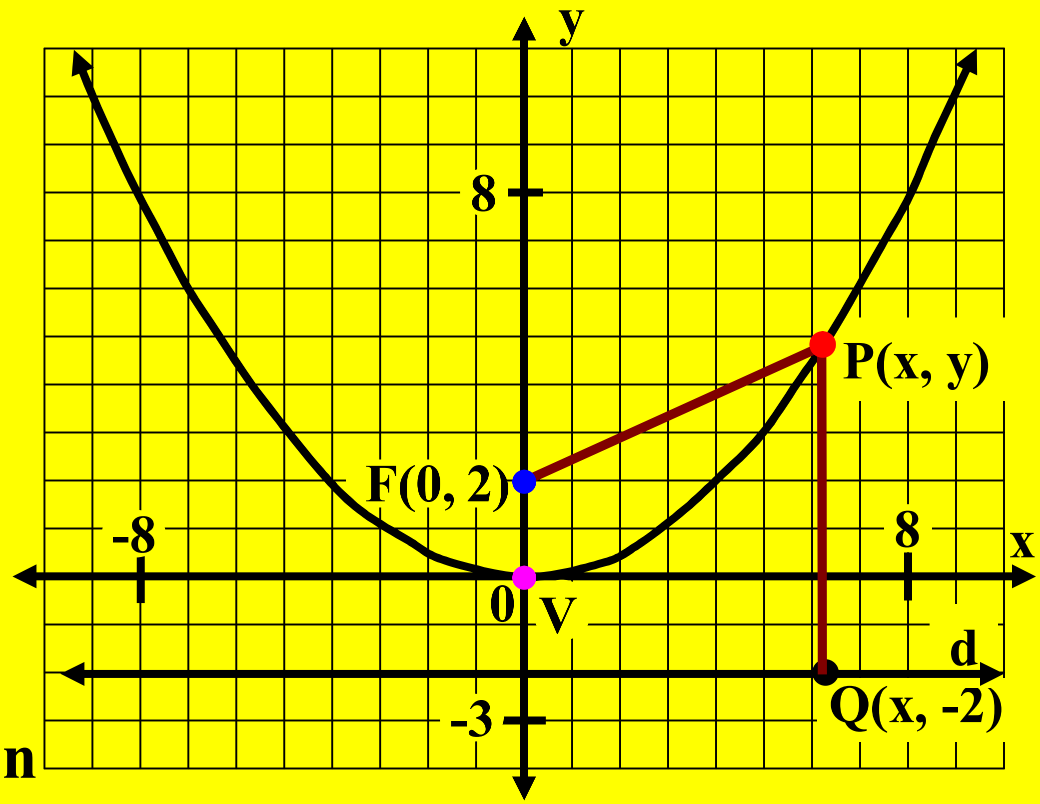

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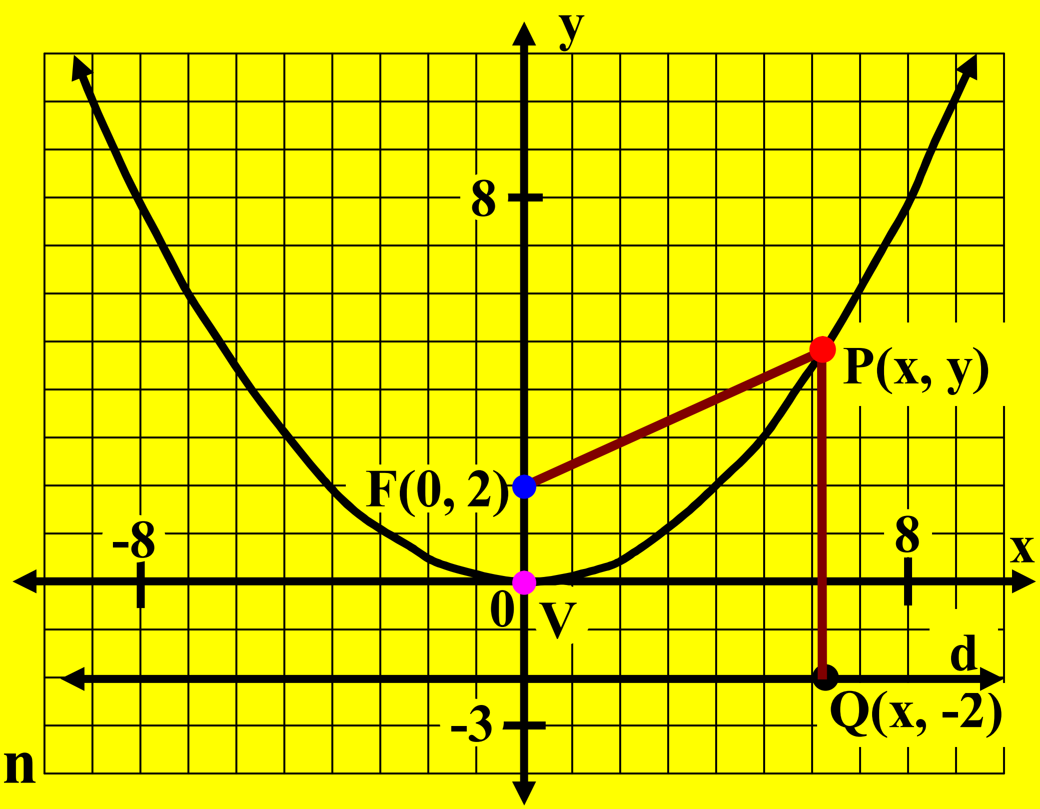

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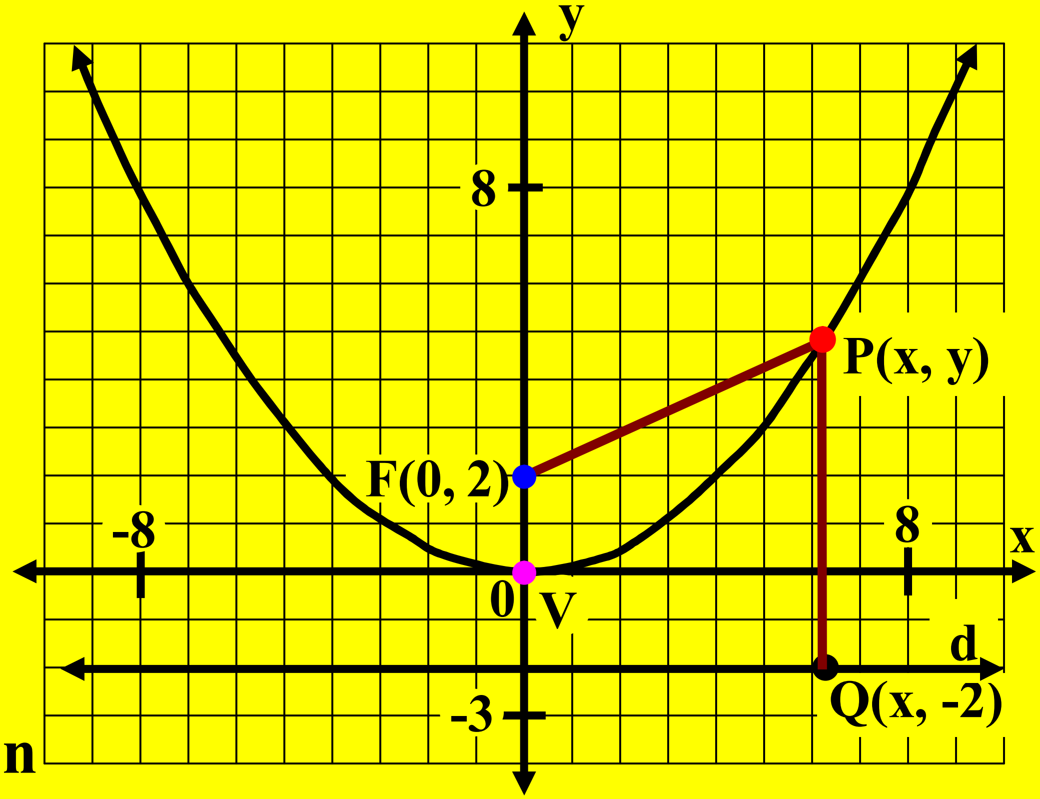

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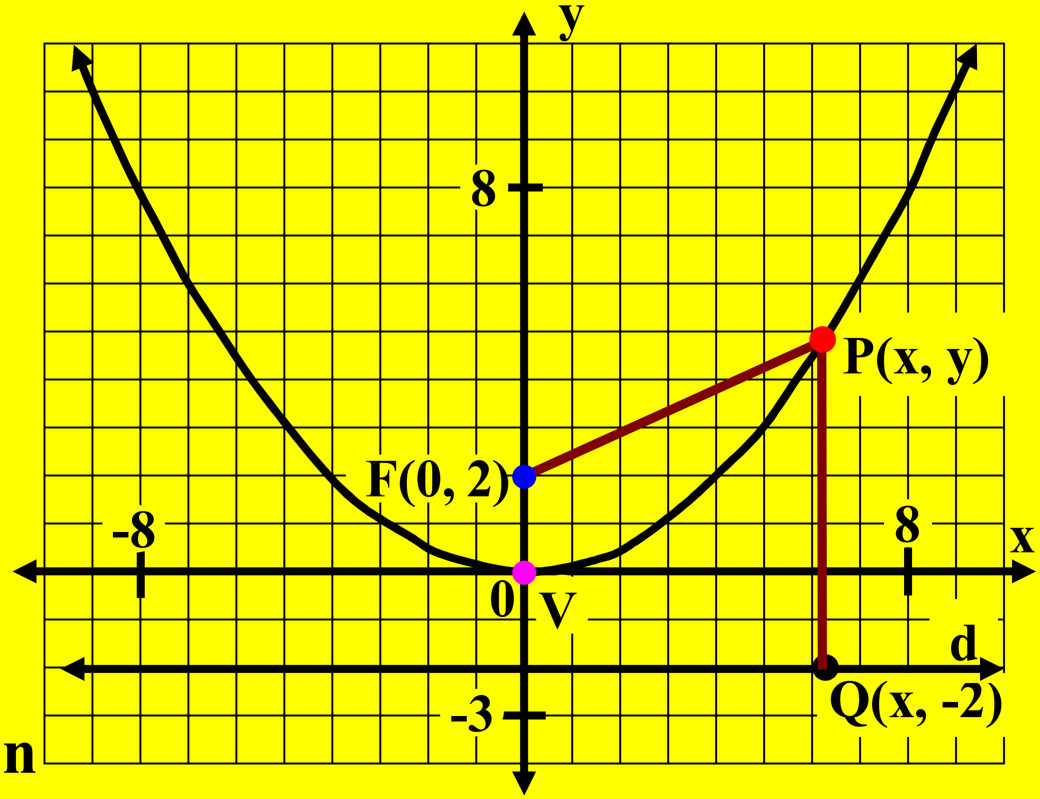

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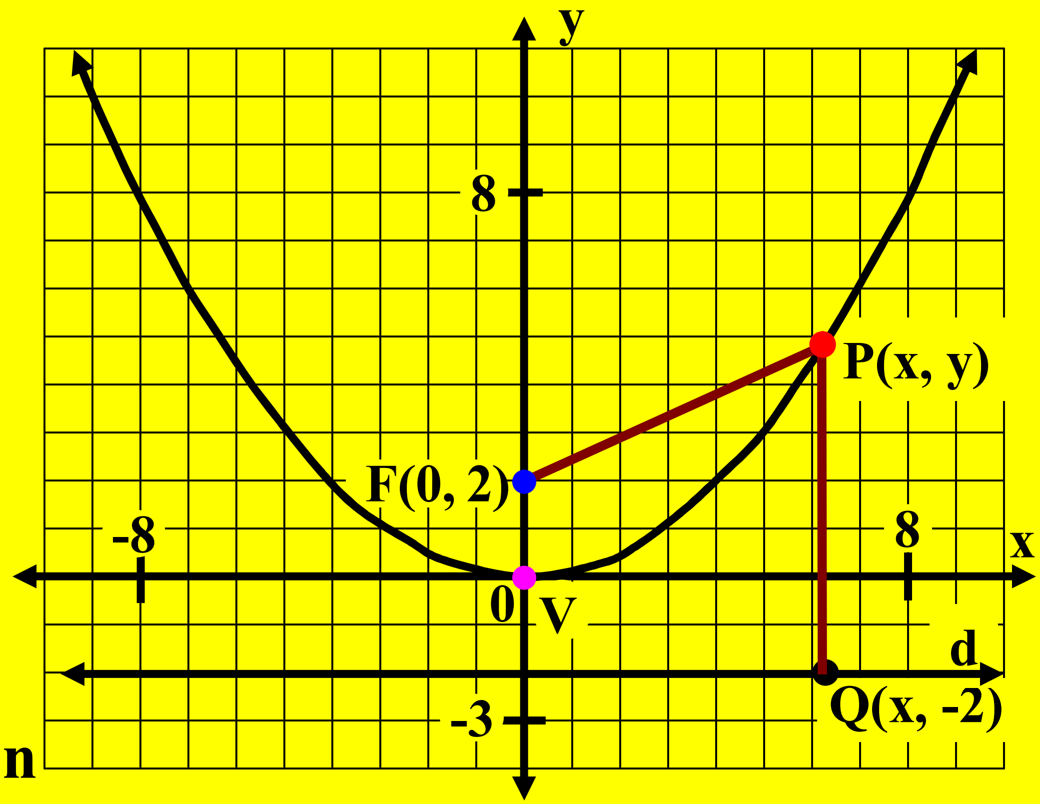

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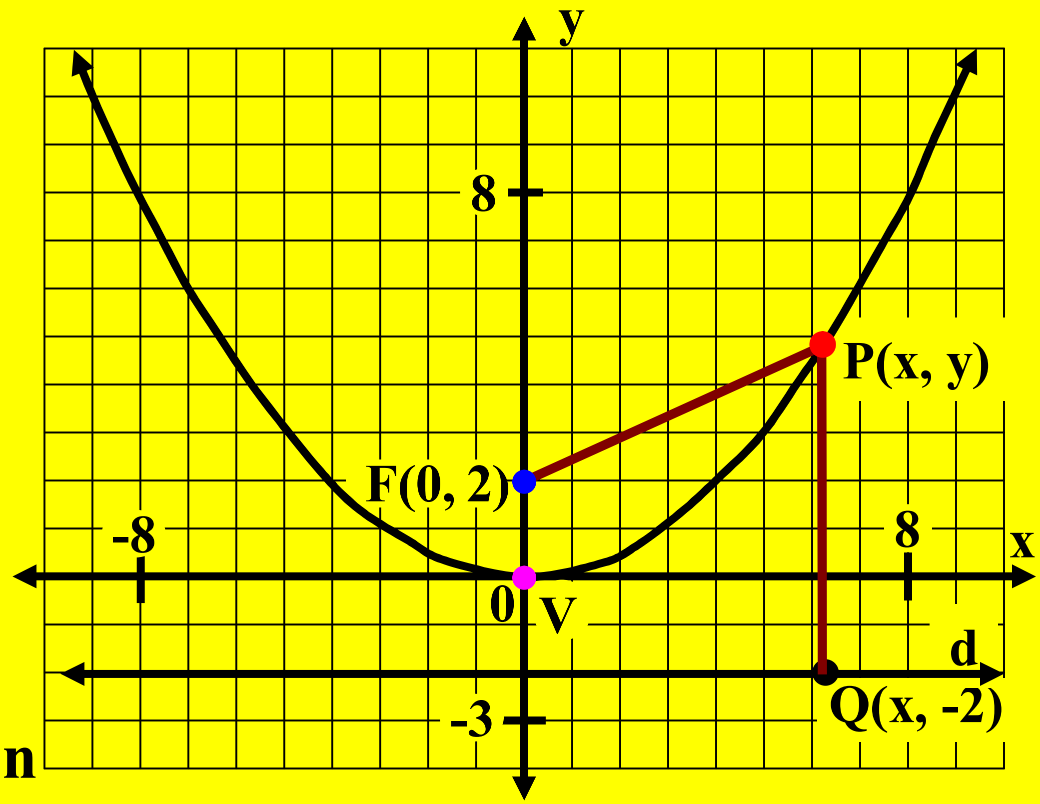

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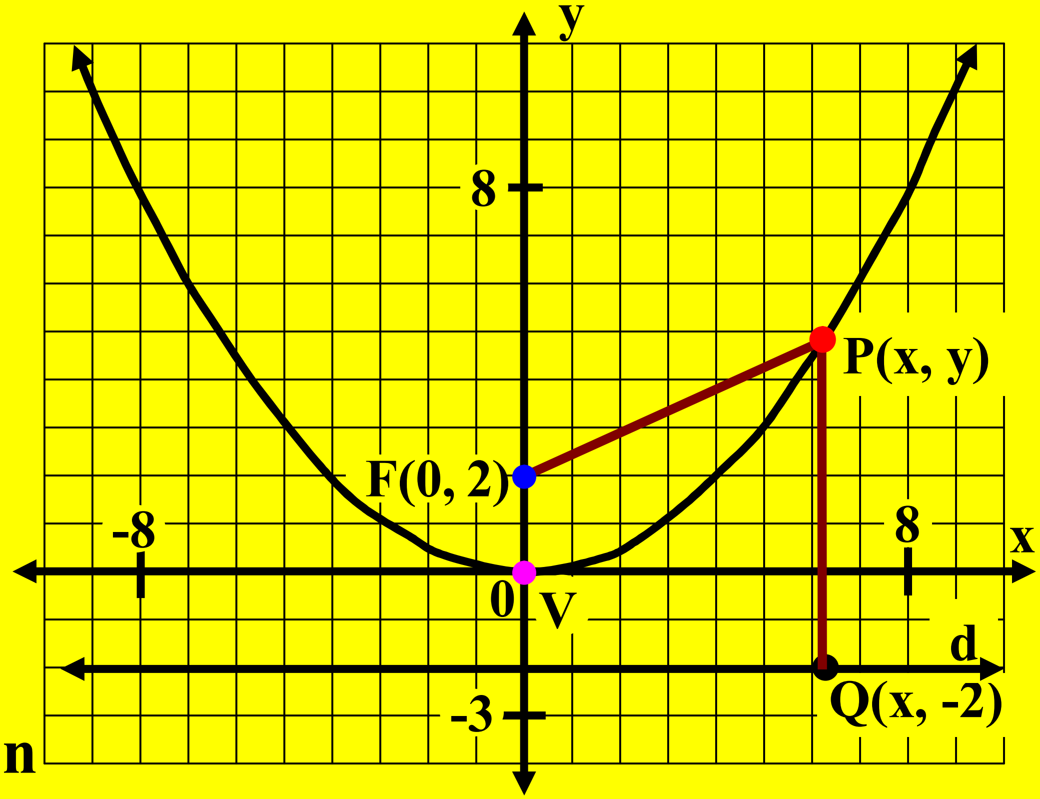

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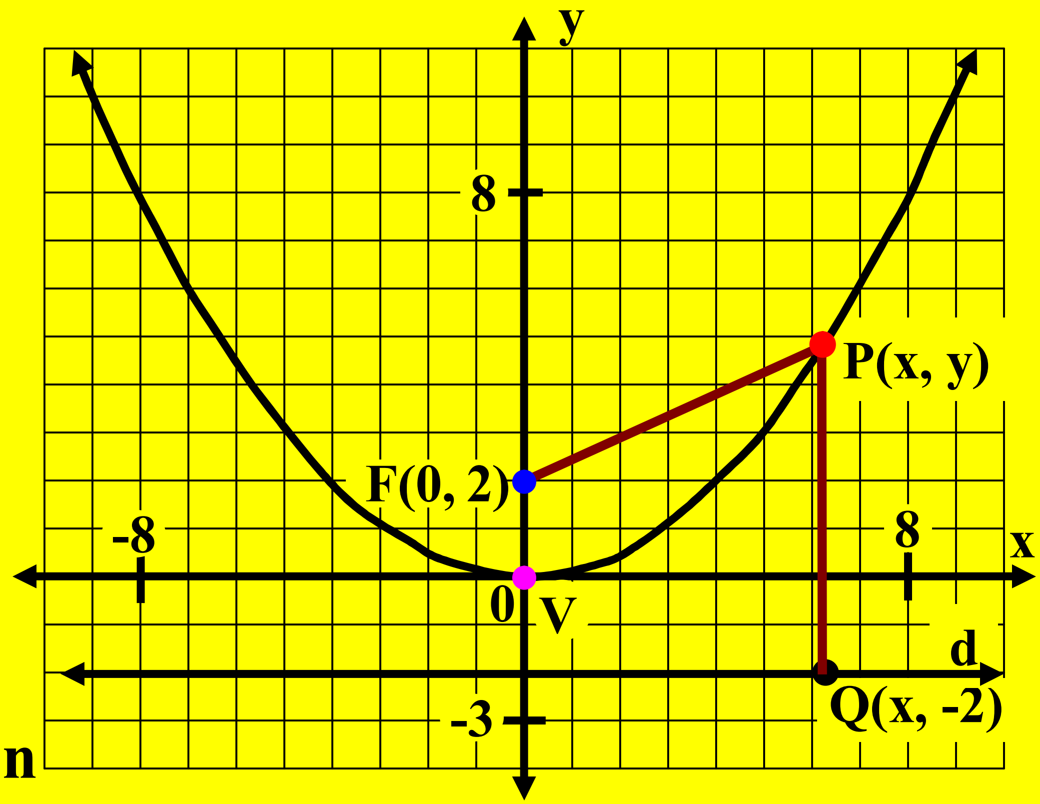

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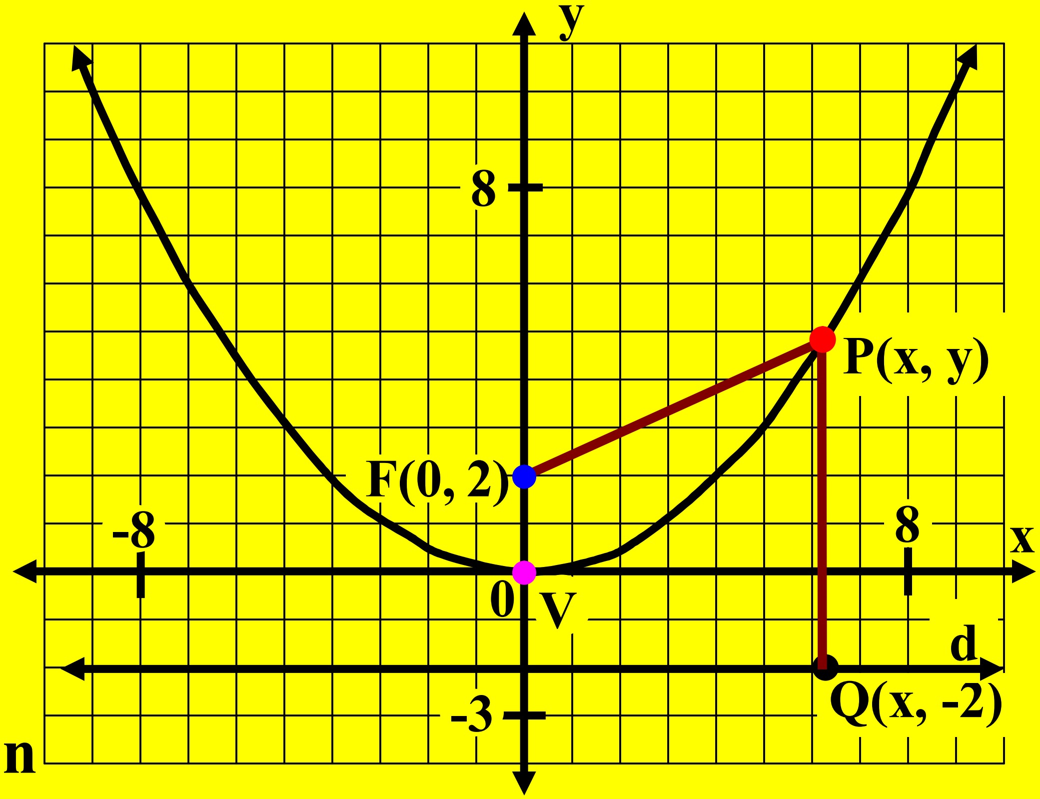

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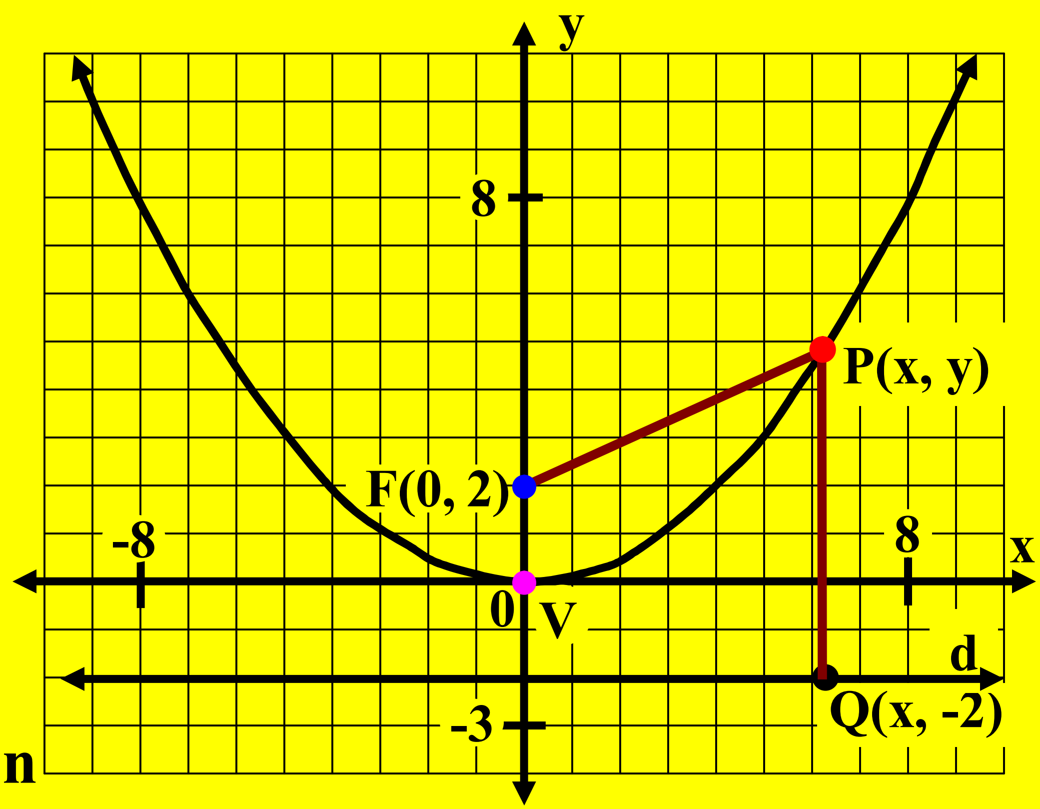

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Subtract $y^2 - 4y + 4$ from both sides.

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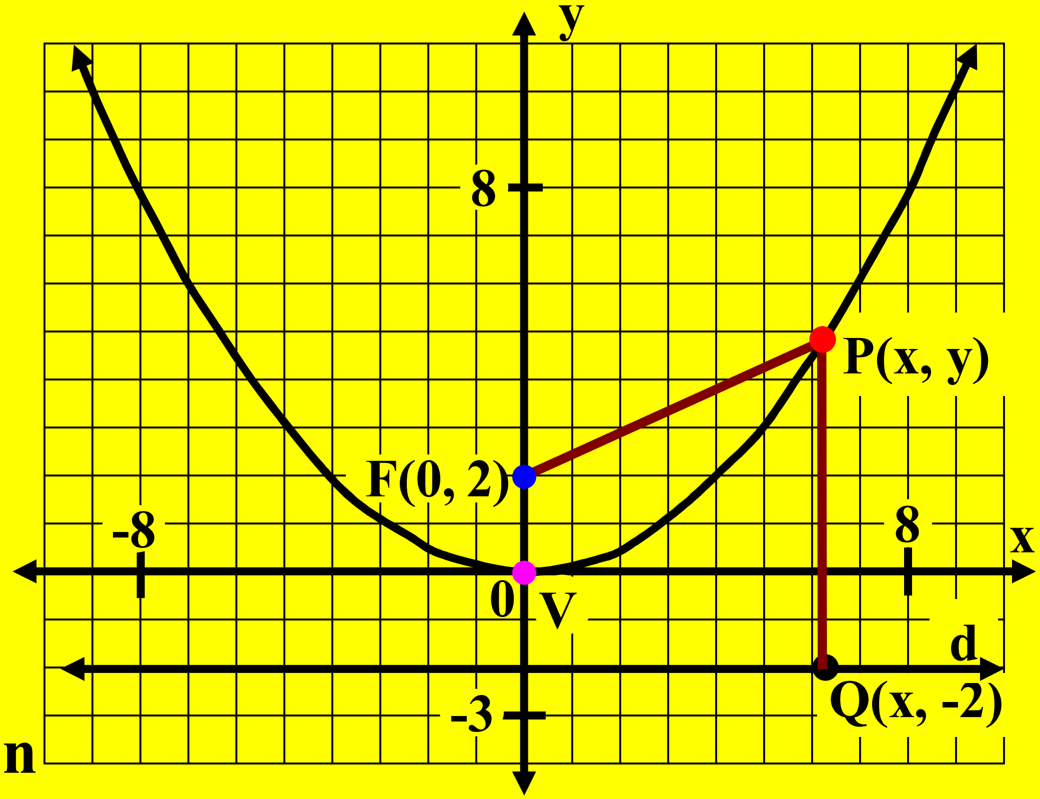

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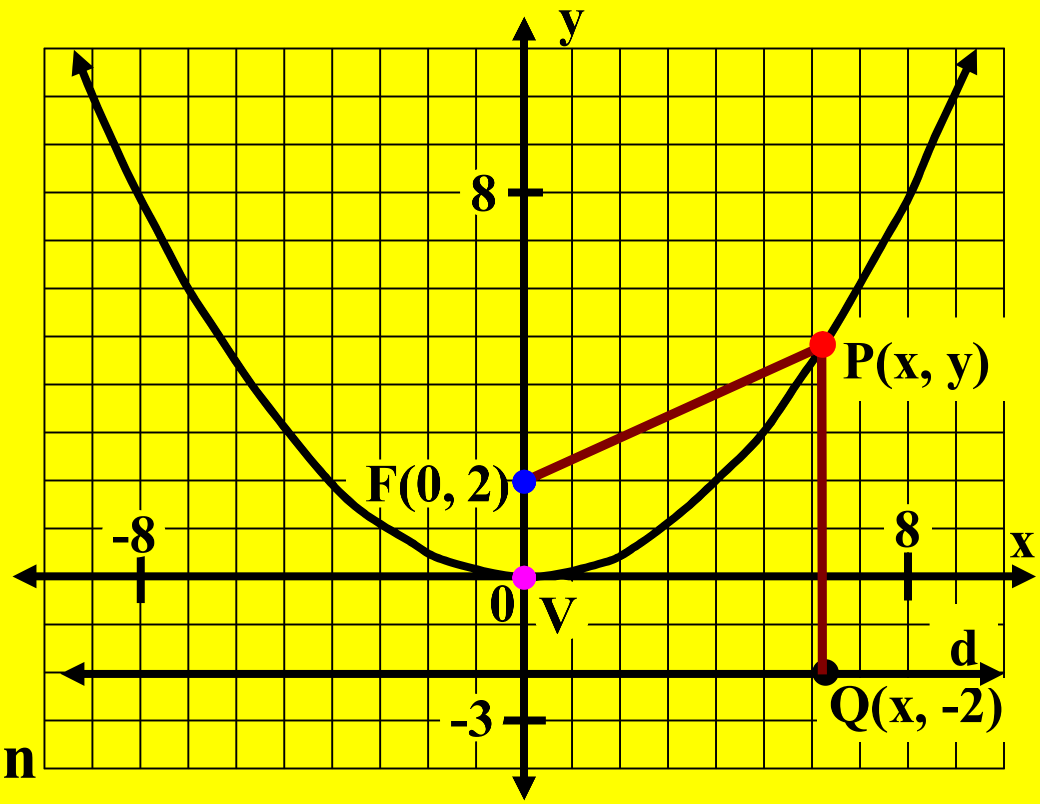

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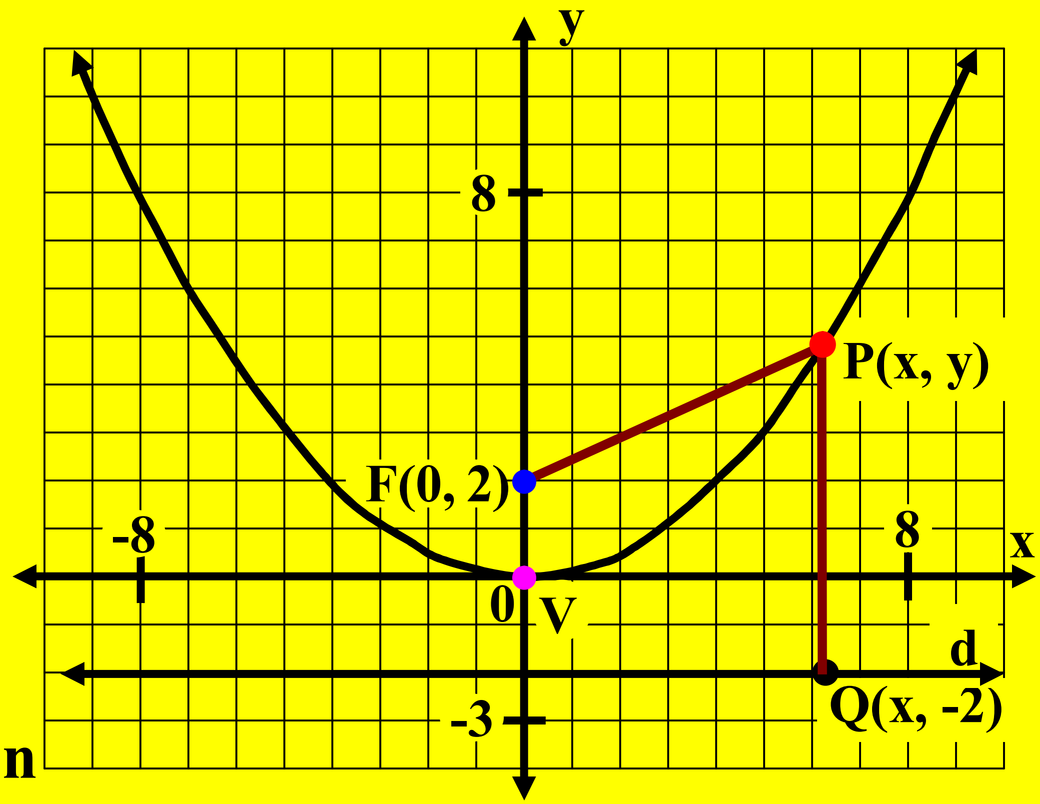

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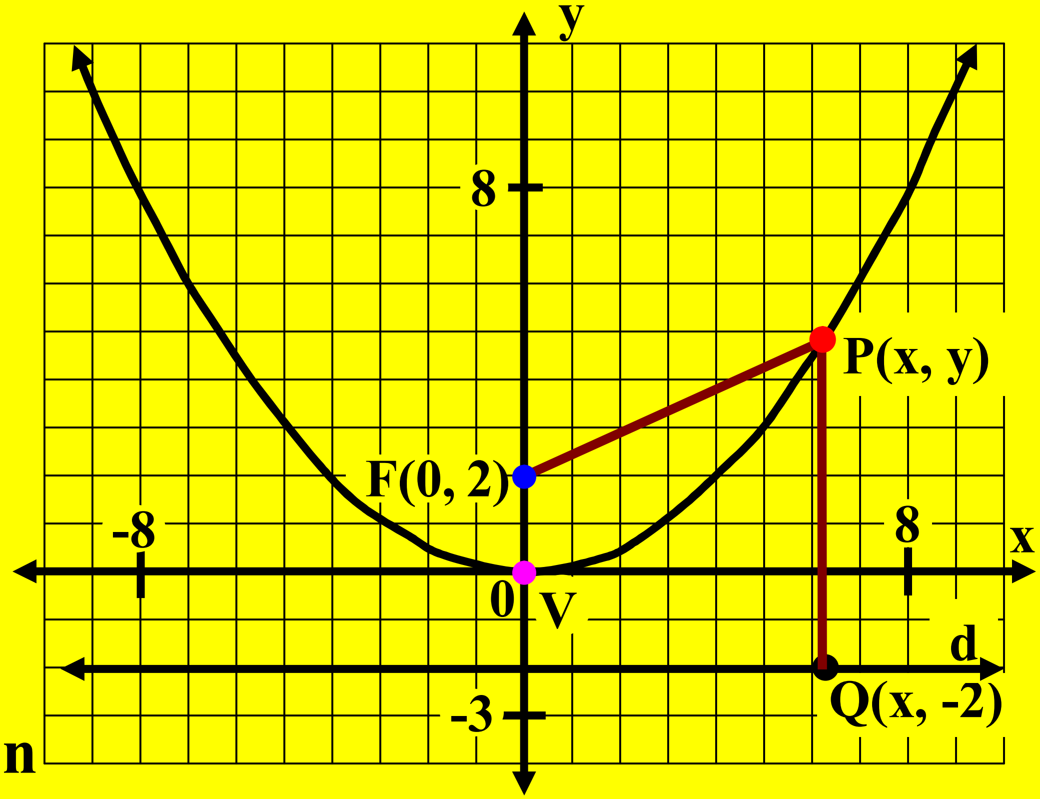

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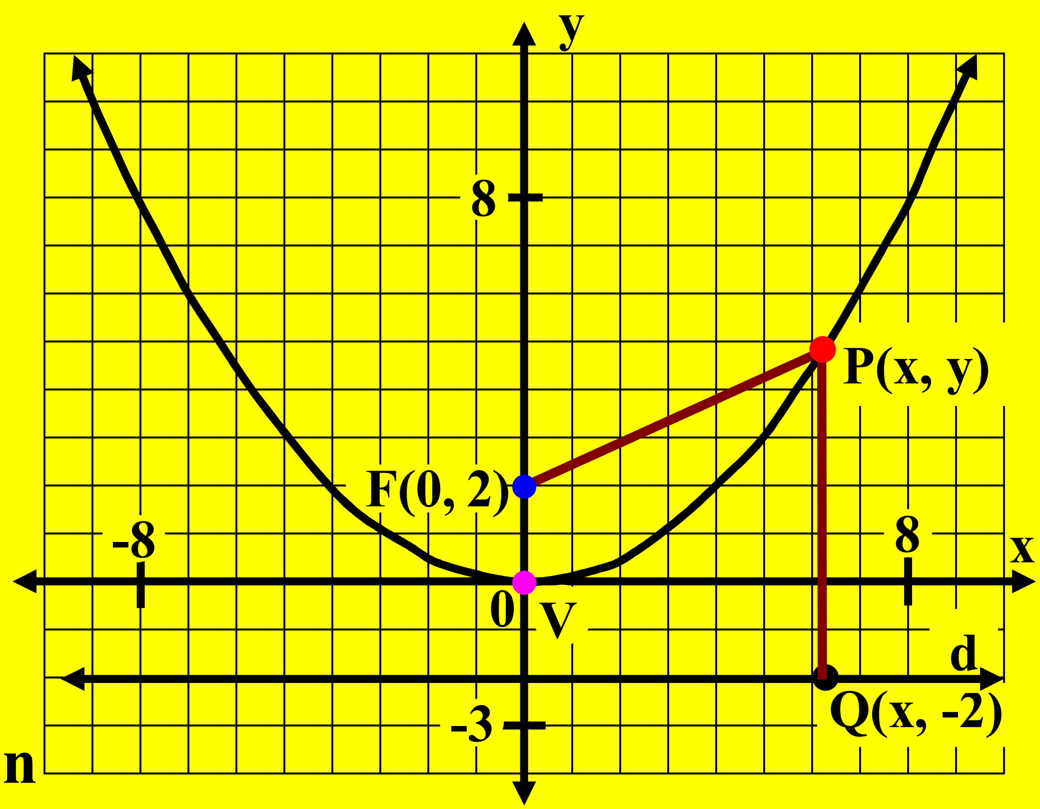

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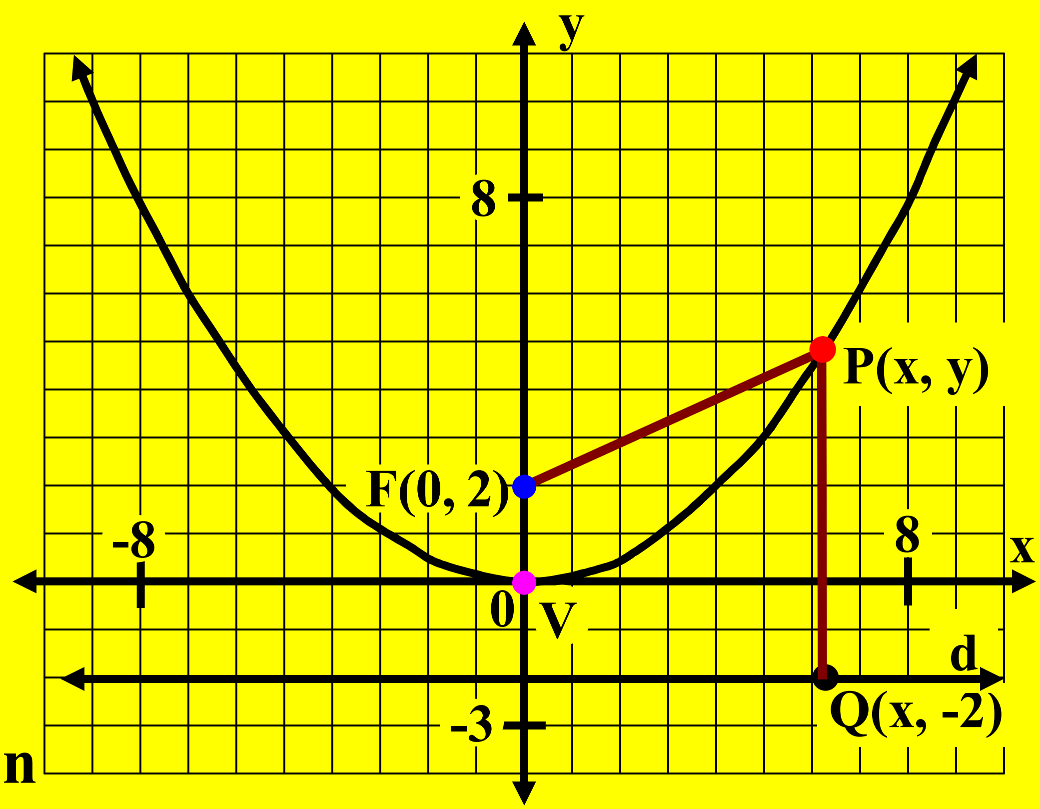

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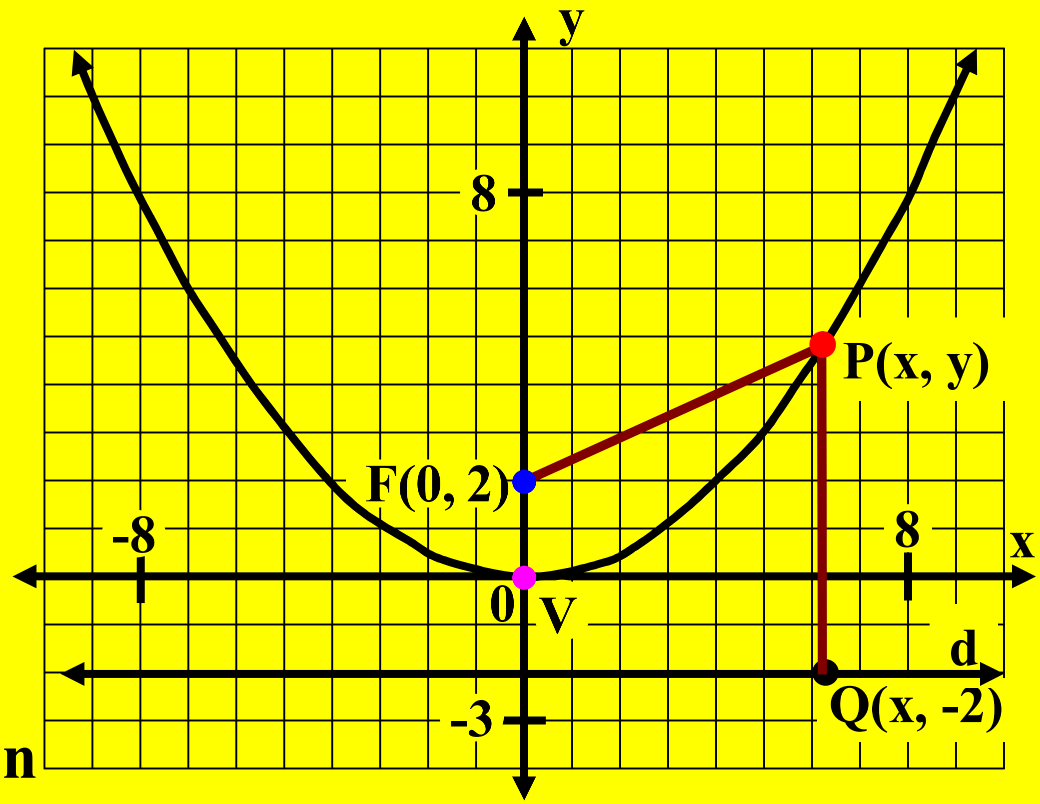

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Multiply both sides by 1/8.

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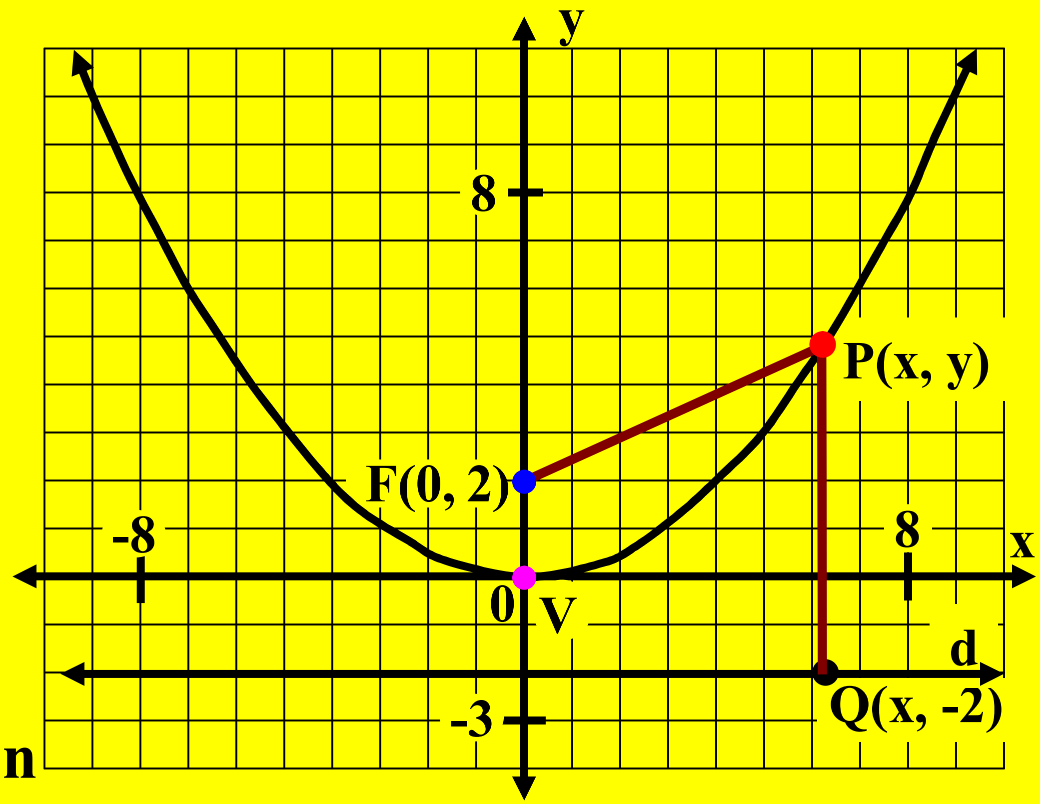

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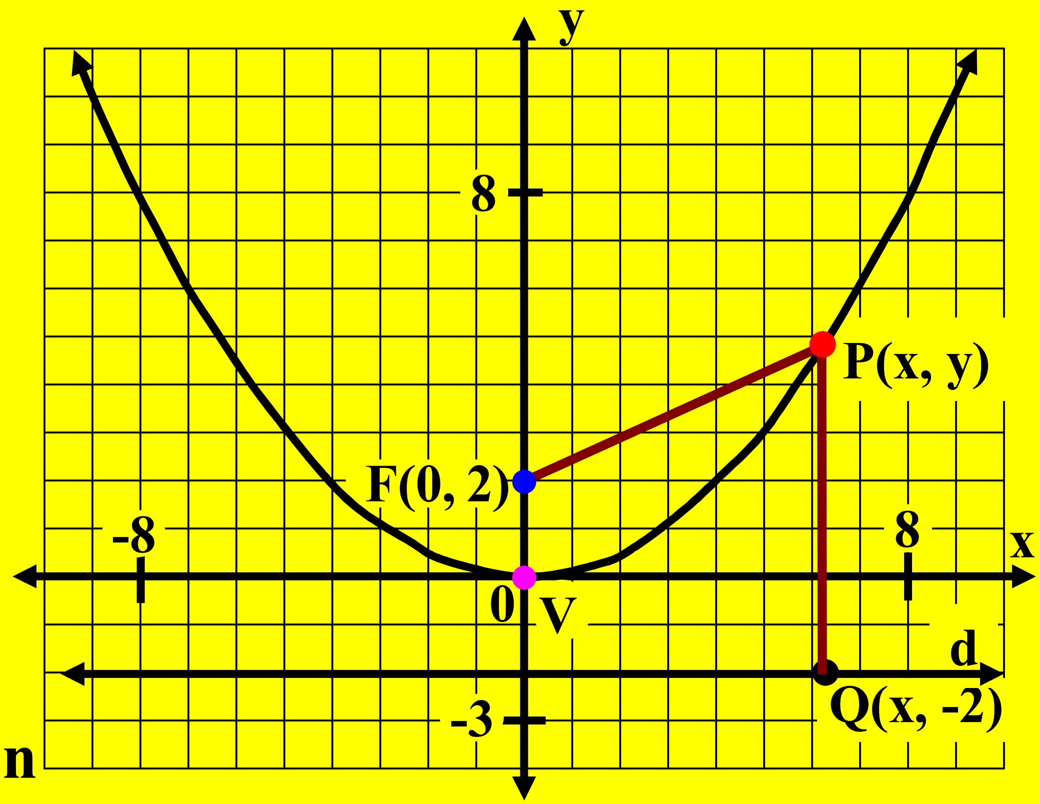

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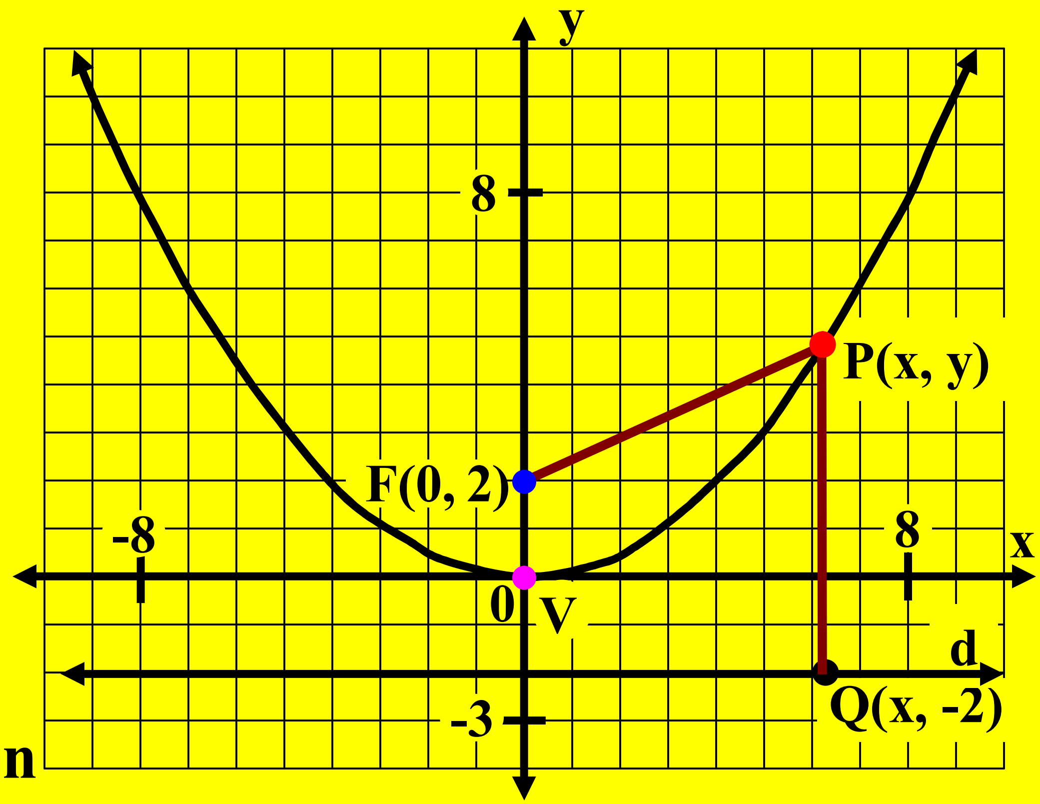

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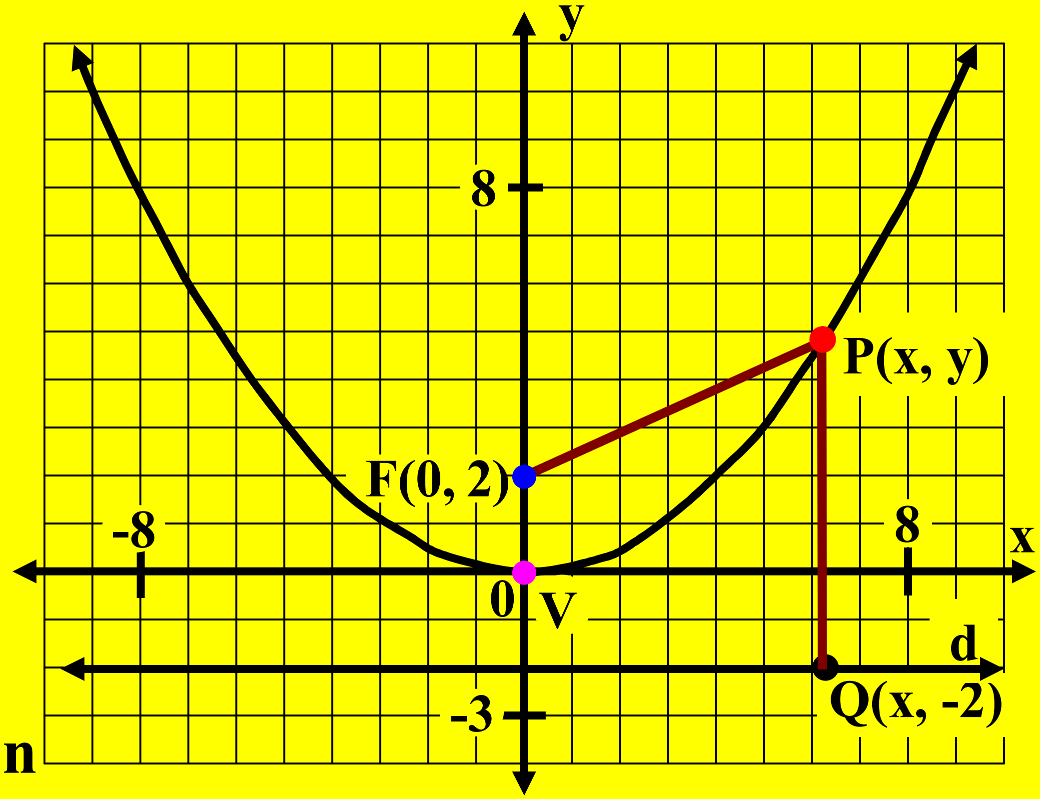

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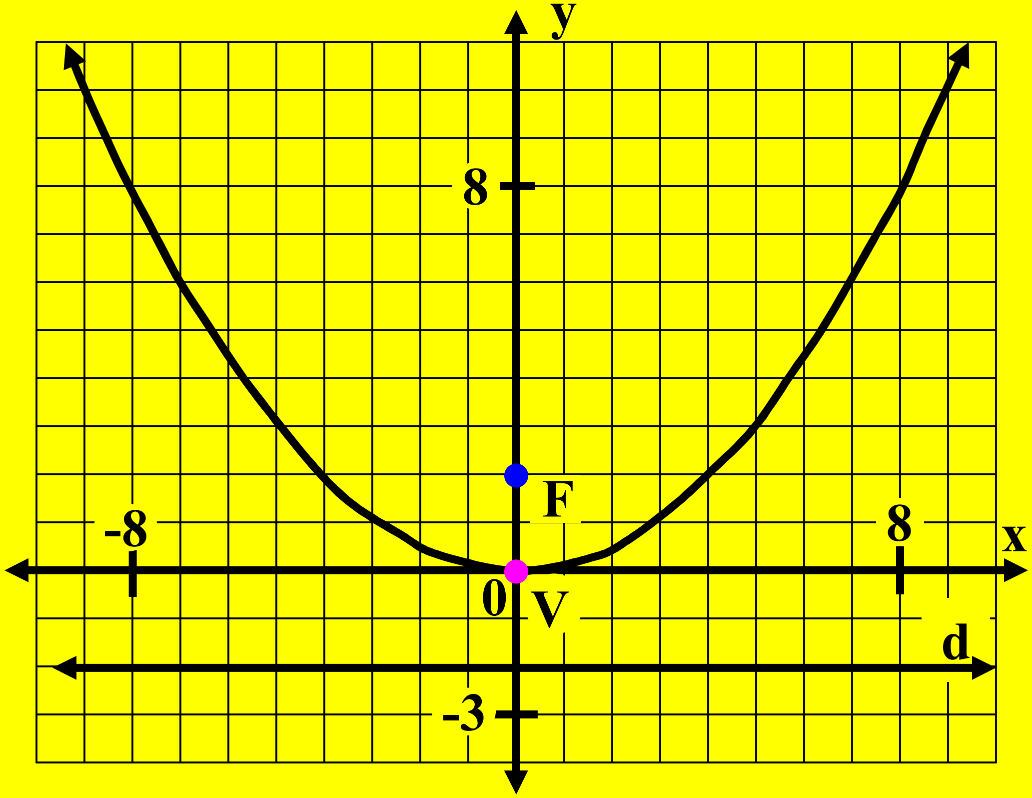
The Equations of a Parabola.

Standard Form Equation

$$y = \frac{1}{8}x^2$$



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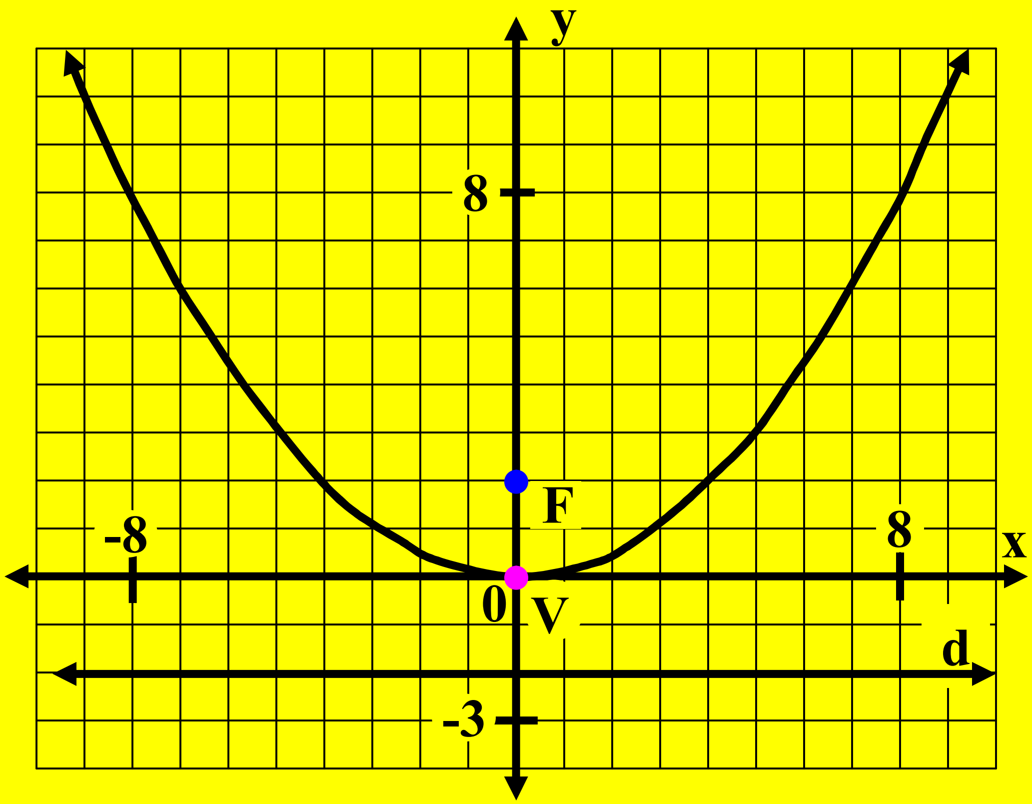
This is an example of a 'type 1' parabola.



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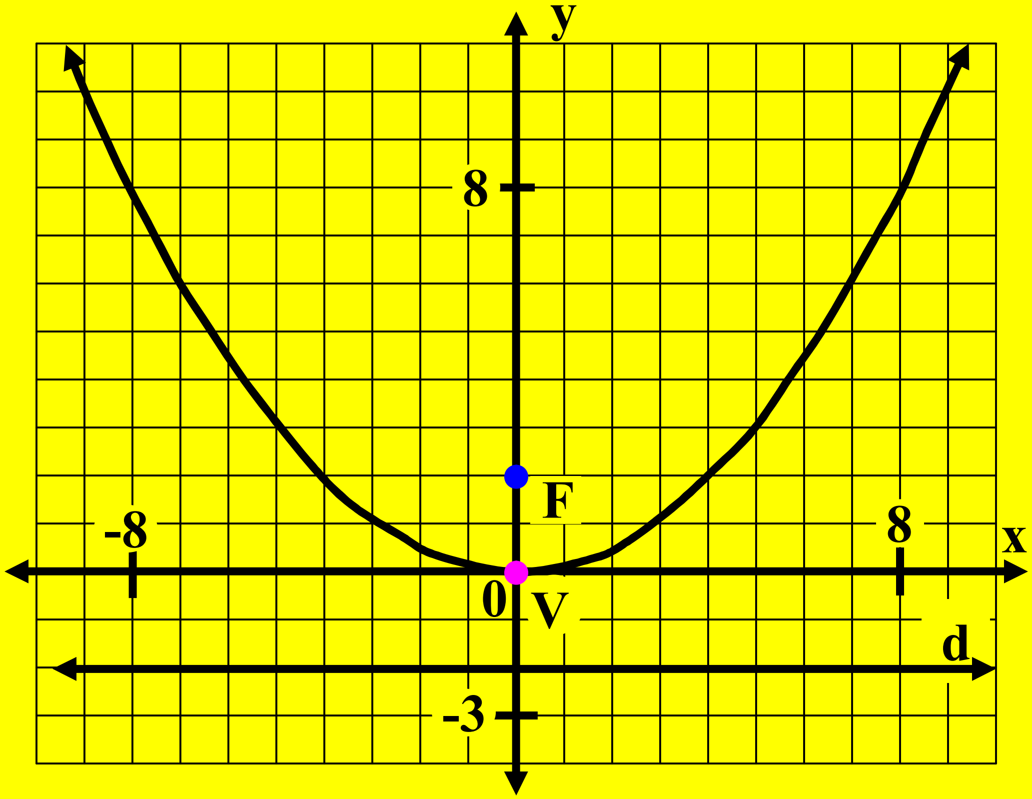

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Standard Form Equation

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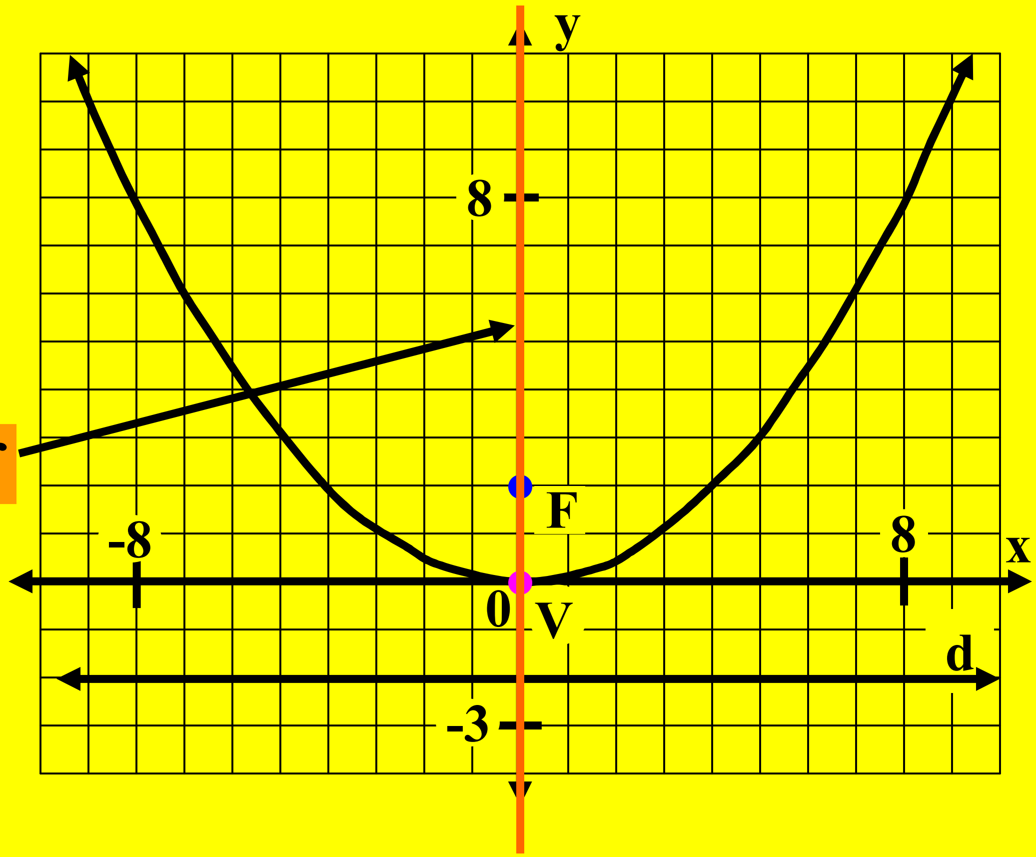
This is an example of a 'type 1' parabola. In this type of parabola, the axis of symmetry



The Equations of a Parabola.

Standard Form Equation

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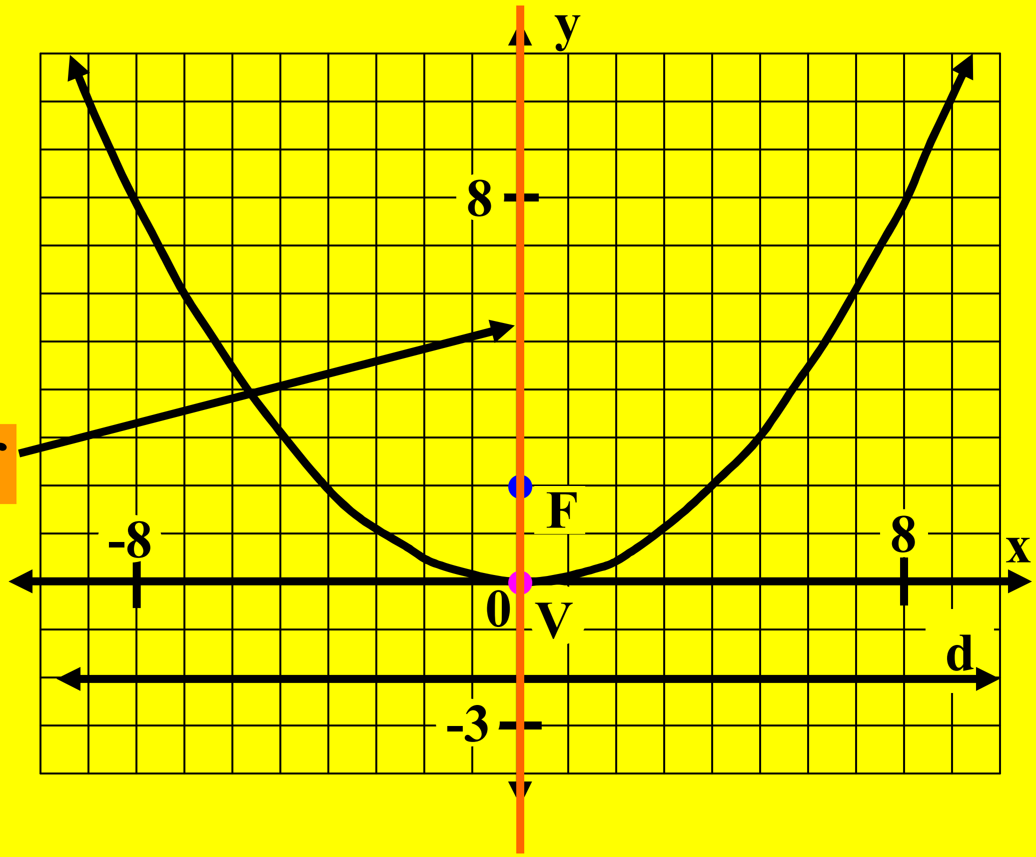
This is an example of a 'type 1' parabola. In this type of parabola, the axis of symmetry is a vertical line.



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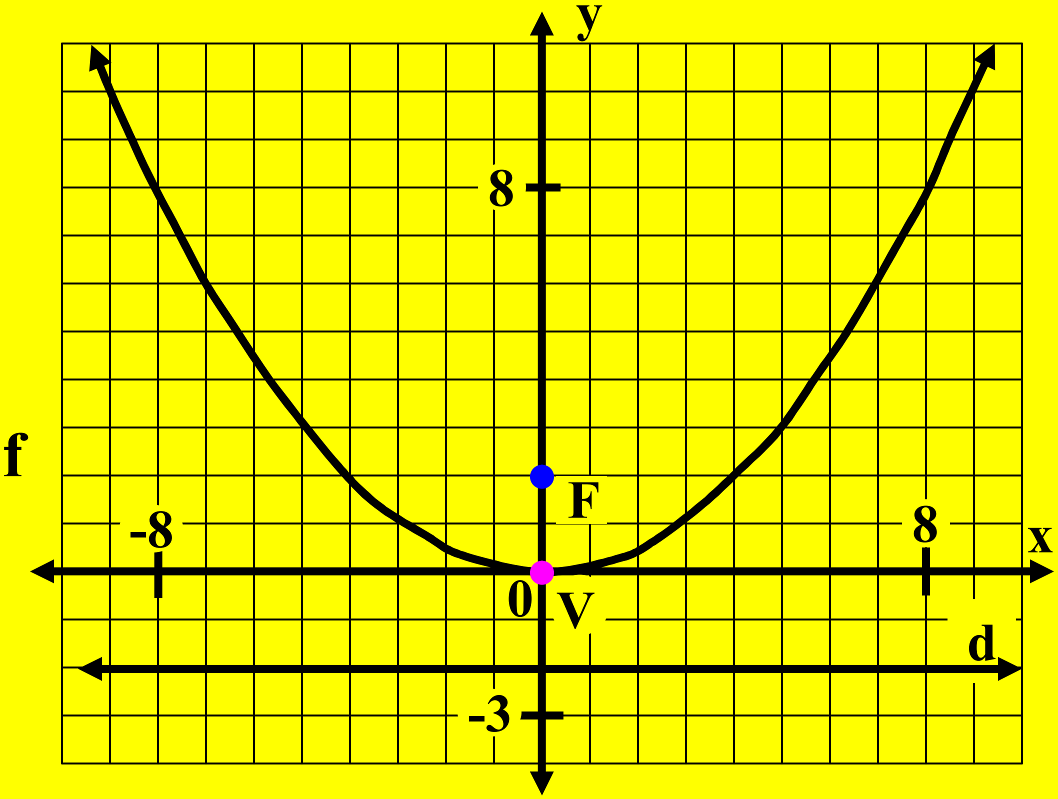

The Equations of a Parabola.

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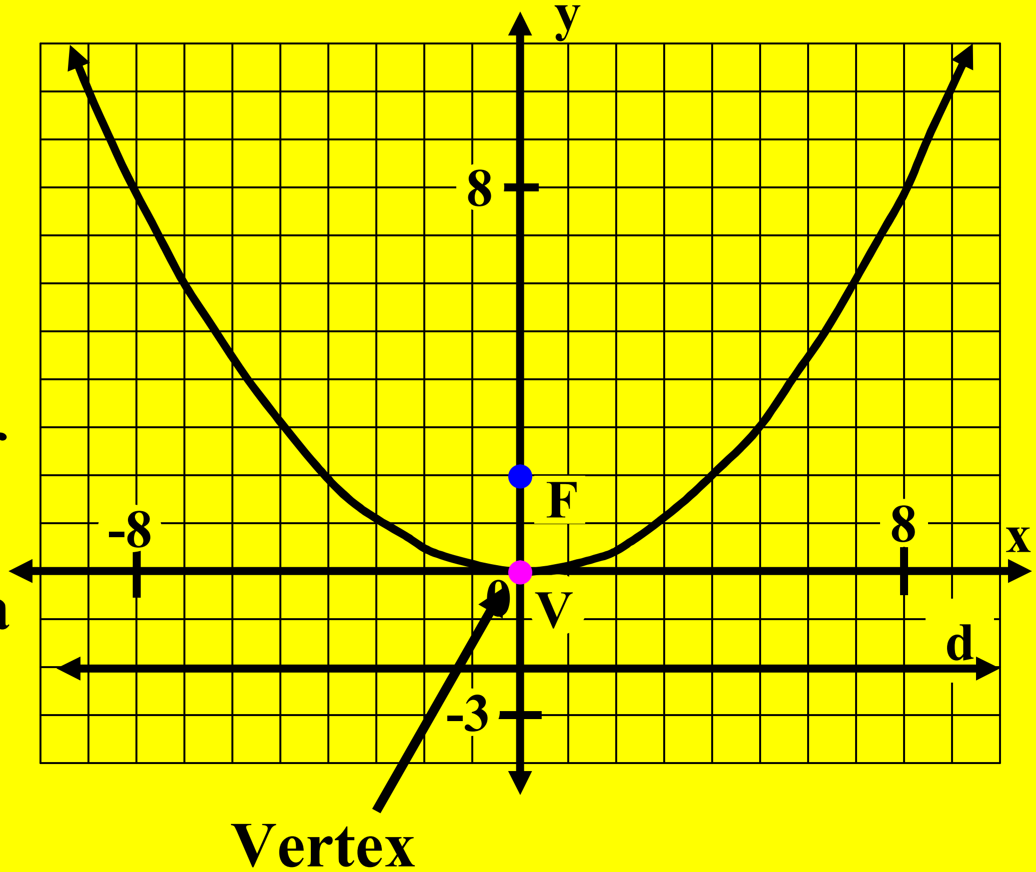
This is an example of a 'type 1' parabola. In this type of parabola, the axis of symmetry is a vertical line. If the vertex of the parabola

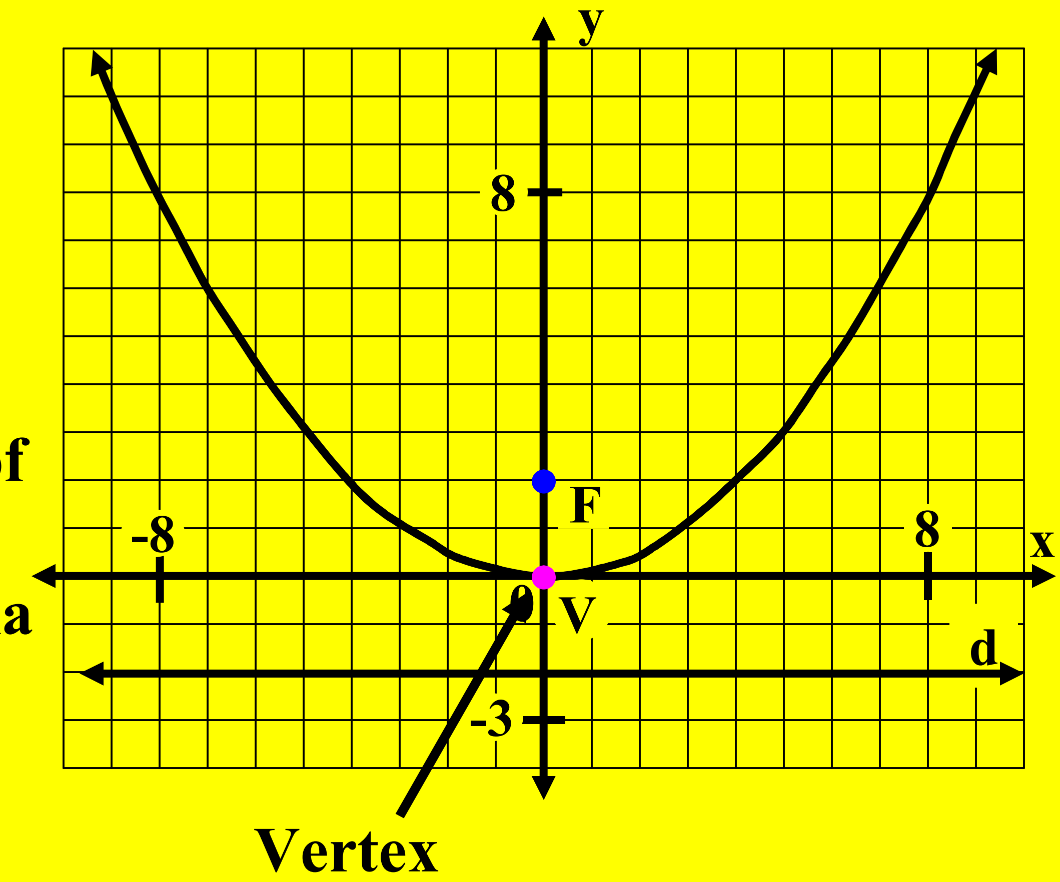


The Equations of a Parabola.

Standard Form Equation

$$y = \frac{1}{8}x^2$$

This is an example of a 'type 1' parabola. In this type of parabola, the axis of symmetry is a vertical line. If the vertex of the parabola is the point (h, k),



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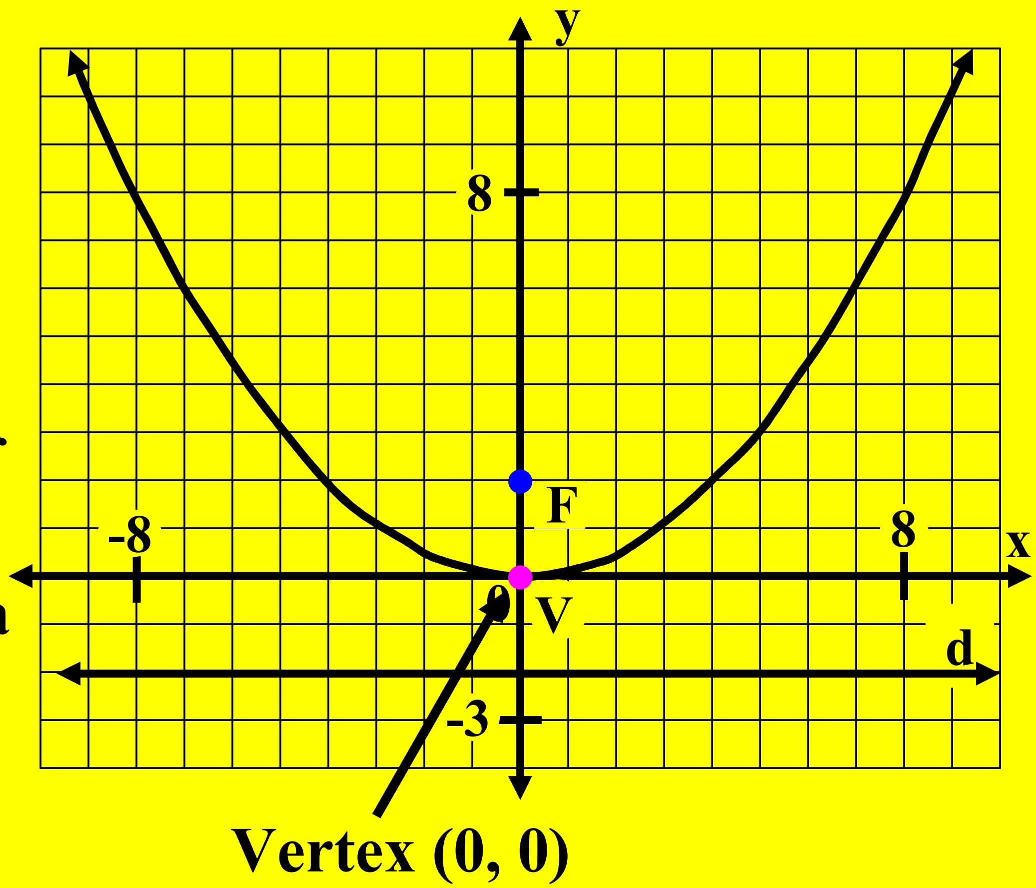

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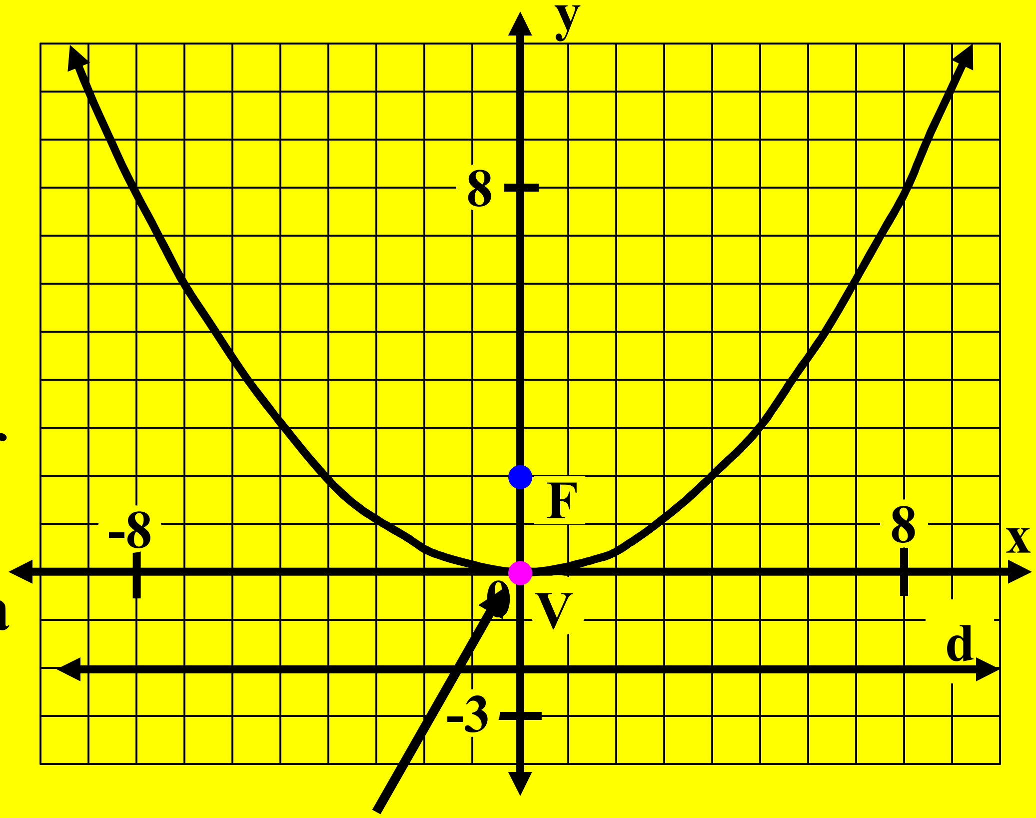

Vertex (0, 0)

h = 0

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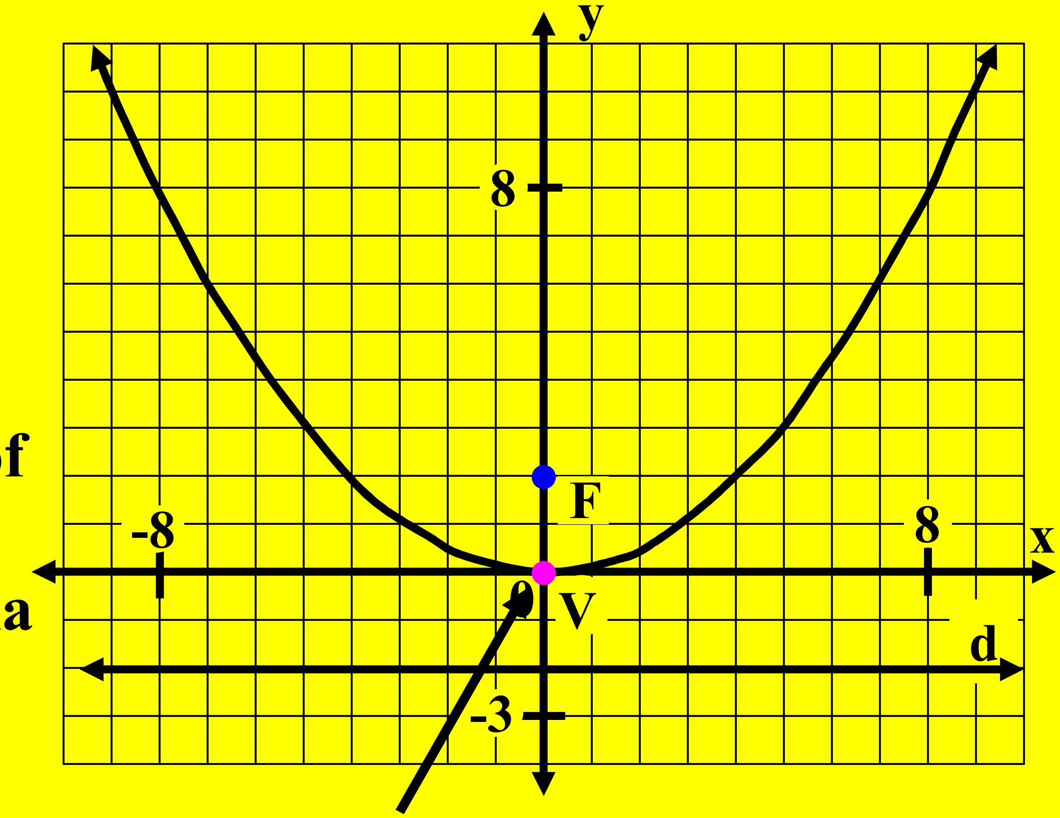

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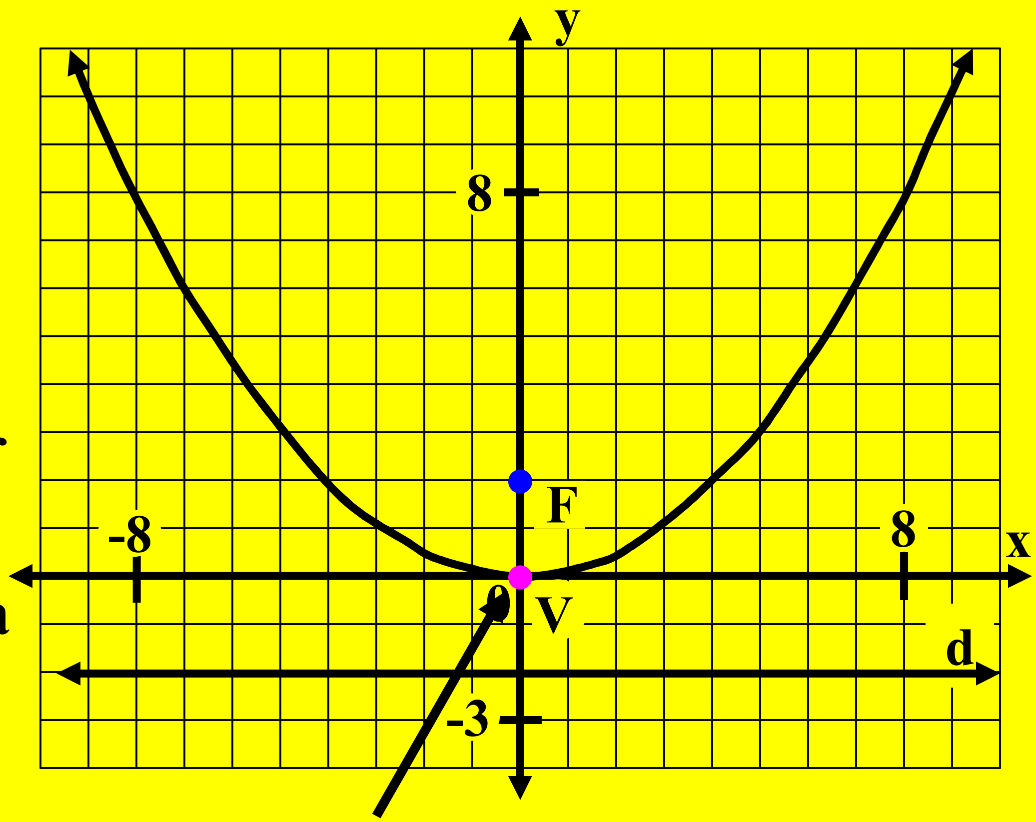

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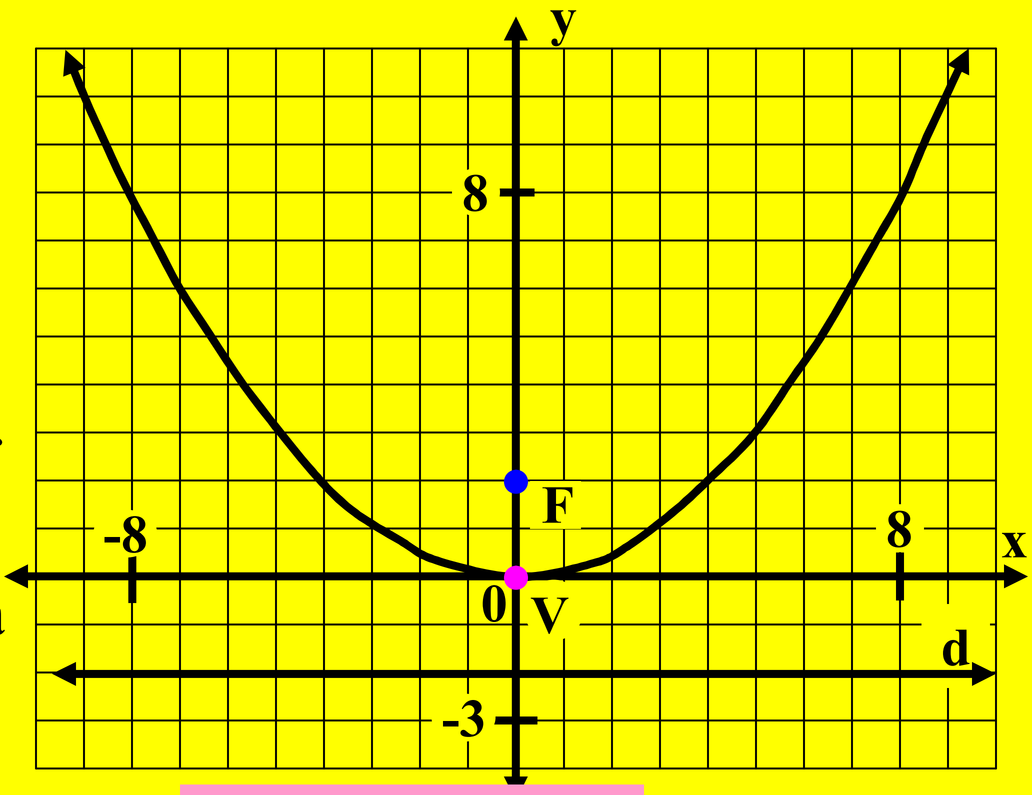

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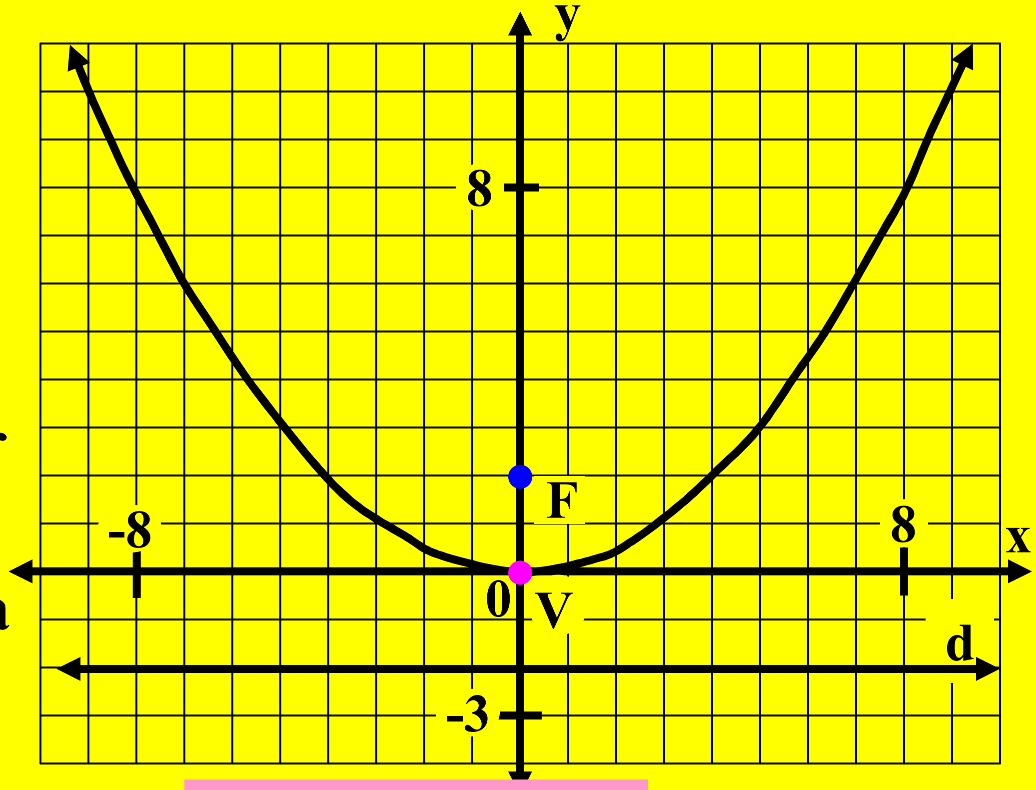

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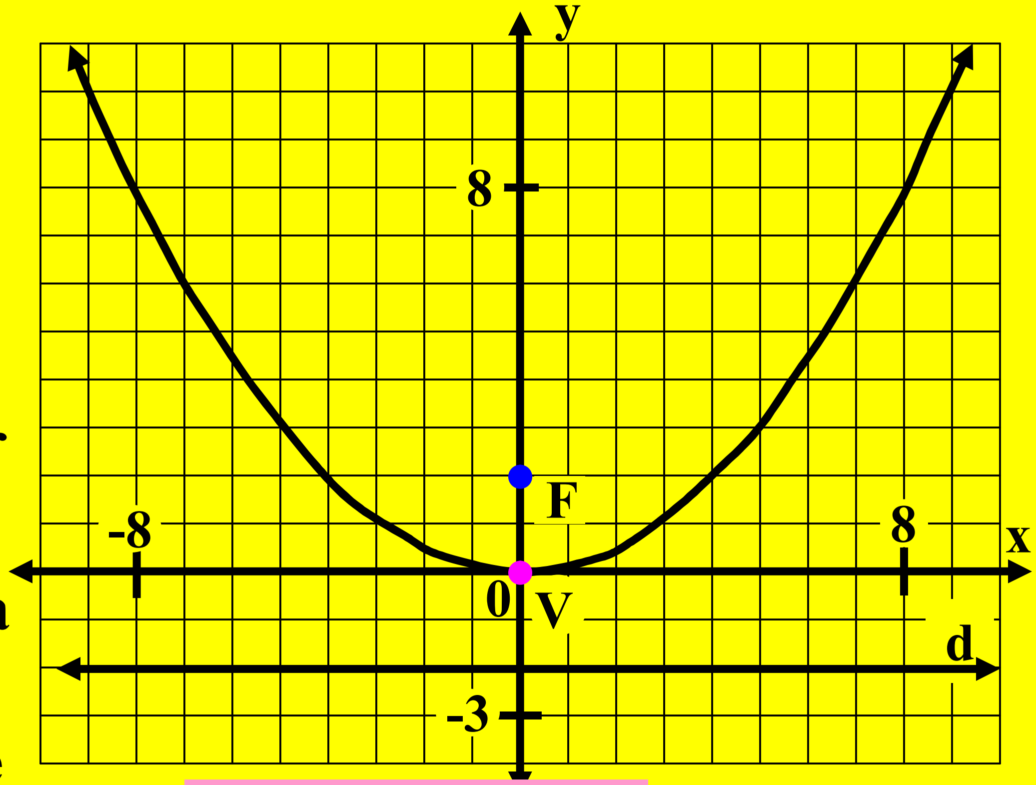

Vertex (0, 0)

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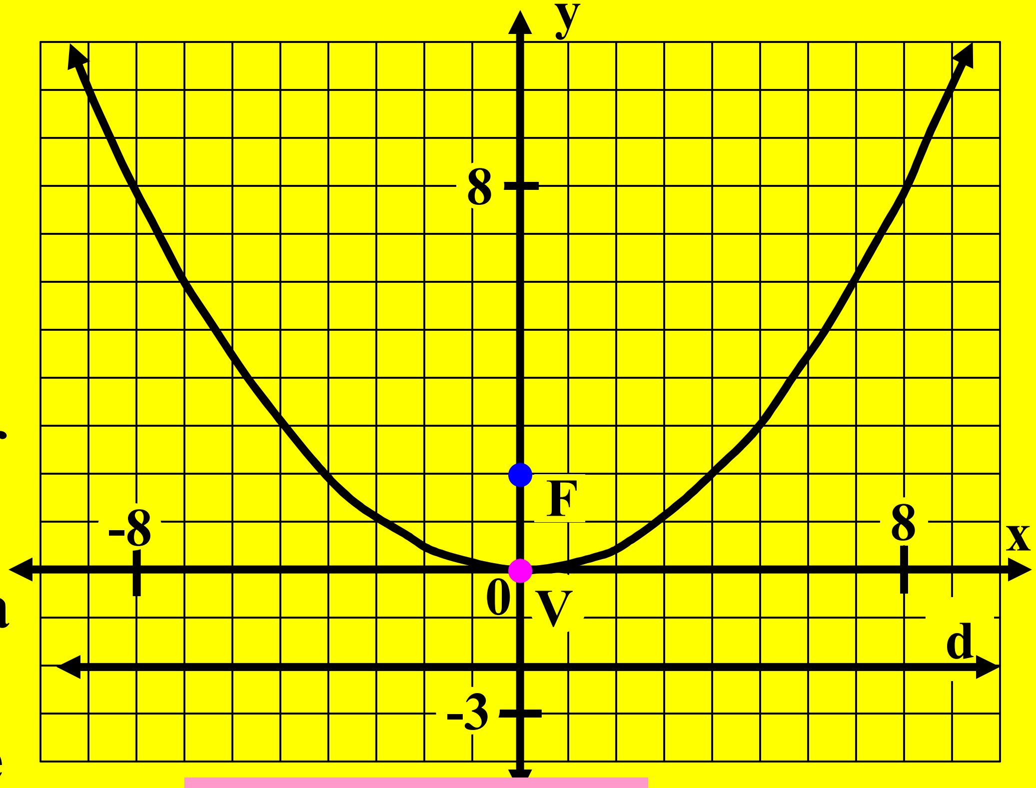

Vertex (0, 0)

h = 0 and k = 0

If the focus is above the vertex, then p > 0.

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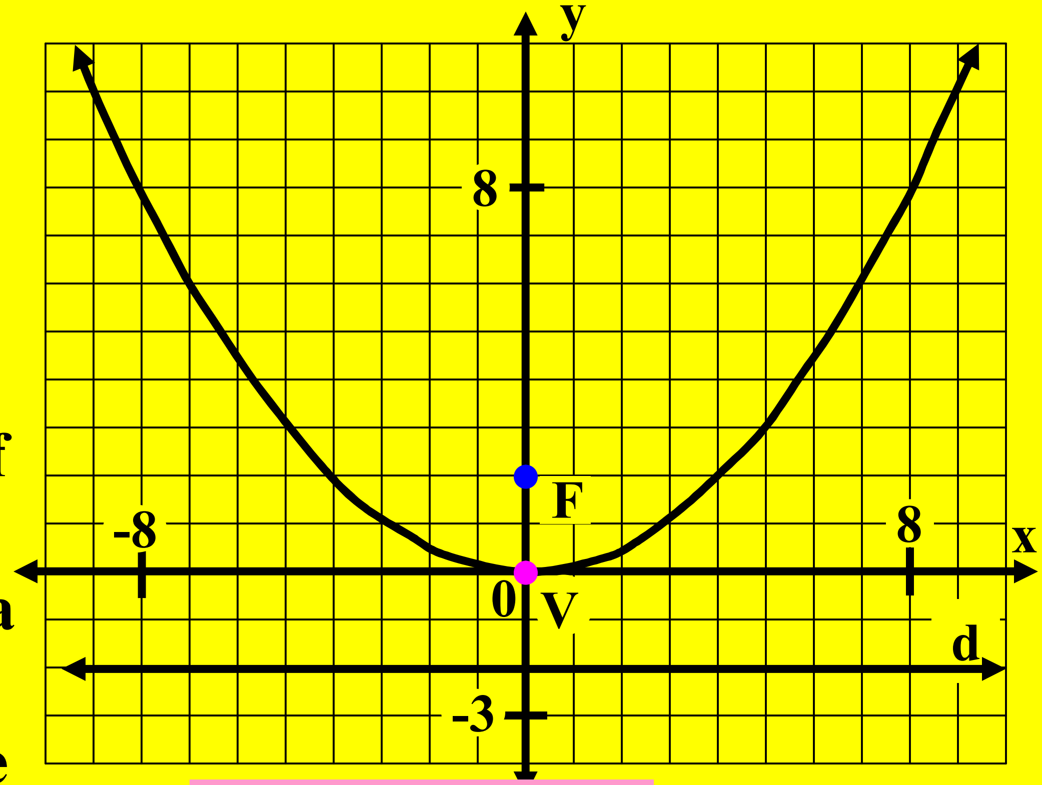

Vertex (0, 0)

h = 0 and k = 0

If the focus is above the vertex, then $p > 0$.

If the focus is below the vertex, then $p < 0$.

The Equations of a Parabola.

Standard Form Equation

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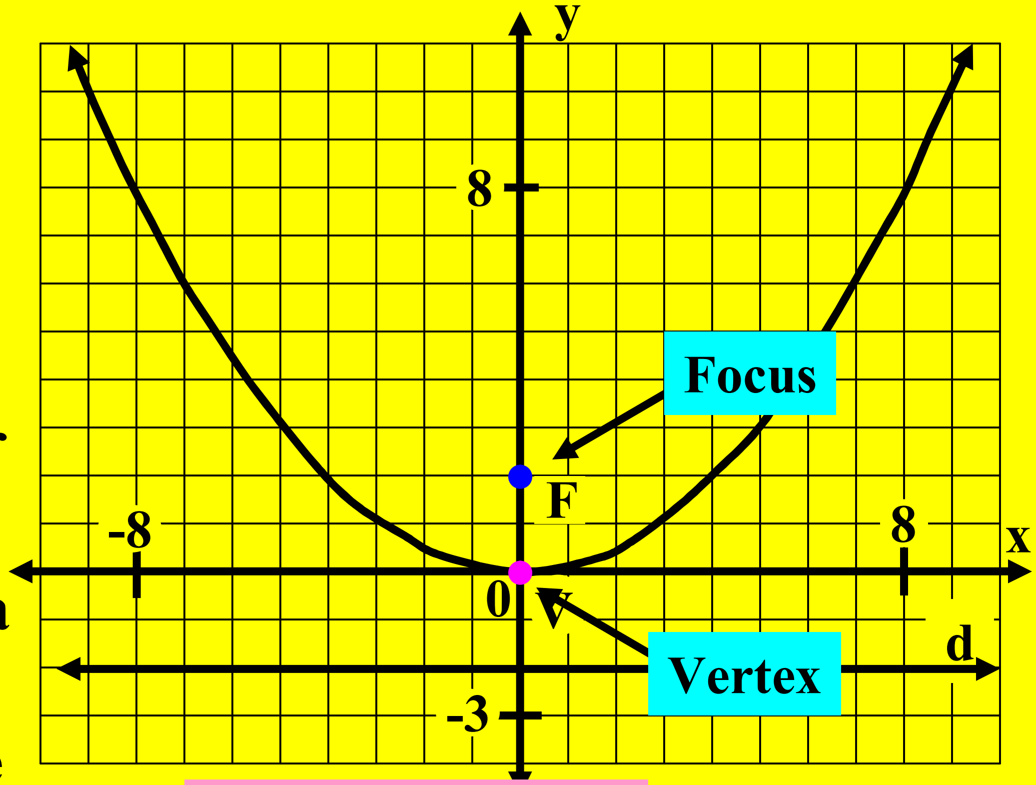

Vertex (0, 0)

h = 0 and k = 0

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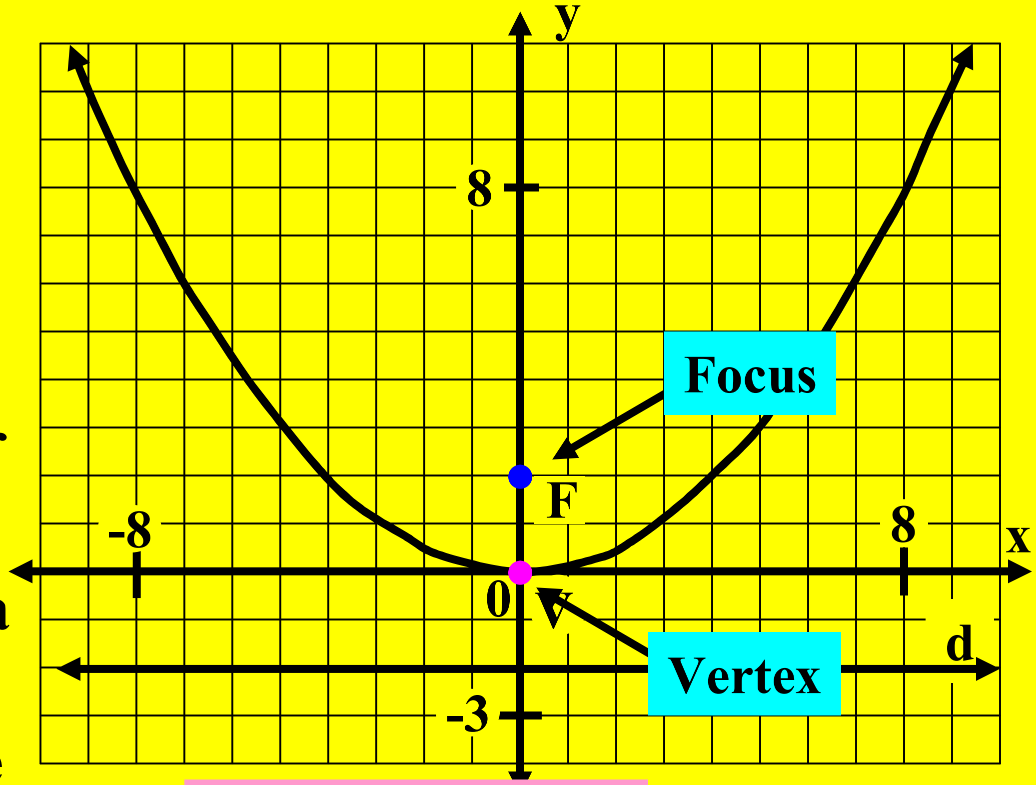

Vertex (0, 0)
h = 0 and k = 0

p =

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Standard Form Equation

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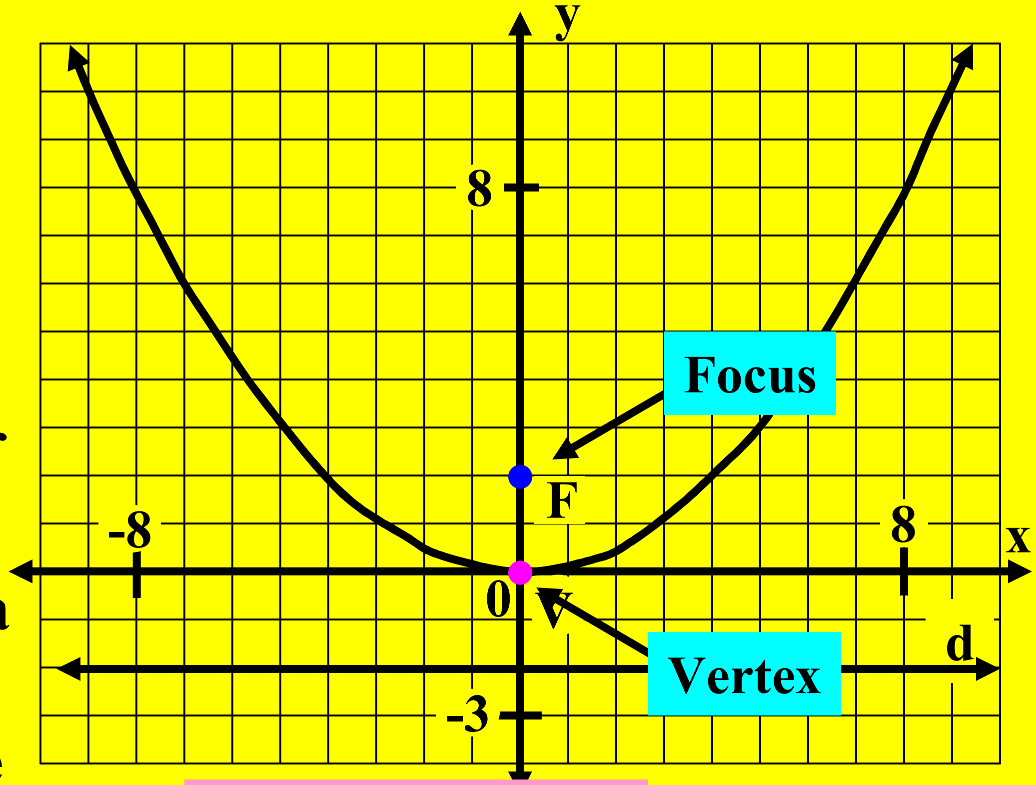

Vertex (0, 0)

h = 0 and k = 0

p = +2

If the focus is above the vertex, then $p > 0$.

If the focus is below the vertex, then $p < 0$.

The Equations of a Parabola.

Standard Form Equation

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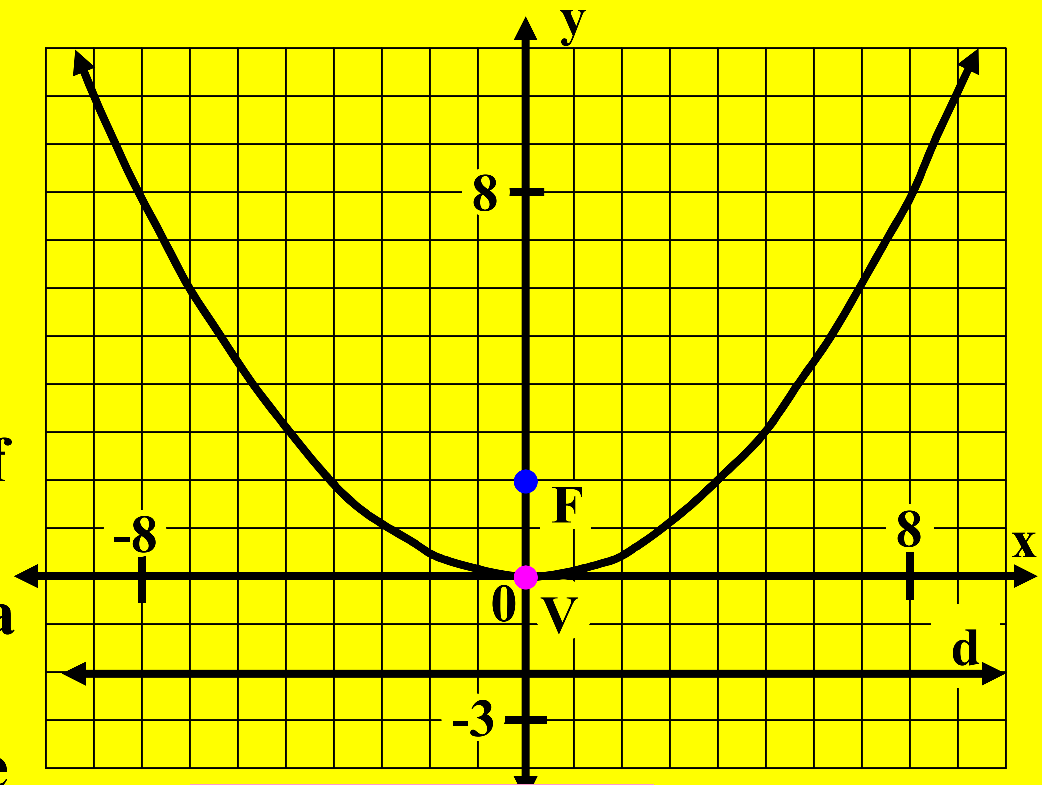

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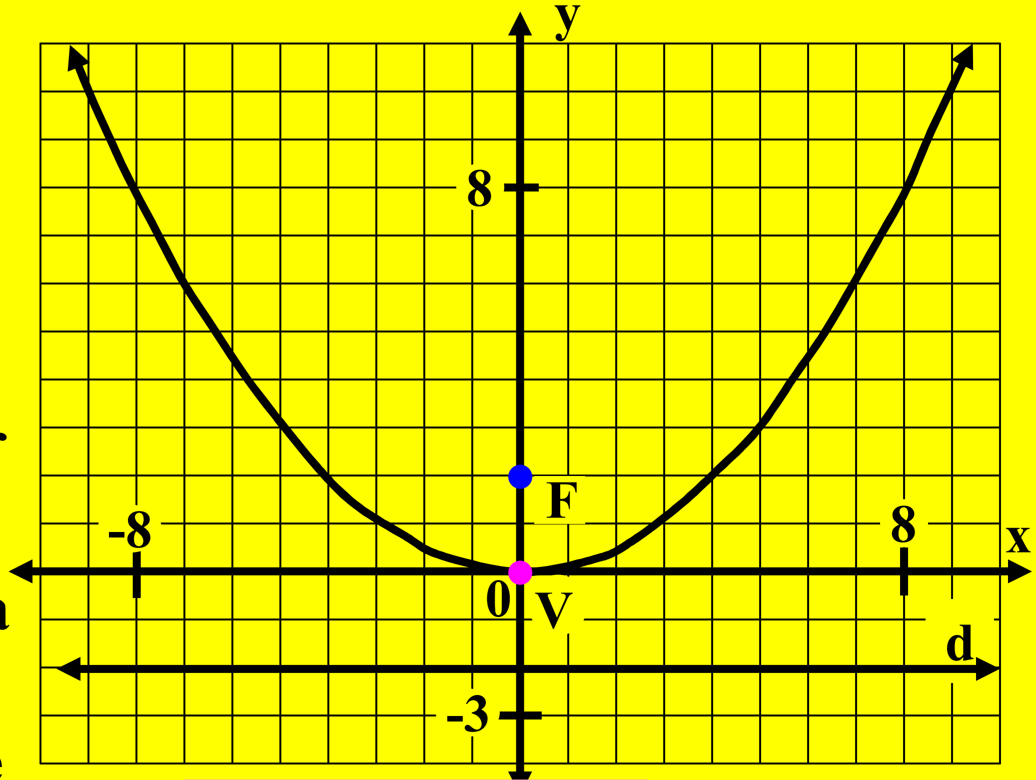

Vertex (0, 0)
h = 0 and k = 0

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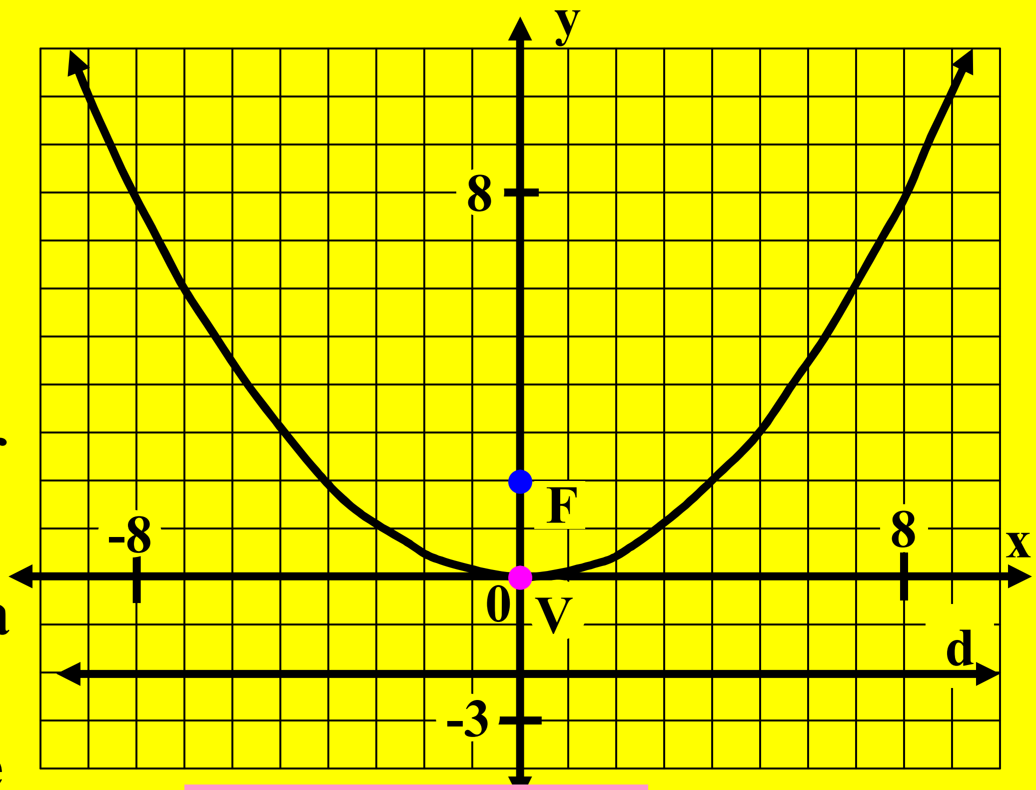

Vertex (0, 0)

$h = 0$ and $k = 0$

$p = +2$

The Equations of a Parabola.

Standard Form Equation

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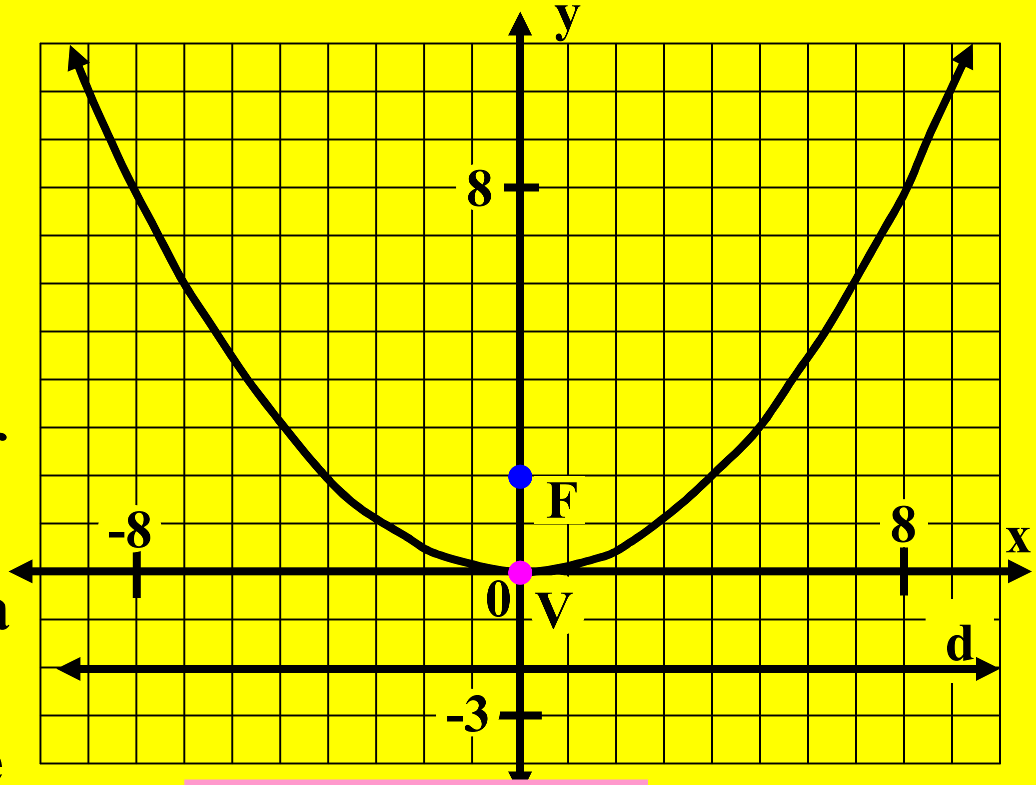

Vertex (0, 0)

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The Equations of a Parabola.

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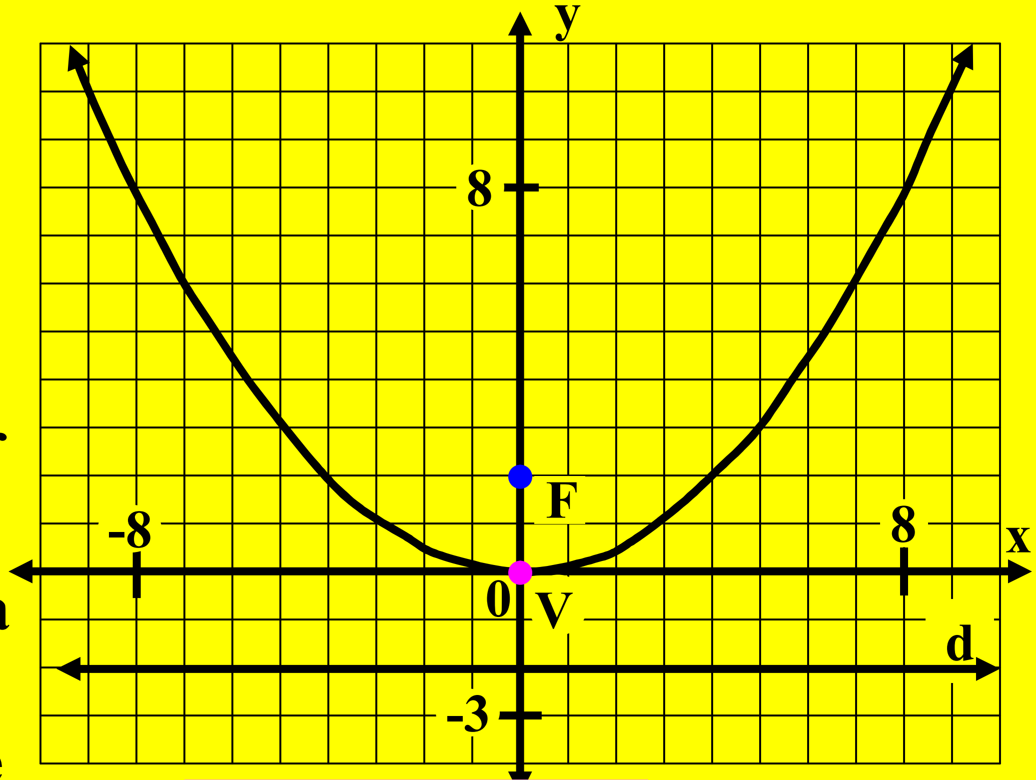

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$$y - k = a(x - h)^2 \text{ where } a = \frac{1}{4p}$$

Vertex (0, 0)

h = 0 and k = 0

p = +2

The Equations of a Parabola.

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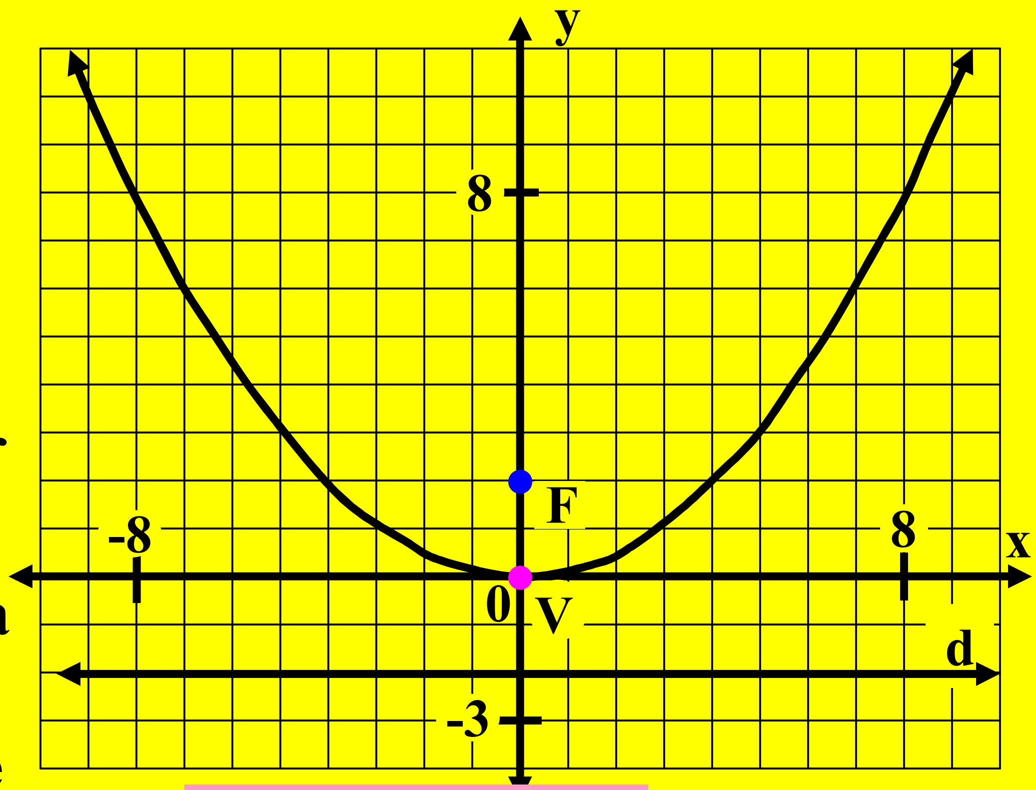

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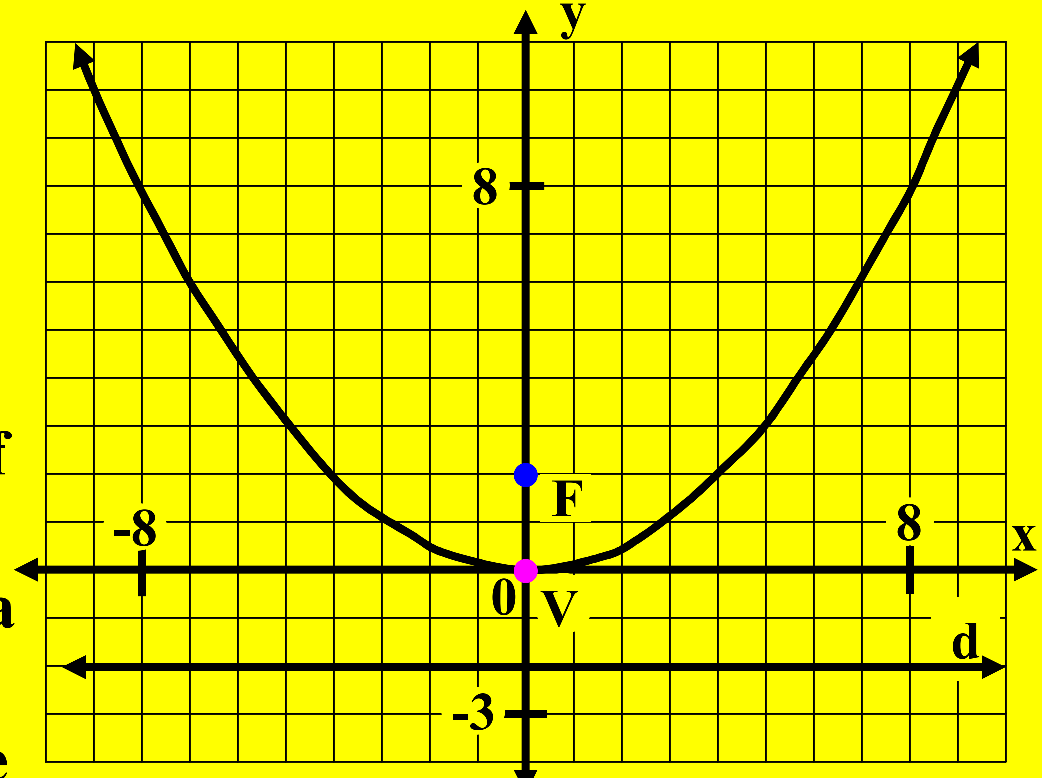

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Vertex (0, 0)

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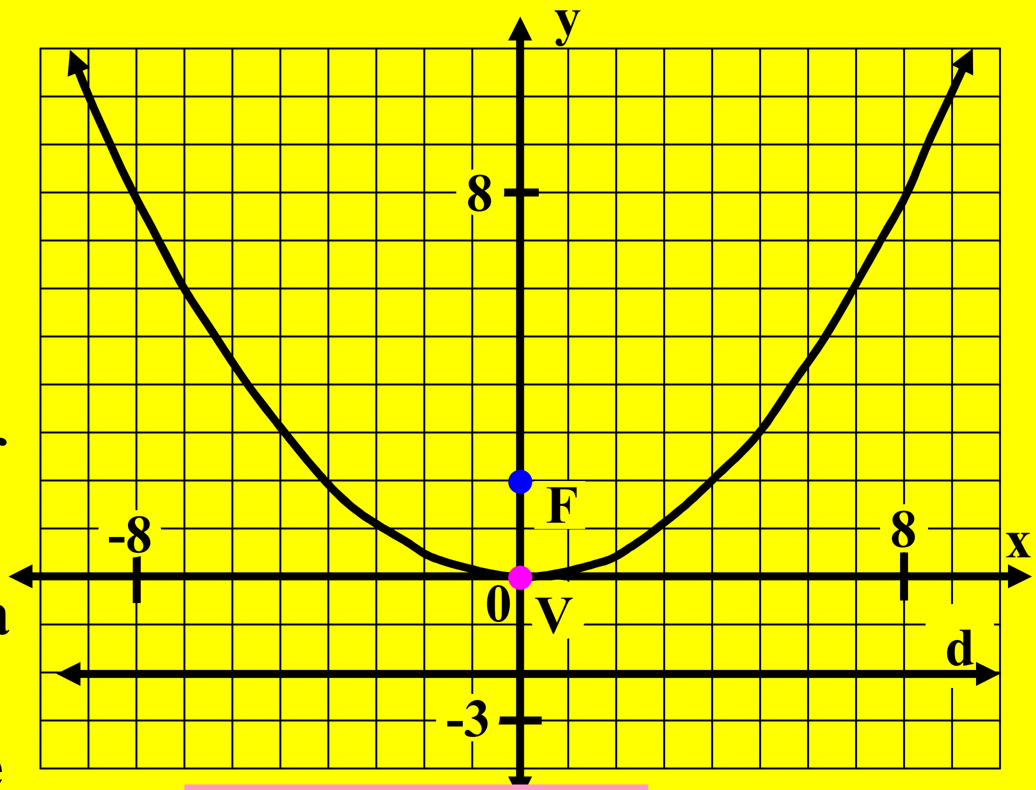

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Vertex (0, 0)

h = 0 and k = 0

$p = +2$

$$a = \frac{1}{4 \cdot 2}$$

The Equations of a Parabola.

Standard Form Equation

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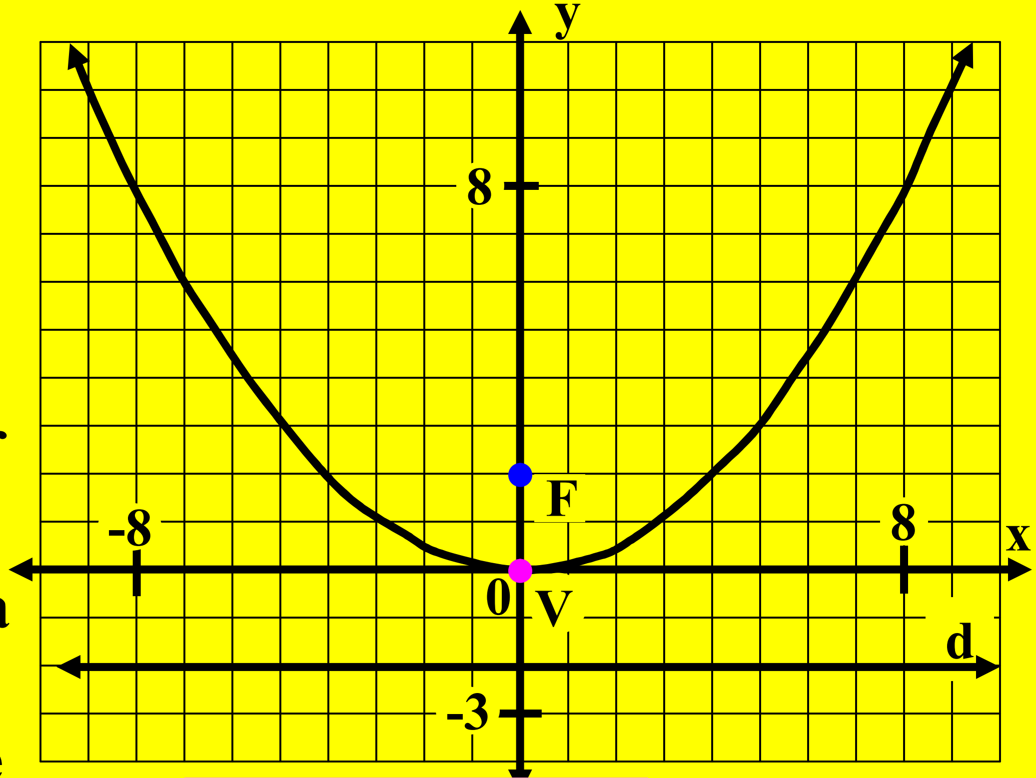

Vertex (0, 0)

h = 0 and k = 0

p = +2

$$a = \frac{1}{4 \cdot 2} = \frac{1}{8}$$

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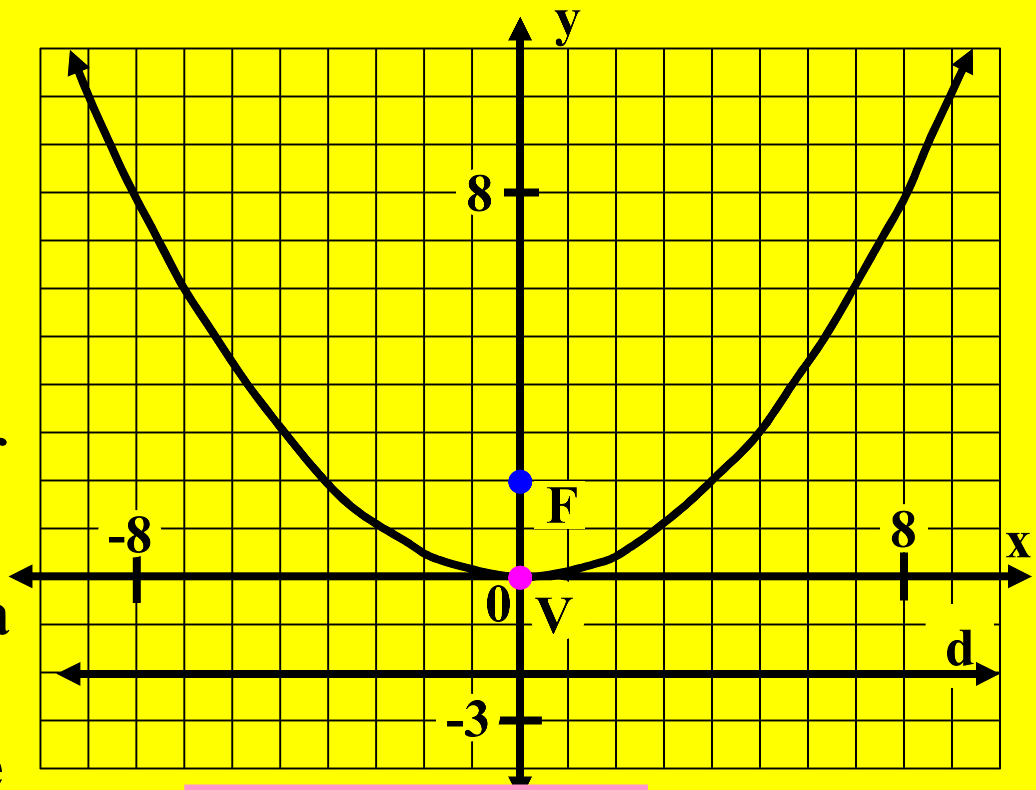

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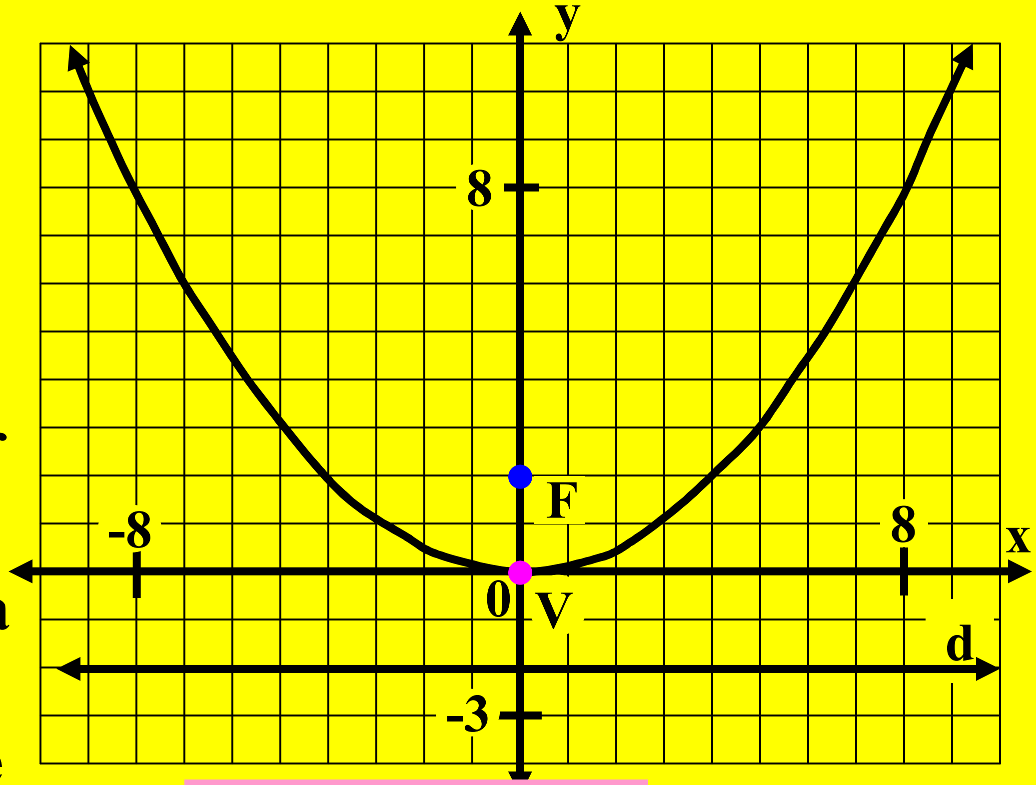

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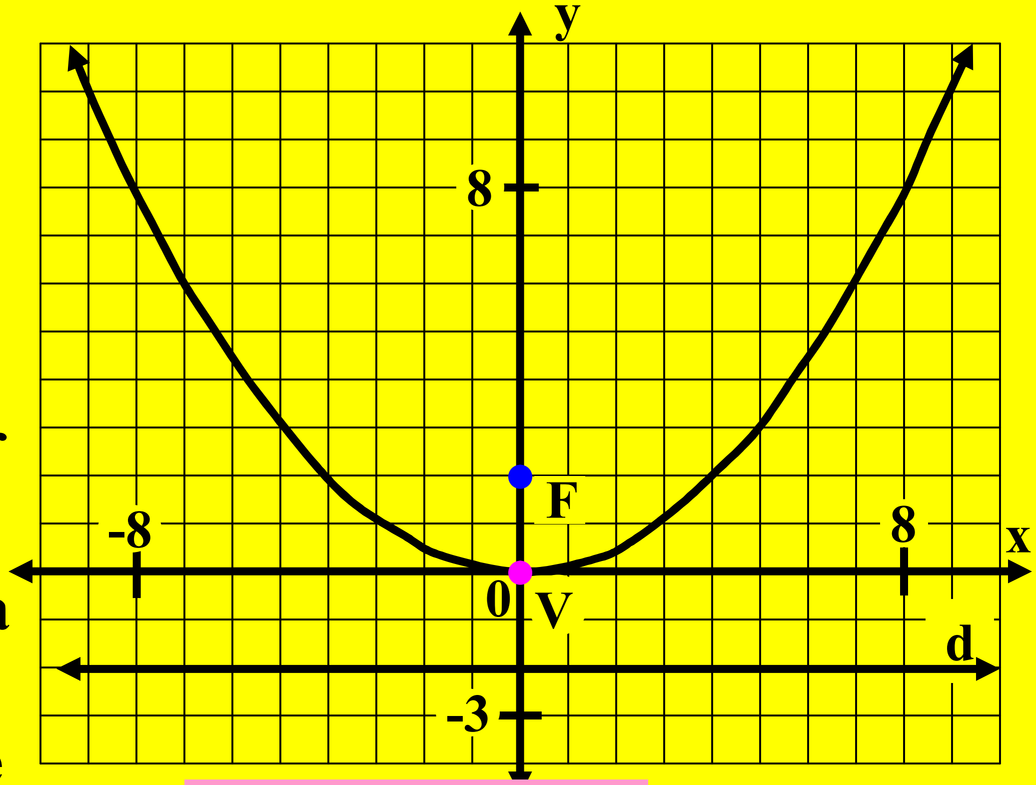

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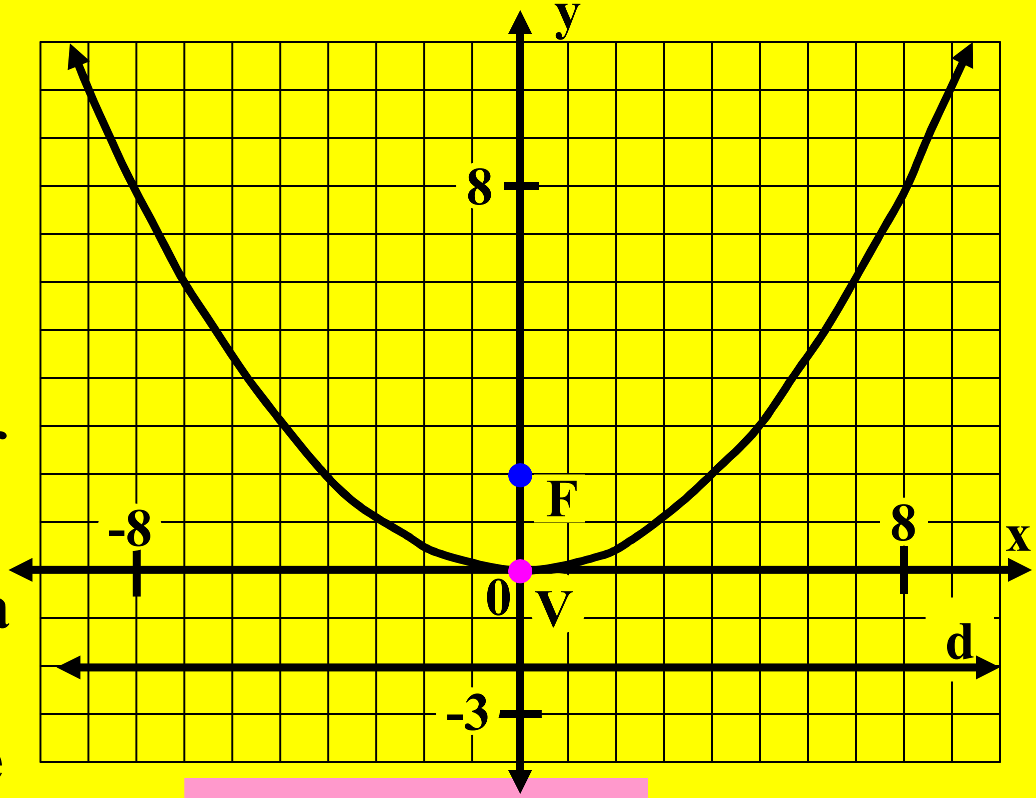

Vertex (0, 0)

h = 0 and k = 0

p = +2

$$y - k = a(x - h)^2 \text{ where } a = \frac{1}{4p}$$

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$$y - 0$$

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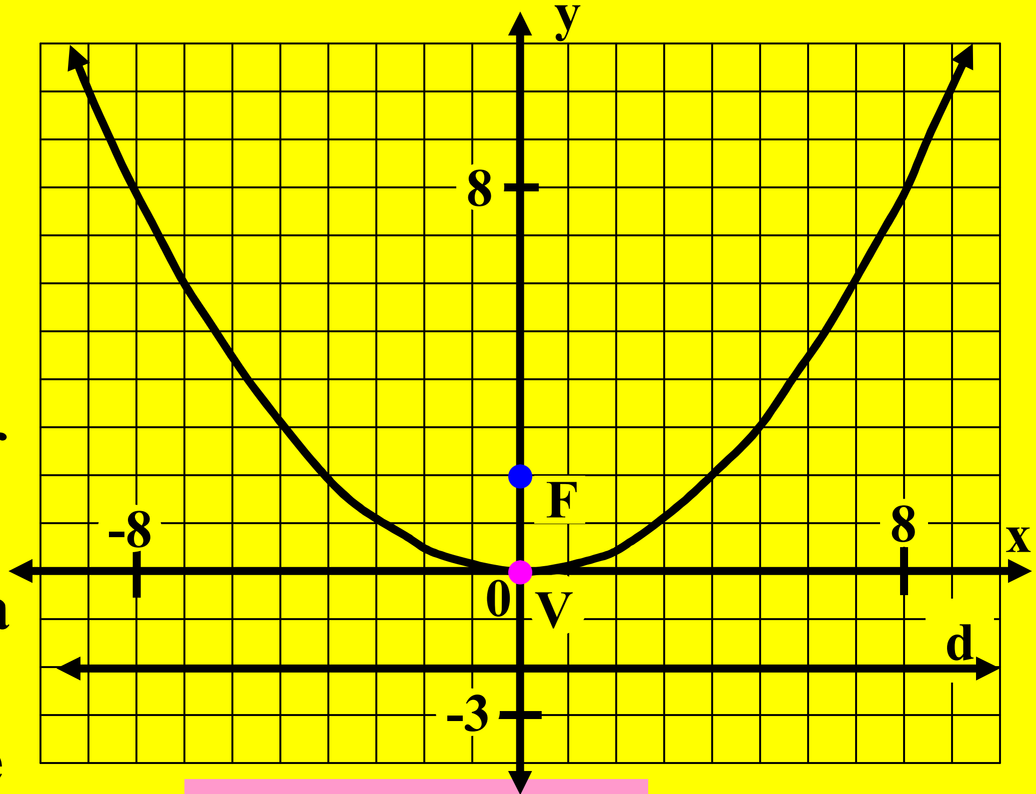
$y - 0 =$



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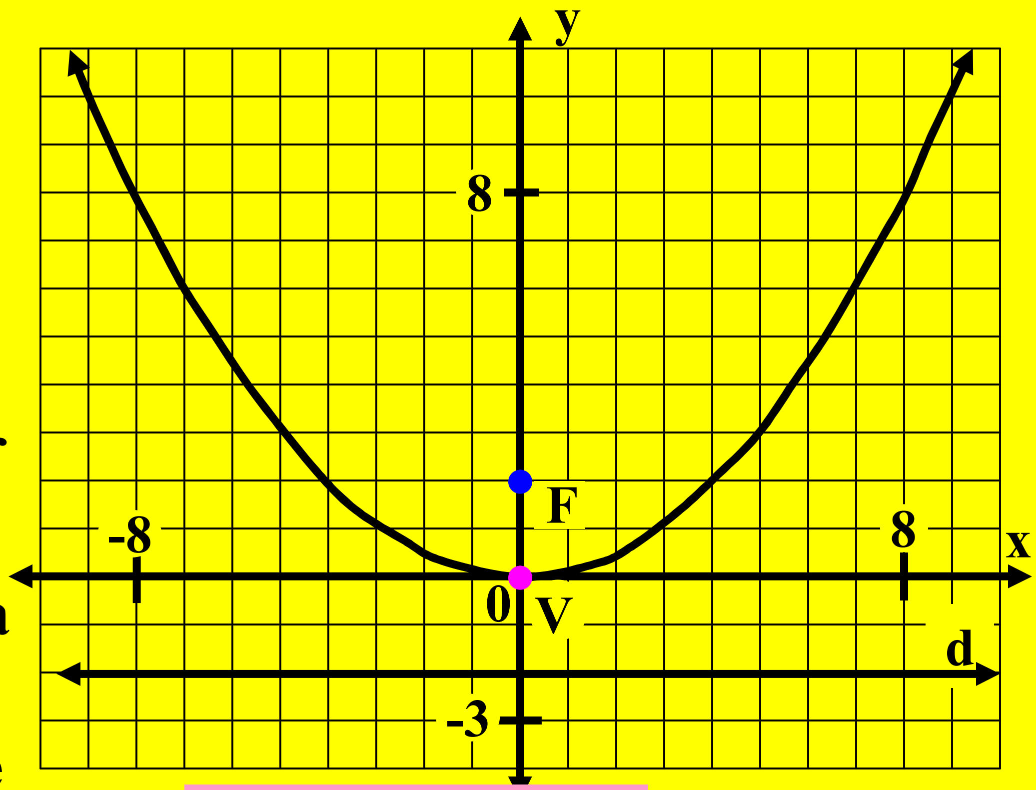

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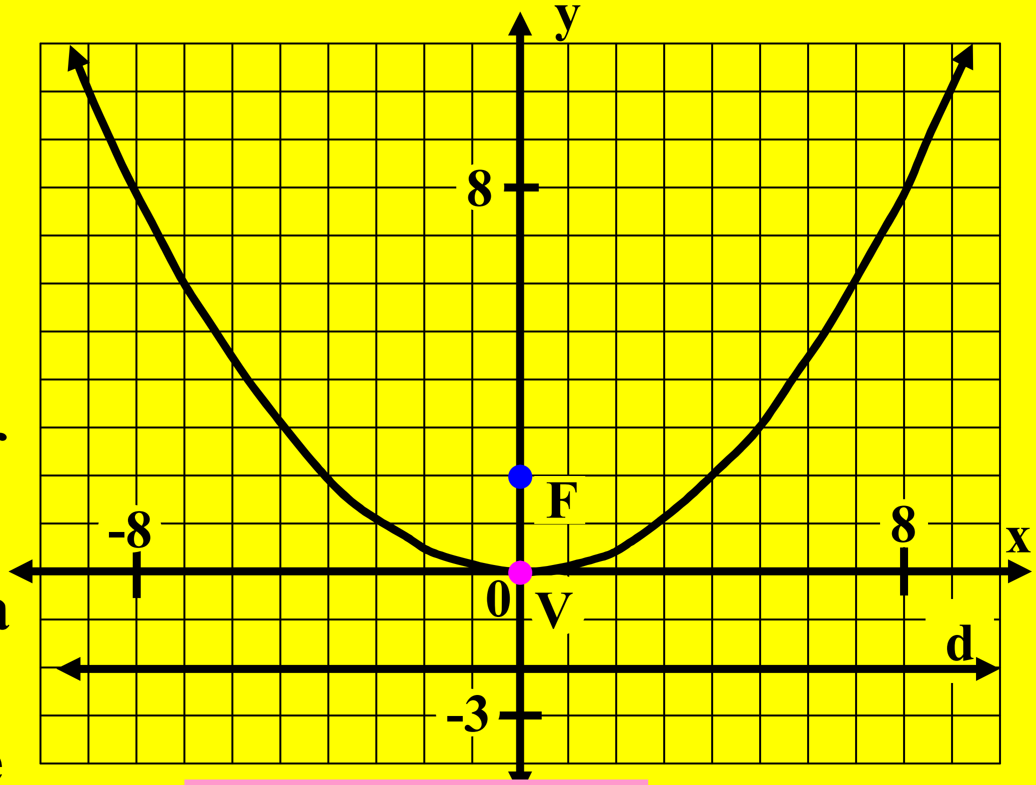

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$$y - 0 = \frac{1}{8}(x -$$

Vertex (0, 0)

h = 0 and k = 0

$$p = +2$$

$$a = \frac{1}{4 \cdot 2} = \frac{1}{8}$$

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Standard Form Equation

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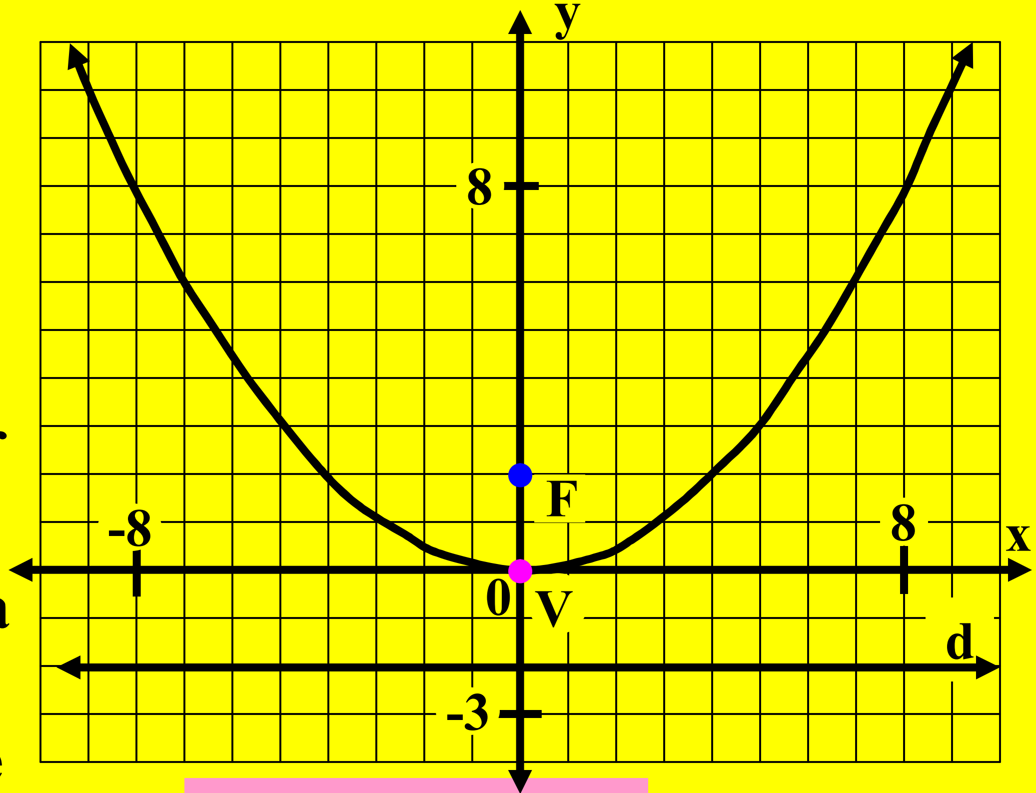
$$y - k = a(x - h)^2 \text{ where } a = \frac{1}{4p}$$

$$y - 0 = \frac{1}{8}(x - 0)$$



Vertex (0, 0)

h = 0 and k = 0

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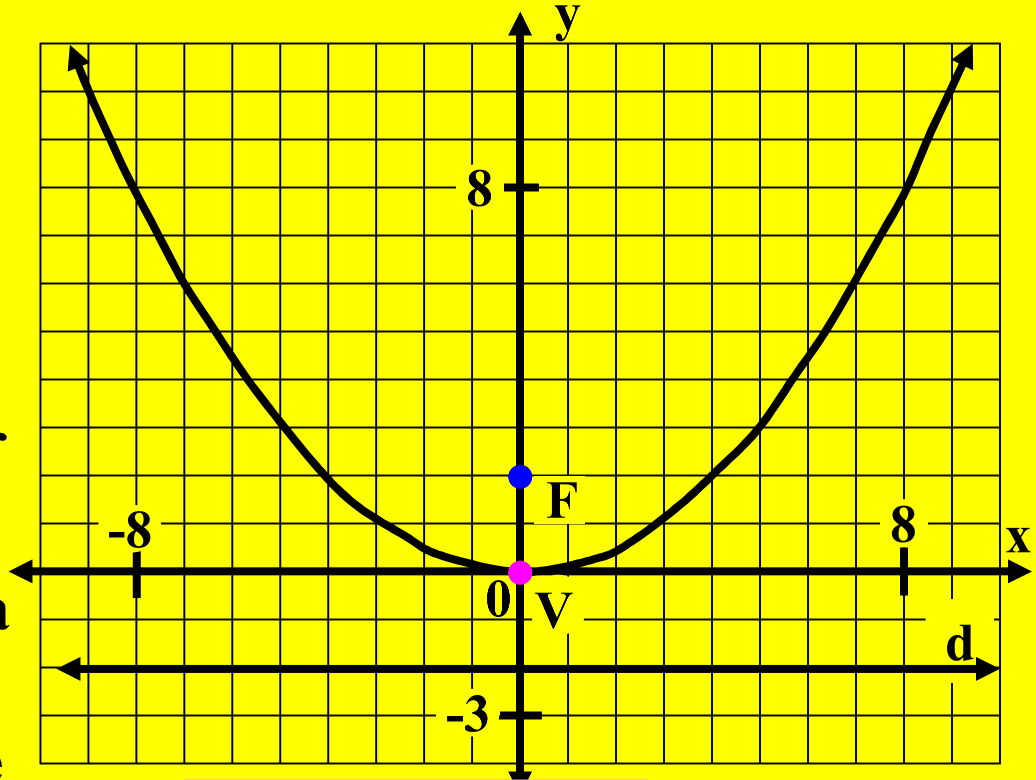

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$$y - 0 = \frac{1}{8}(x - 0)^2$$

Vertex (0, 0)

h = 0 and k = 0

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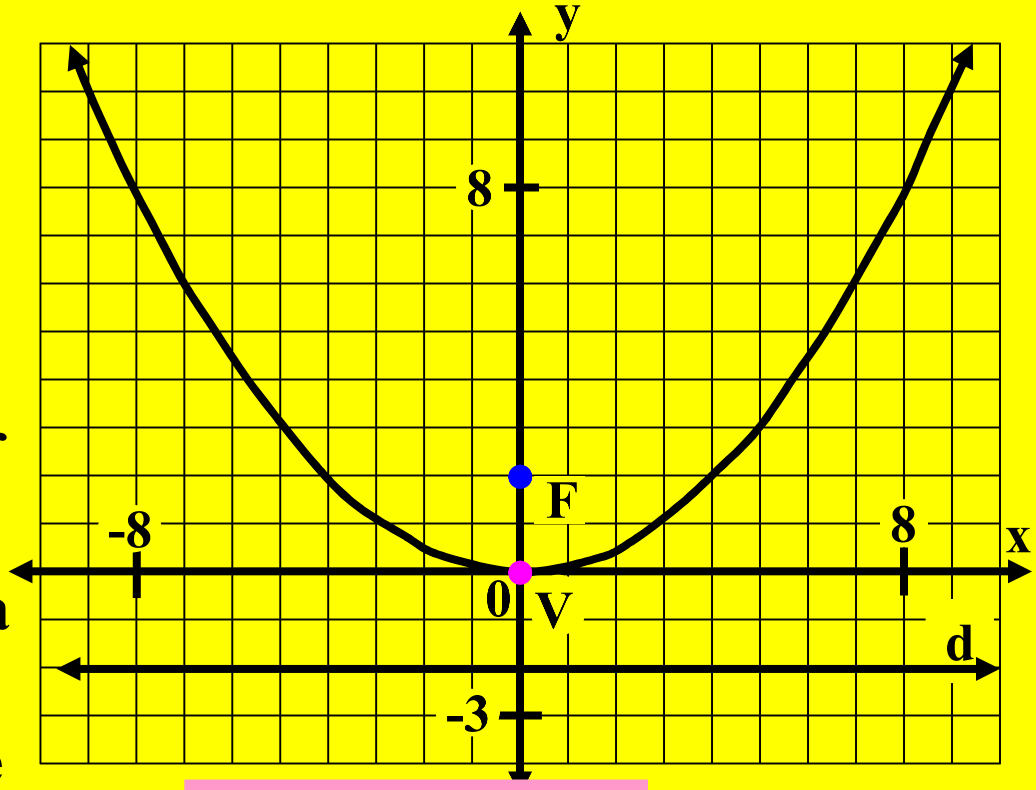

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$$y - 0 = \frac{1}{8}(x - 0)^2$$

Vertex (0, 0)

h = 0 and k = 0

$p = +2$

$$a = \frac{1}{4 \cdot 2} = \frac{1}{8}$$

The Equations of a Parabola.

Standard Form Equation

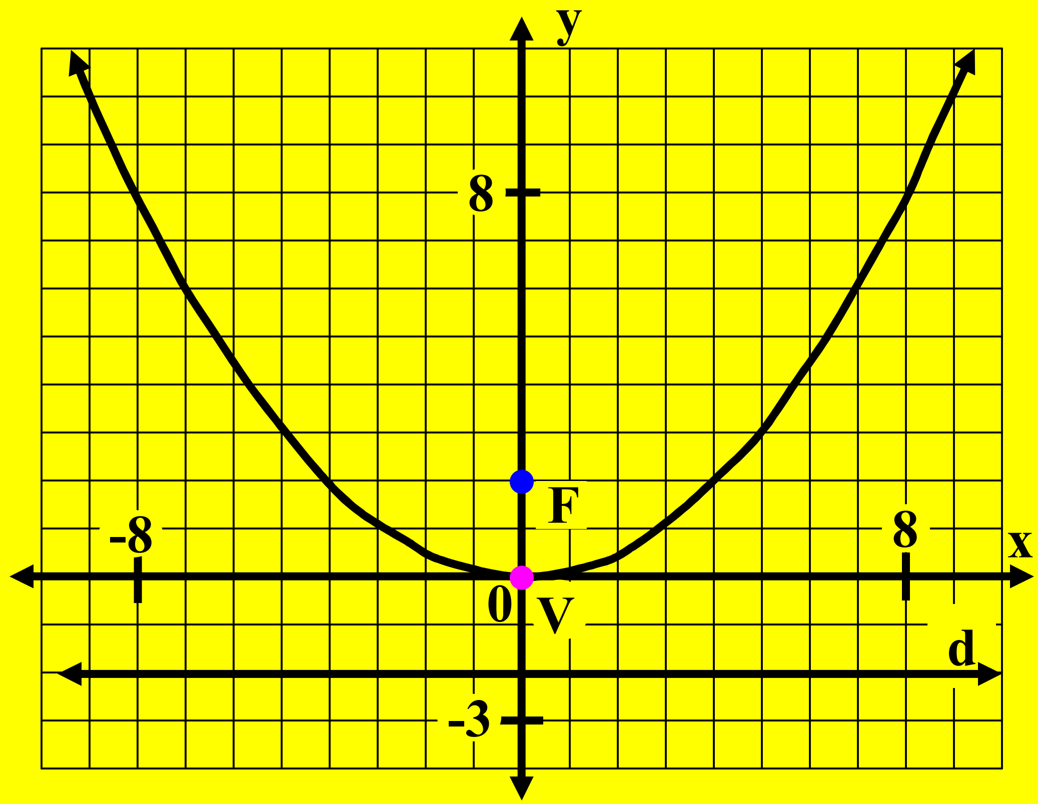
$$y = \frac{1}{8}x^2$$

Type 1 Parabola
Standard form equation

$$y - k = a(x - h)^2$$

Vertex: (h, k) $a = \frac{1}{4p}$

p is the <u>directed distance</u> from the vertex to the focus.



The Equations of a Parabola.

Standard Form Equation

$$y = \frac{1}{8}x^2$$

Type 1 Parabola
Standard form equation

$$y - k = a(x - h)^2$$

Vertex: (h, k) $a = \frac{1}{4p}$

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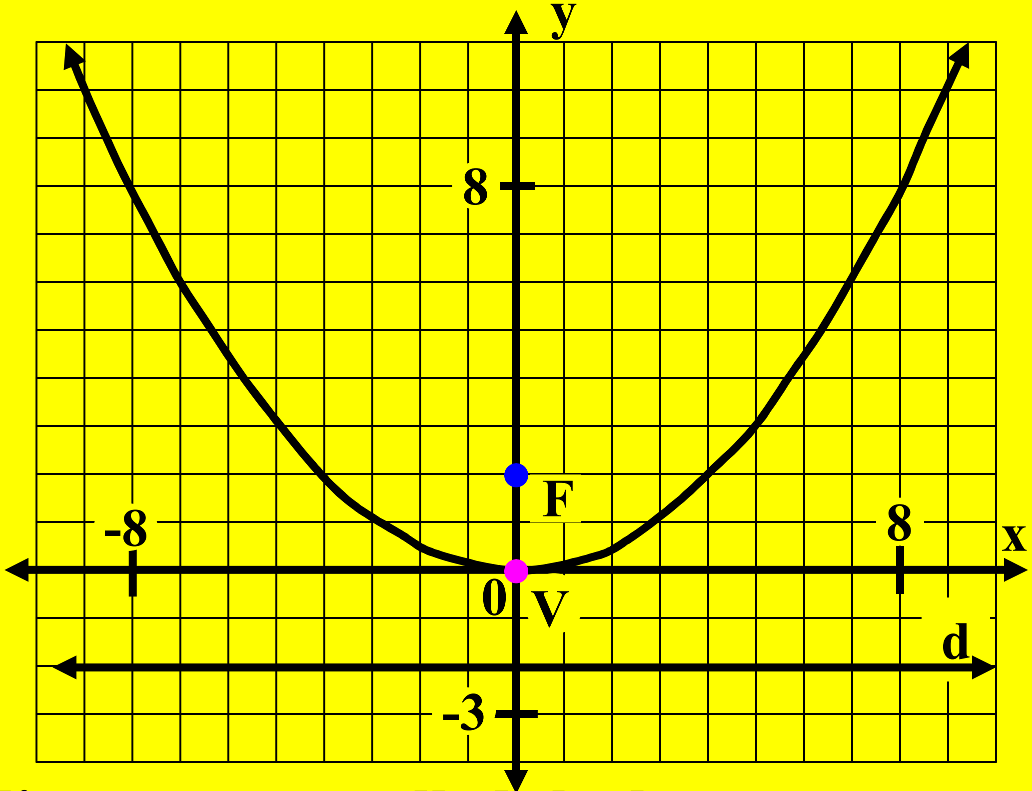

Next, we will introduce a line segment called the <u>latus rectum</u>.

The Equations of a Parabola.

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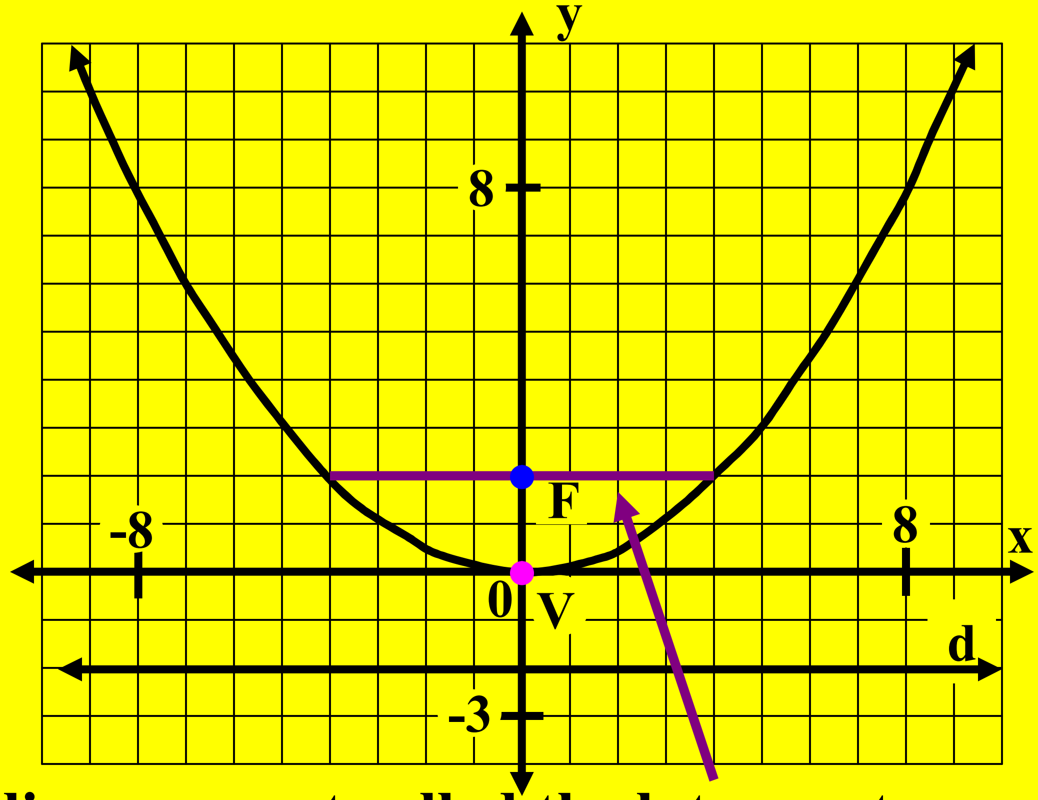

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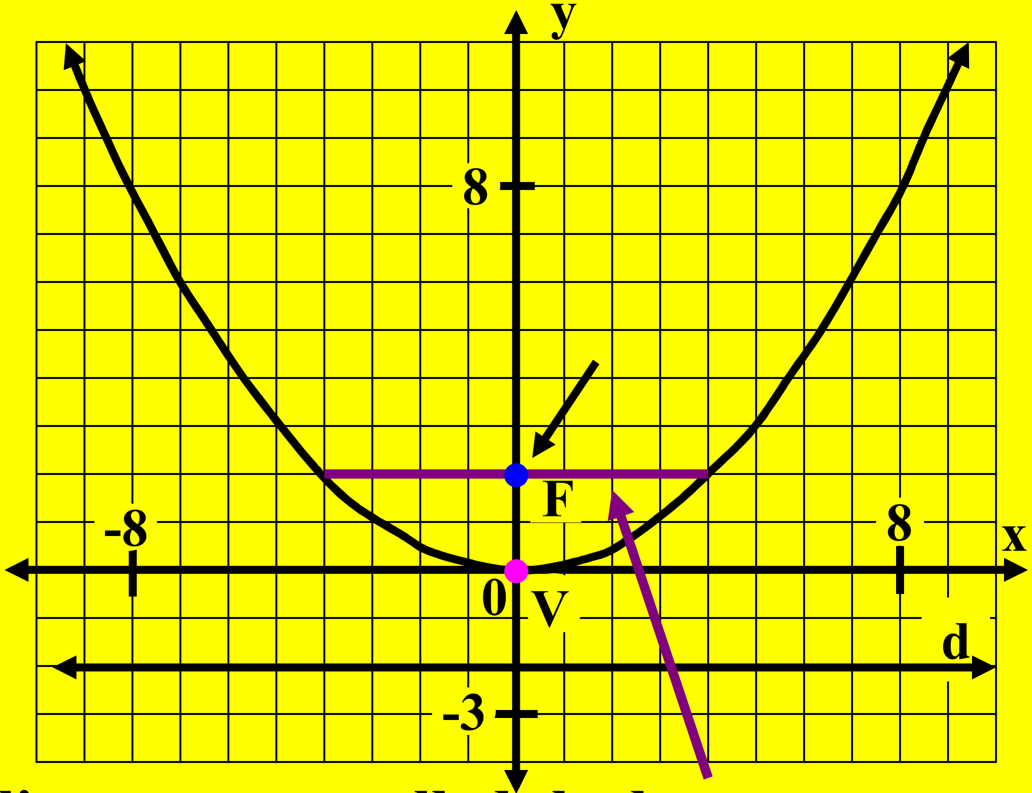

Next, we will introduce a line segment called the <u>latus rectum</u>. This line segment

(a) goes through the focus,

The Equations of a Parabola.

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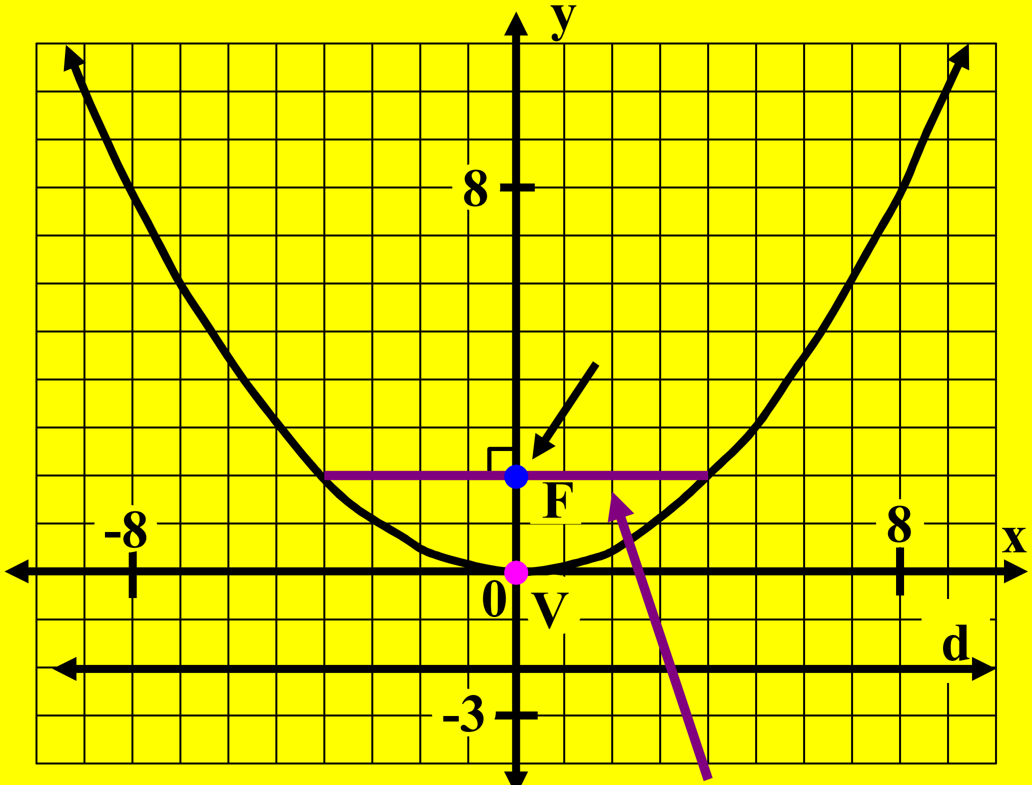
Type 1 Parabola
Standard form equation

$$y - k = a(x - h)^2$$

Vertex: (h, k) $\quad a = \frac{1}{4p}$

p is the <u>directed distance</u> from the vertex to the focus.



Next, we will introduce a line segment called the <u>latus rectum</u>. This line segment

(a) goes through the focus,

(b) is perpendicular to the axis of symmetry, and

The Equations of a Parabola.

Standard Form Equation

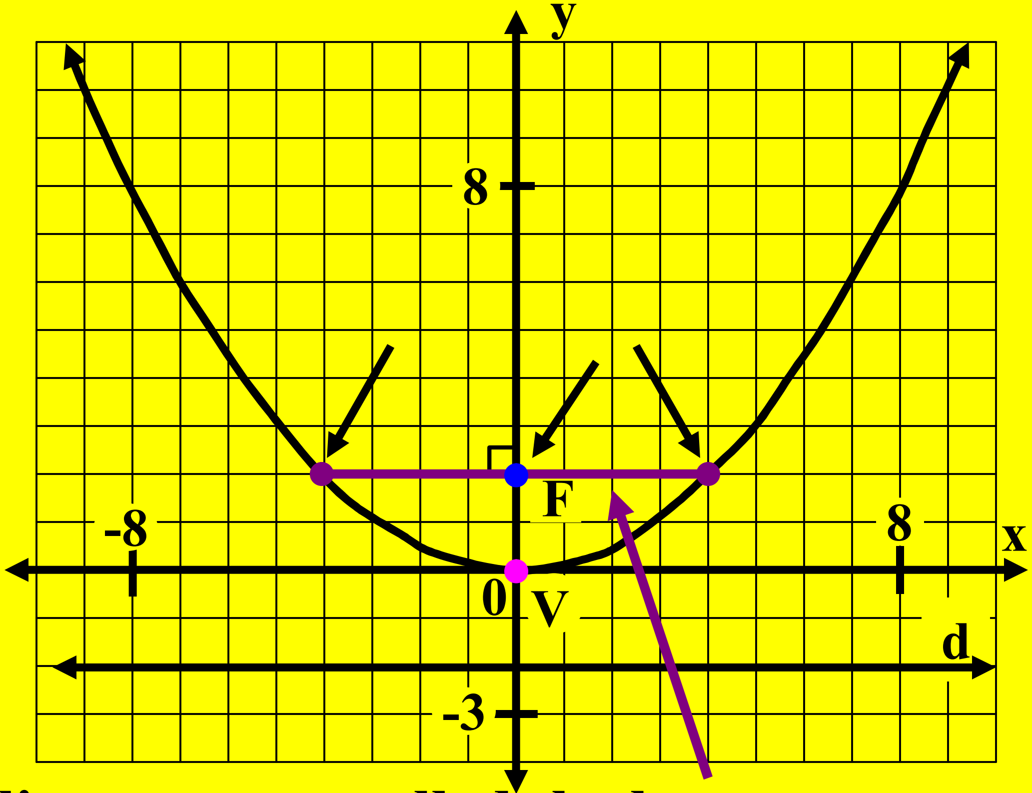
$$y = \frac{1}{8}x^2$$

Type 1 Parabola
Standard form equation

$$y - k = a(x - h)^2$$

Vertex: (h, k) $a = \frac{1}{4p}$

p is the directed distance from the vertex to the focus.



Next, we will introduce a line segment called the latus rectum. This line segment

(a) goes through the focus,

(b) is perpendicular to the axis of symmetry, and

(c) has each end point on the parabola.

The Equations of a Parabola.

Standard Form Equation

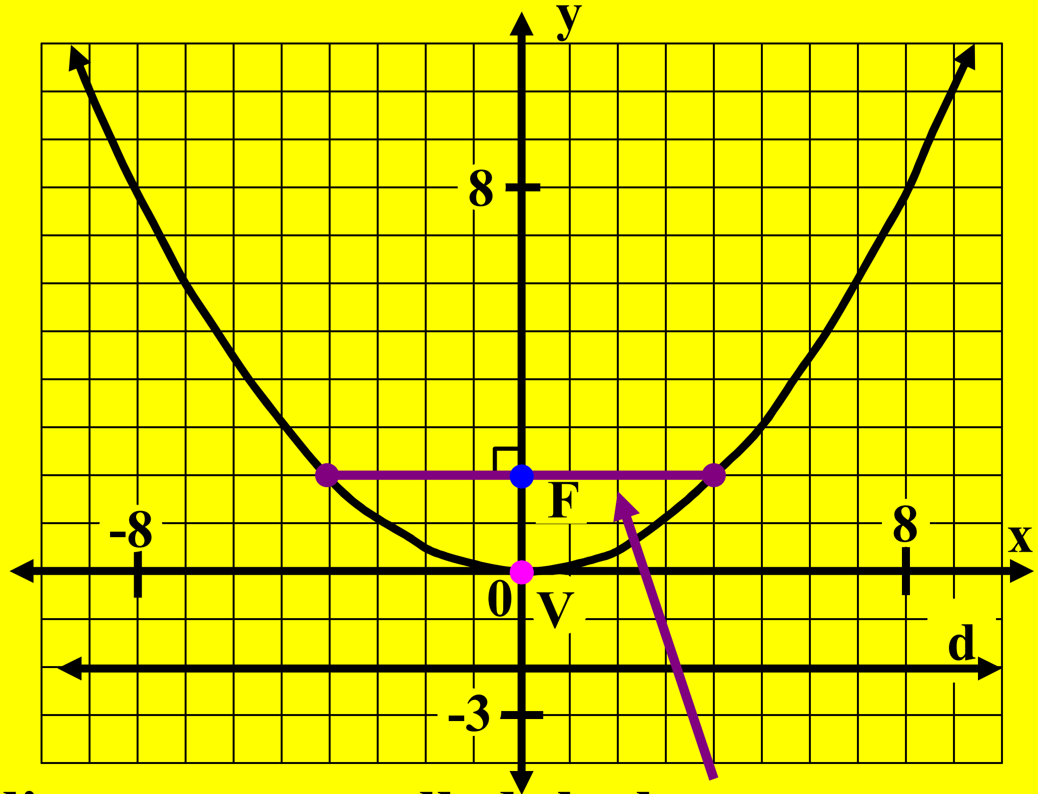
$$y = \frac{1}{8}x^2$$

Type 1 Parabola
Standard form equation

$$y - k = a(x - h)^2$$

Vertex: (h, k) $a = \frac{1}{4p}$

p is the <u>directed distance</u> from the vertex to the focus.



Next, we will introduce a line segment called the <u>latus rectum</u>. This line segment

(a) goes through the focus,
(b) is perpendicular to the axis of symmetry, and
(c) has each end point on the parabola.

The Equations of a Parabola.

Standard Form Equation

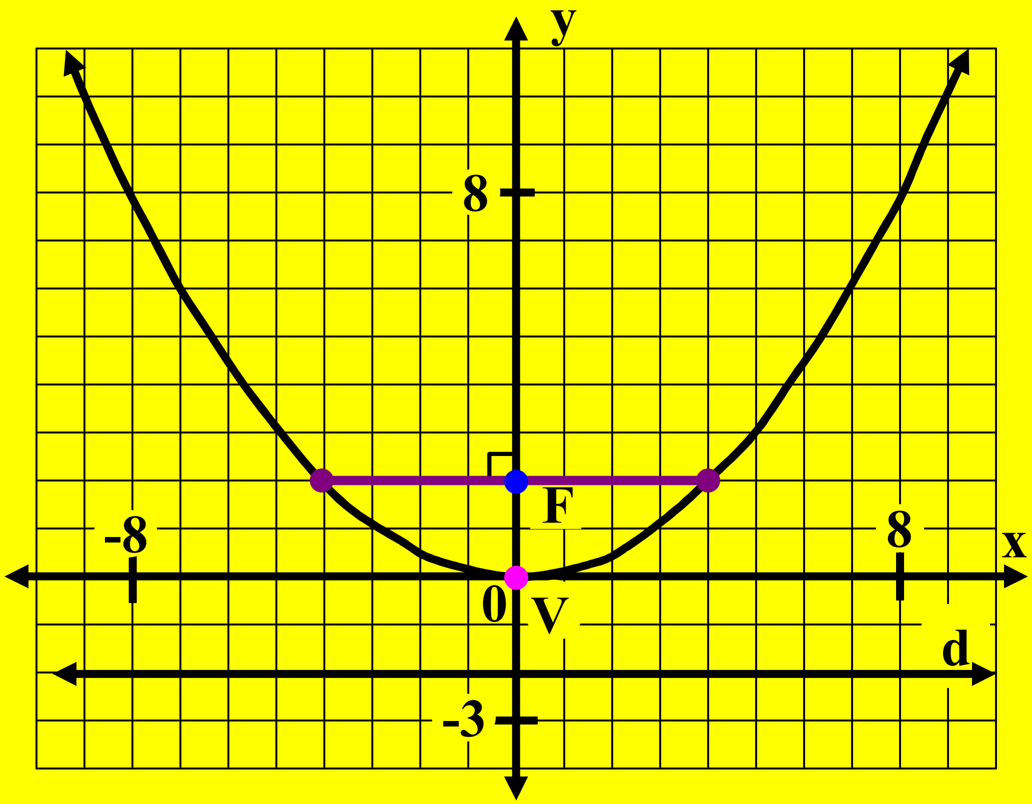
$$y = \frac{1}{8}x^2$$

Type 1 Parabola
Standard form equation

$$y - k = a(x - h)^2$$

Vertex: (h, k) $\quad a = \frac{1}{4p}$

p is the directed distance from the vertex to the focus.



Given the distance relationship for a parabola,

The Equations of a Parabola.

Standard Form Equation

$$y = \frac{1}{8}x^2$$

Type 1 Parabola
Standard form equation

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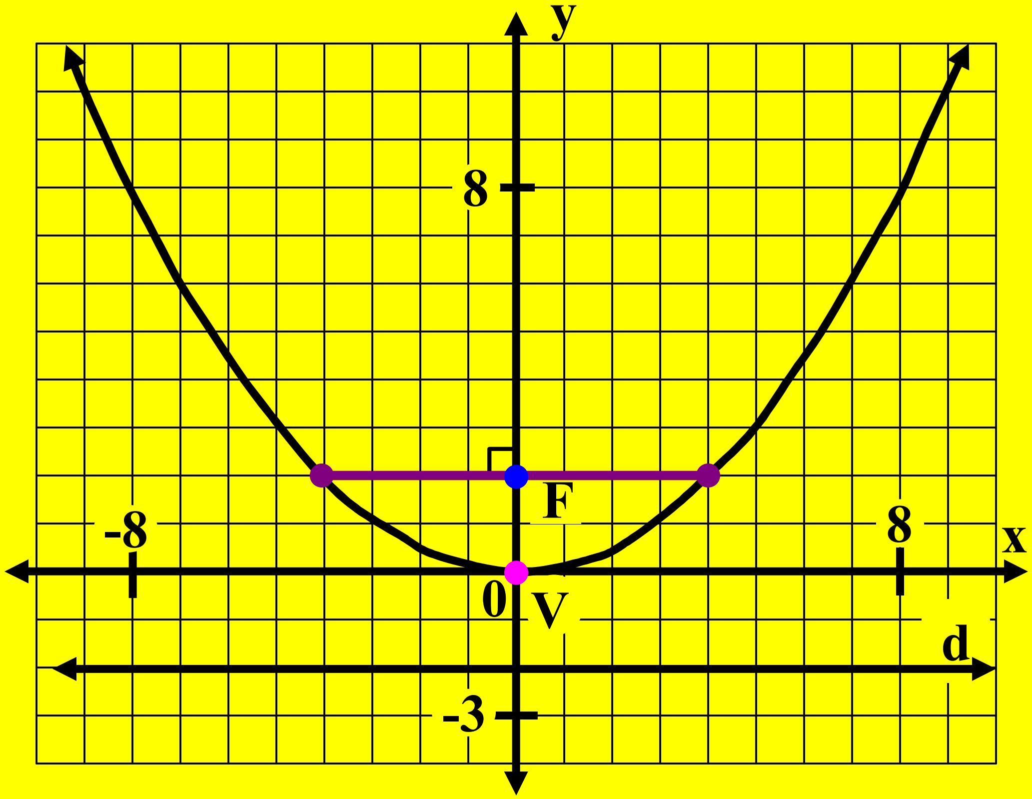
Vertex: (h, k) $a = \frac{1}{4p}$

p is the <u>directed distance</u> from the vertex to the focus.



Given the distance relationship for a parabola,

Any point on the parabola is equidistant from point F and line d.

The Equations of a Parabola.

Standard Form Equation

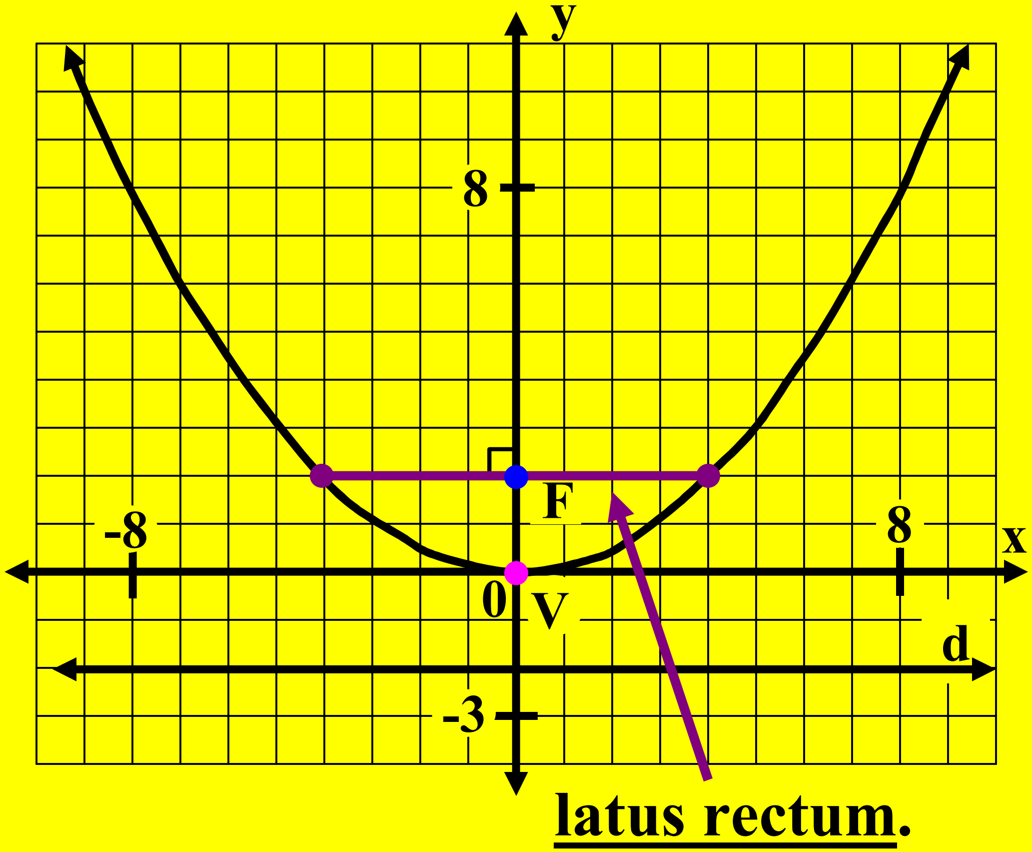
$$y = \frac{1}{8}x^2$$

Type 1 Parabola
Standard form equation

$$y - k = a(x - h)^2$$

Vertex: (h, k) $a = \frac{1}{4p}$

p is the <u>directed distance</u> from the vertex to the focus.



Given the distance relationship for a parabola, and the definition of p,

Any point on the parabola is equidistant from point F and line d.

The Equations of a Parabola.

Standard Form Equation

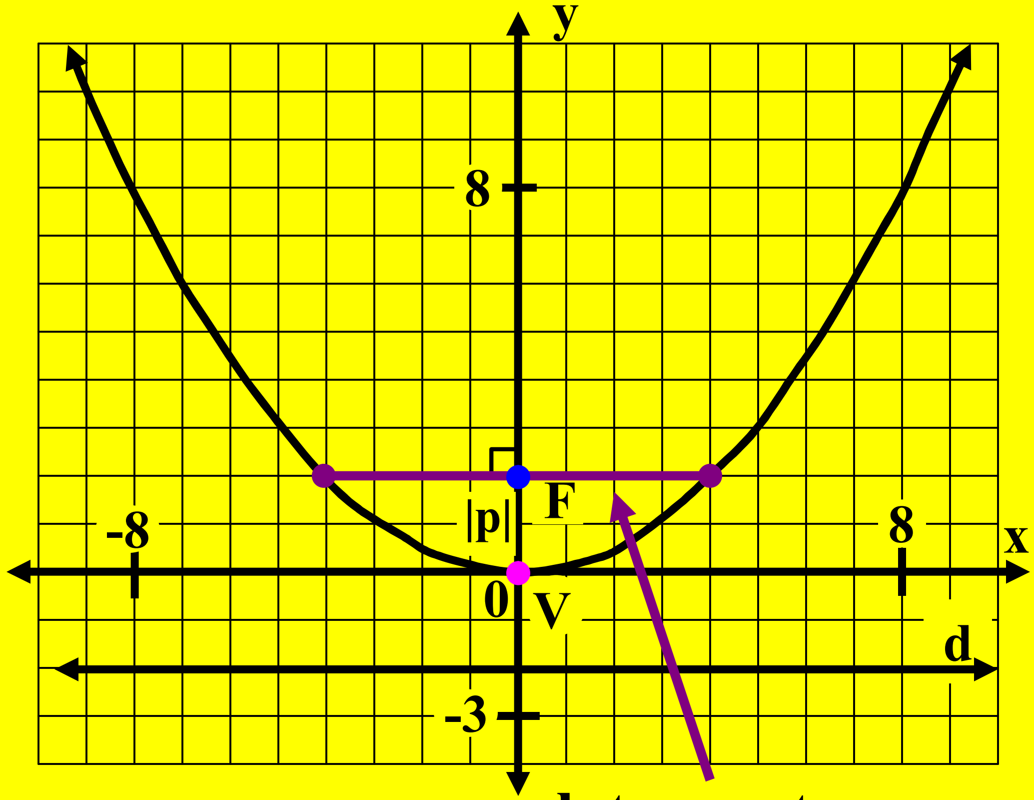
$$y = \frac{1}{8}x^2$$

Type 1 Parabola
Standard form equation

$$y - k = a(x - h)^2$$

Vertex: (h, k) $\quad a = \frac{1}{4p}$

p is the <u>directed distance</u> from the vertex to the focus.



<u>latus rectum</u>.

Given the distance relationship for a parabola, and the definition of p,

p is the directed distance from point V to point F.

Any point on the parabola is equidistant from point F and line d.

The Equations of a Parabola.

Standard Form Equation

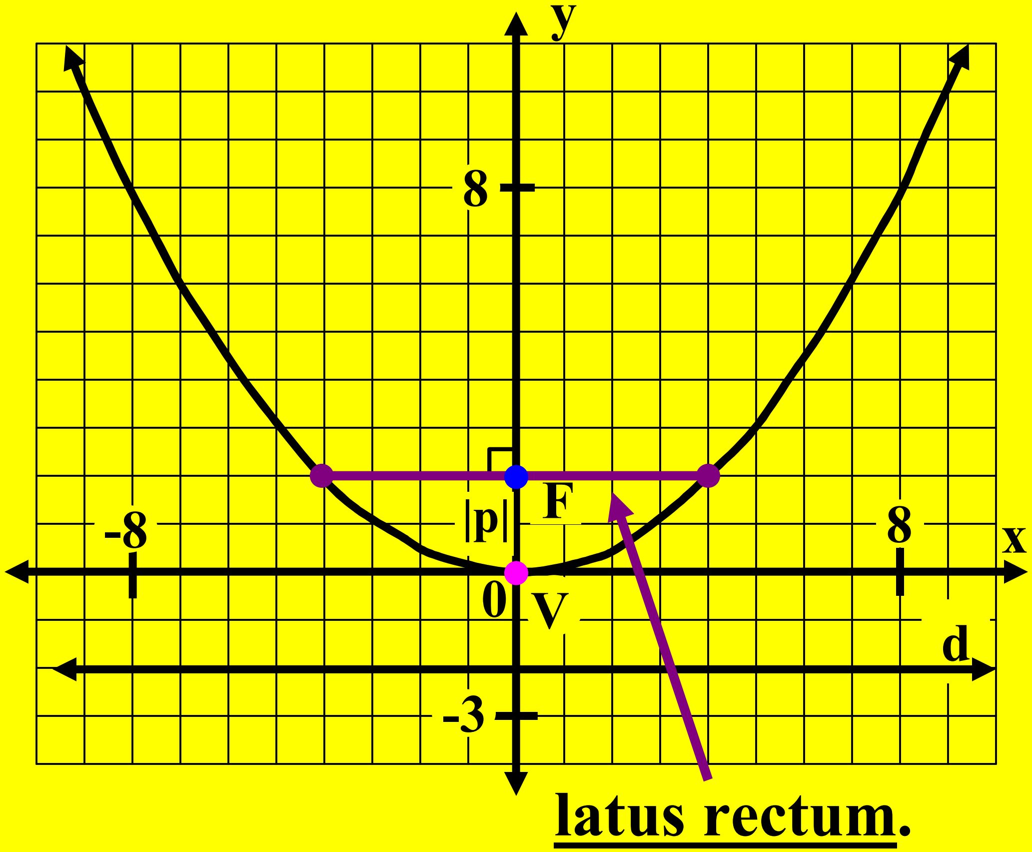
$$y = \frac{1}{8}x^2$$

Type 1 Parabola
Standard form equation

$$y - k = a(x - h)^2$$

Vertex: (h, k) $\quad a = \frac{1}{4p}$

p is the <u>directed distance</u> from the vertex to the focus.



Given the distance relationship for a parabola, and the definition of p,

Any point on the parabola is equidistant from point F and line d.

The Equations of a Parabola.

Standard Form Equation

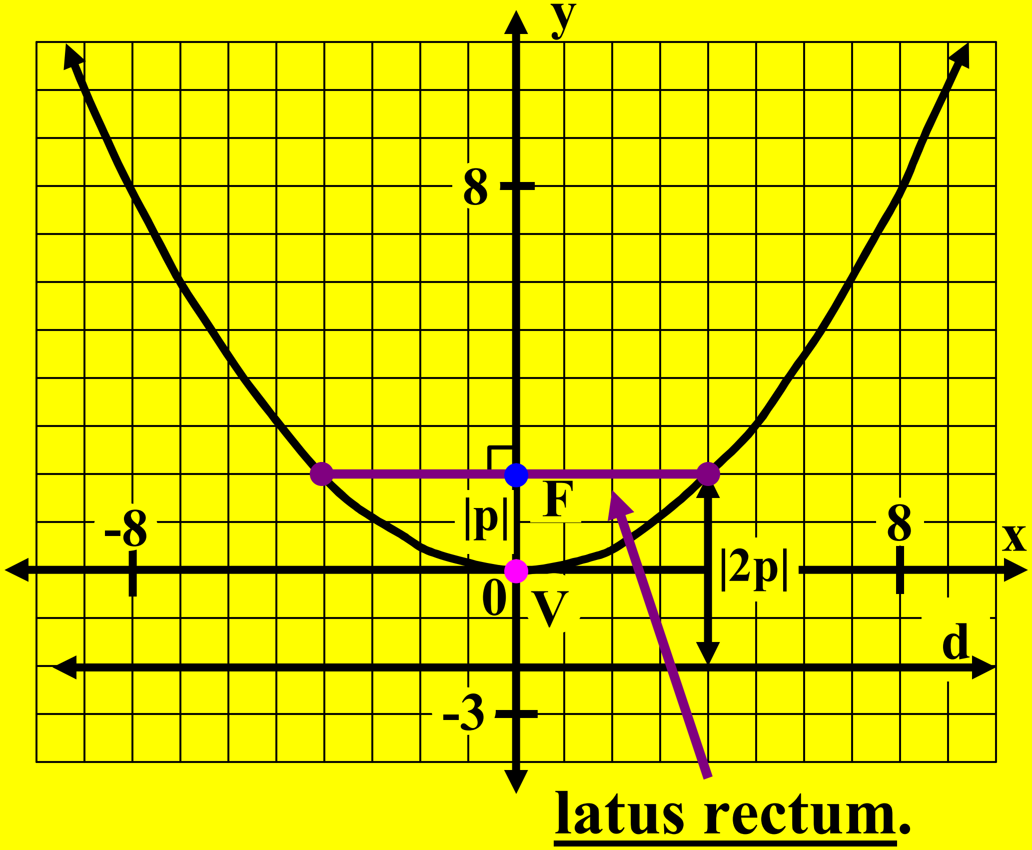
$$y = \frac{1}{8}x^2$$

Type 1 Parabola
Standard form equation

$$y - k = a(x - h)^2$$

Vertex: (h, k) $\quad a = \frac{1}{4p}$

p is the <u>directed distance</u> from the vertex to the focus.



Given the distance relationship for a parabola, and the definition of p, it is clear that each end of the latus rectum is |2p| units from line d

Any point on the parabola is equidistant from point F and line d.

The Equations of a Parabola.

Standard Form Equation

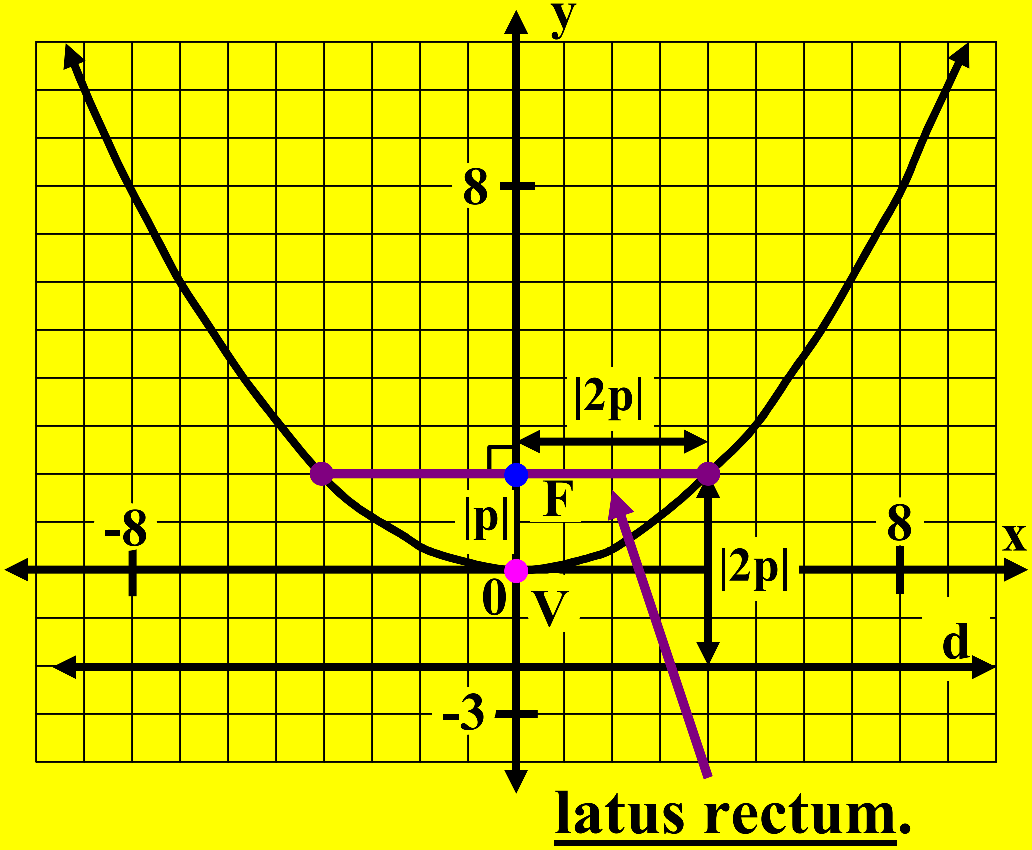
$$y = \tfrac{1}{8}x^2$$

Type 1 Parabola
Standard form equation

$$y - k = a(x - h)^2$$

Vertex: (h, k) $\quad a = \frac{1}{4p}$

p is the directed distance from the vertex to the focus.



Given the distance relationship for a parabola, and the definition of p, it is clear that each end of the latus rectum is |2p| units from line d and |2p| from point F.

Any point on the parabola is equidistant from point F and line d.

The Equations of a Parabola.

Standard Form Equation

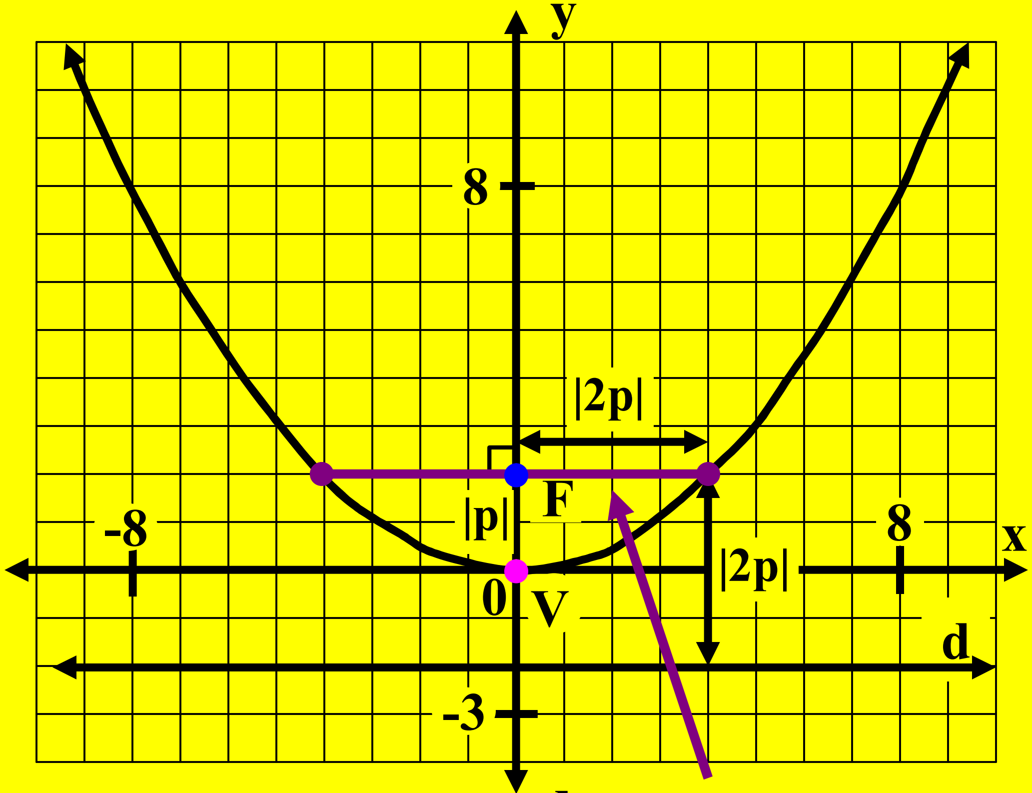
$$y = \frac{1}{8}x^2$$

Type 1 Parabola
Standard form equation

$$y - k = a(x - h)^2$$

Vertex: (h, k) $a = \frac{1}{4p}$

p is the <u>directed distance</u> from the vertex to the focus.



<u>latus rectum</u>.

Given the distance relationship for a parabola, and the definition of p, it is clear that each end of the latus rectum is |2p| units from line d and |2p| from point F. Therefore,

The Equations of a Parabola.

Standard Form Equation

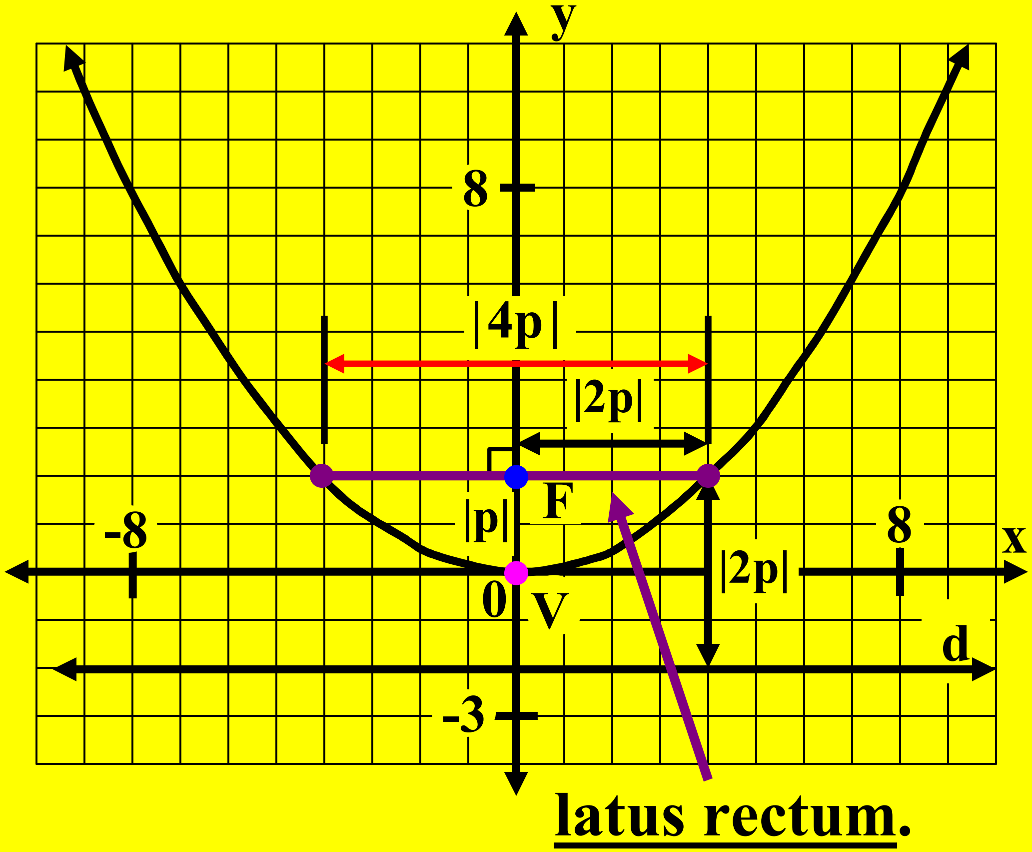
$$y = \frac{1}{8}x^2$$

Type 1 Parabola
Standard form equation

$$y - k = a(x - h)^2$$

Vertex: (h, k) $\quad a = \frac{1}{4p}$

p is the <u>directed distance</u> from the vertex to the focus.



Given the distance relationship for a parabola, and the definition of p, it is clear that each end of the latus rectum is |2p| units from line d and |2p| from point F. Therefore, the length of the latus rectum is |4p| units.

The Equations of a Parabola.

Standard Form Equation

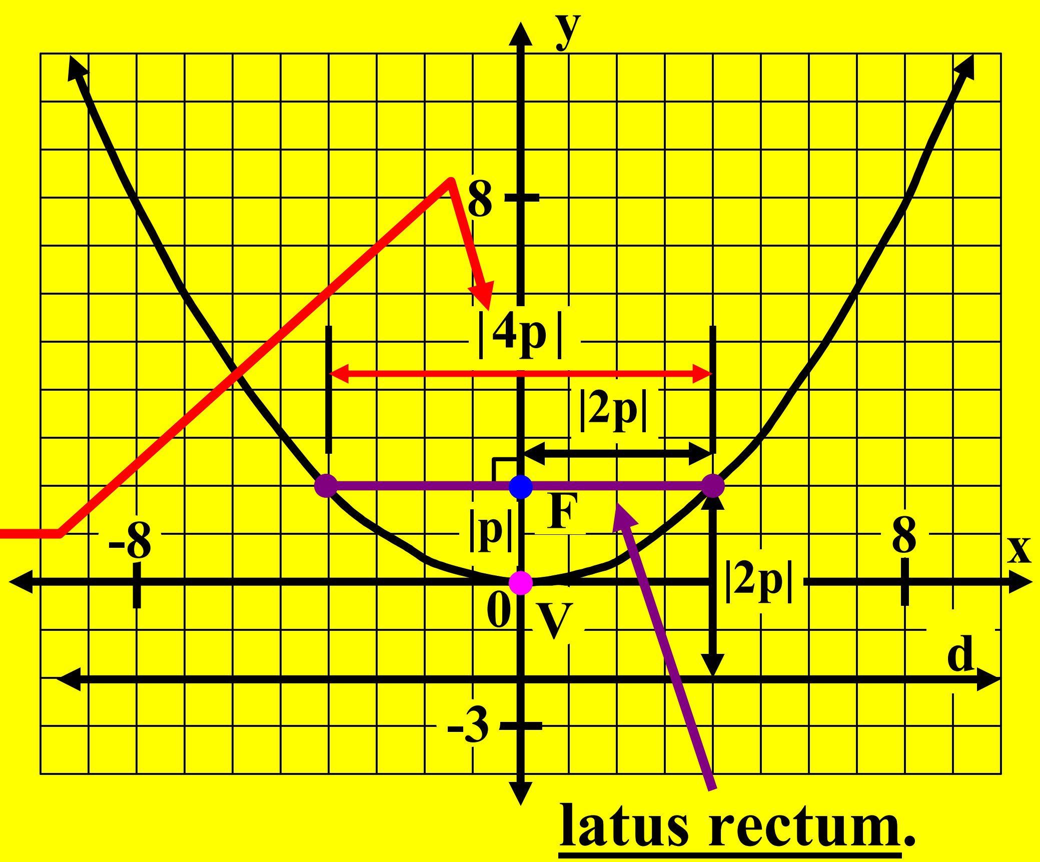
$$y = \frac{1}{8}x^2$$

Type 1 Parabola
Standard form equation

$$y - k = a(x - h)^2$$

Vertex: (h, k) $a = \frac{1}{4p}$

p is the <u>directed distance</u> from the vertex to the focus.



Given the distance relationship for a parabola, and the definition of p, it is clear that each end of the latus rectum is |2p| units from line d and |2p| from point F. Therefore, the length of the latus rectum is |4p| units.

The Equations of a Parabola.

Standard Form Equation

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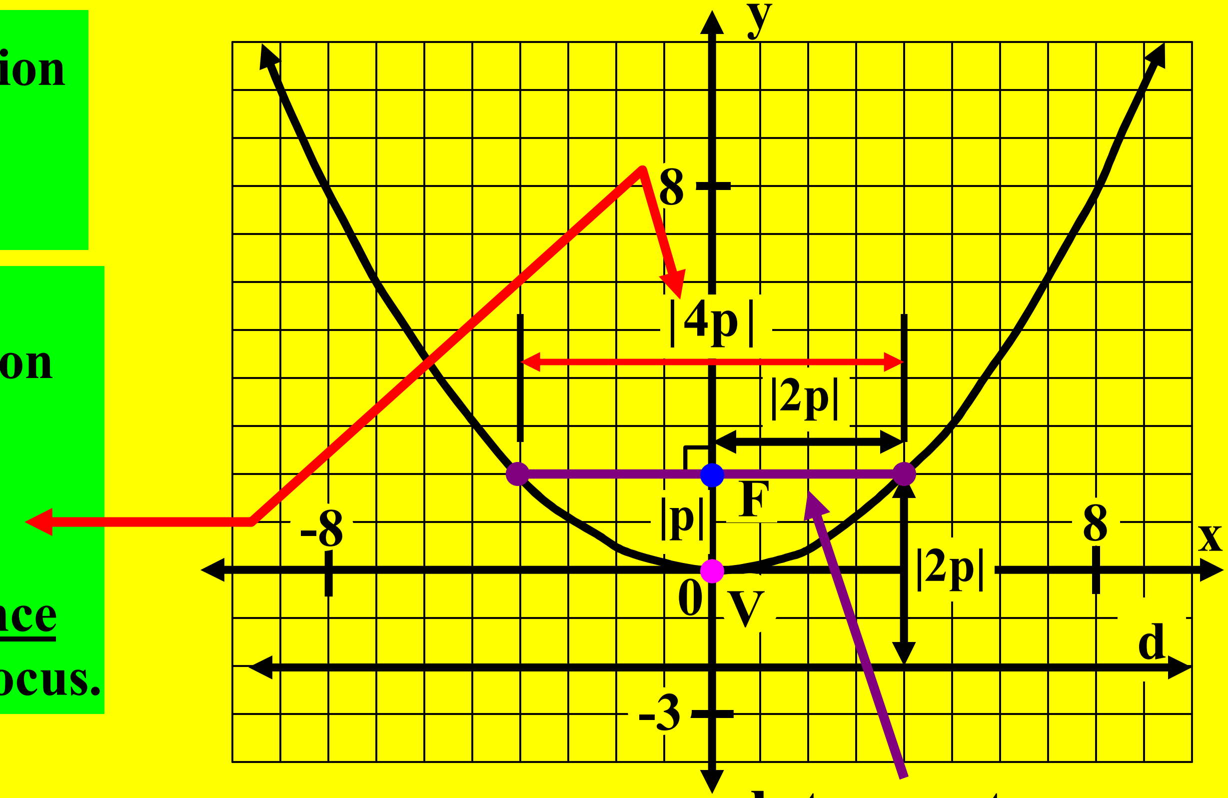
Type 1 Parabola
Standard form equation

$$y - k = a(x - h)^2$$

Vertex: (h, k) $\quad a = \frac{1}{4p}$

p is the <u>directed distance</u> from the vertex to the focus.



<u>latus rectum</u>.

Given the distance relationship for a parabola, and the definition of p, it is clear that each end of the latus rectum is |2p| units from line d and |2p| from point F. Therefore, the length of the latus rectum is |4p| units. Also, a =

The Equations of a Parabola.

Standard Form Equation

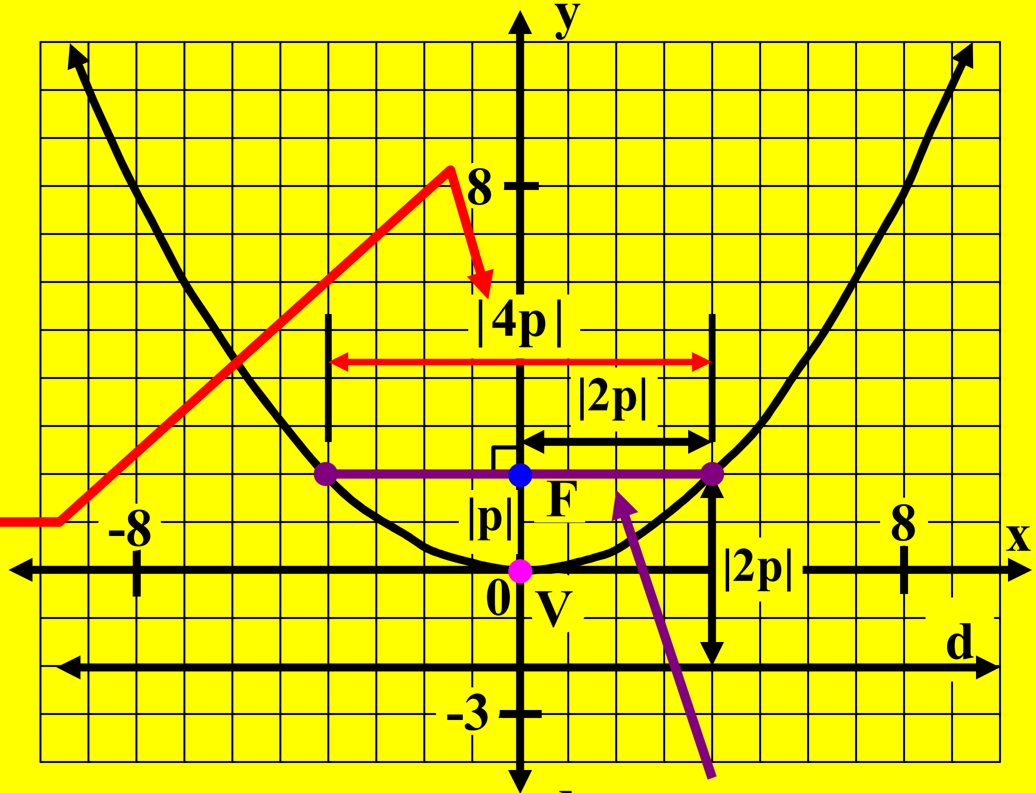
$$y = \tfrac{1}{8}x^2$$

Type 1 Parabola
Standard form equation

$$y - k = a(x - h)^2$$

Vertex: (h, k) $a = \dfrac{1}{4p}$

p is the <u>directed distance</u> from the vertex to the focus.



Given the distance relationship for a parabola, and the definition of p, it is clear that each end of the latus rectum is |2p| units from line d and |2p| from point F. Therefore, the length of the latus rectum is |4p| units. Also, $a = \dfrac{1}{4p}$,

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Type 1 Parabola
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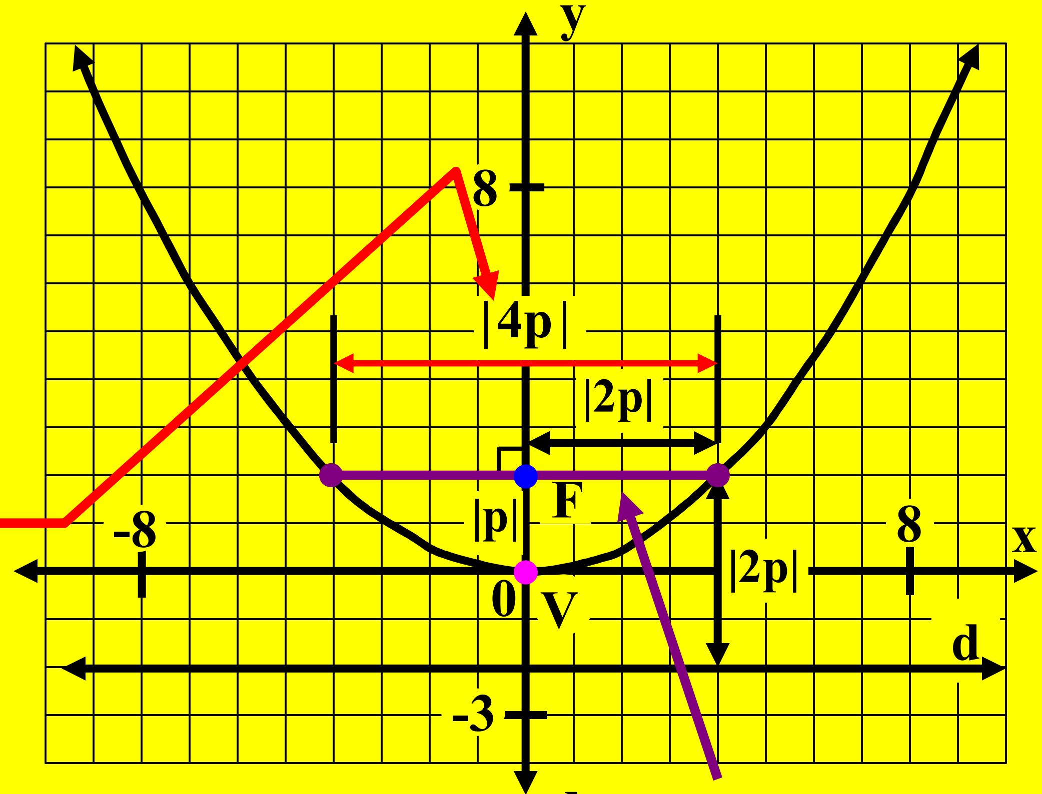
Vertex: (h, k) $\quad a = \frac{1}{4p}$

p is the <u>directed distance</u> from the vertex to the focus.

Latus Rectum: |4p| units long



<u>latus rectum</u>.

Given the distance relationship for a parabola, and the definition of p, it is clear that each end of the latus rectum is |2p| units from line d and |2p| from point F. Therefore, the length of the latus rectum is |4p| units. Also, $a = \frac{1}{4p}$**, which may prove helpful.**

The Equations of a Parabola.

Standard Form Equation

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Type 1 Parabola
Standard form equation

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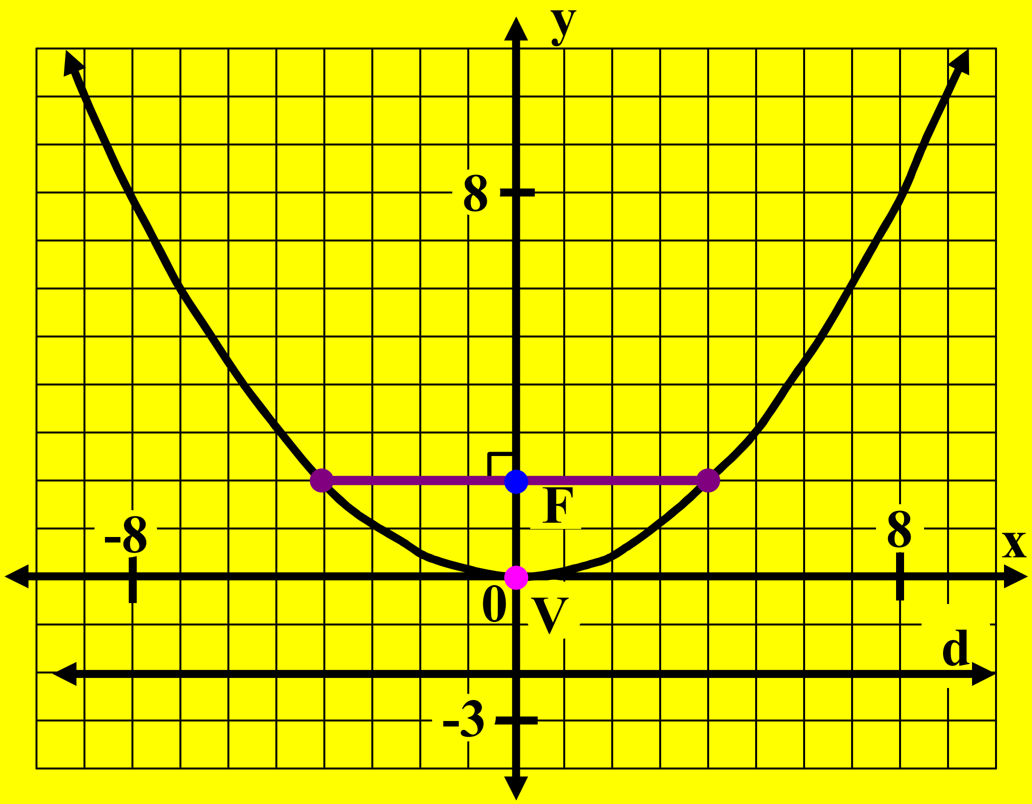
Vertex: (h, k) $\quad a = \frac{1}{4p}$

p is the <u>directed distance</u> from the vertex to the focus.

Latus Rectum: |4p| units long



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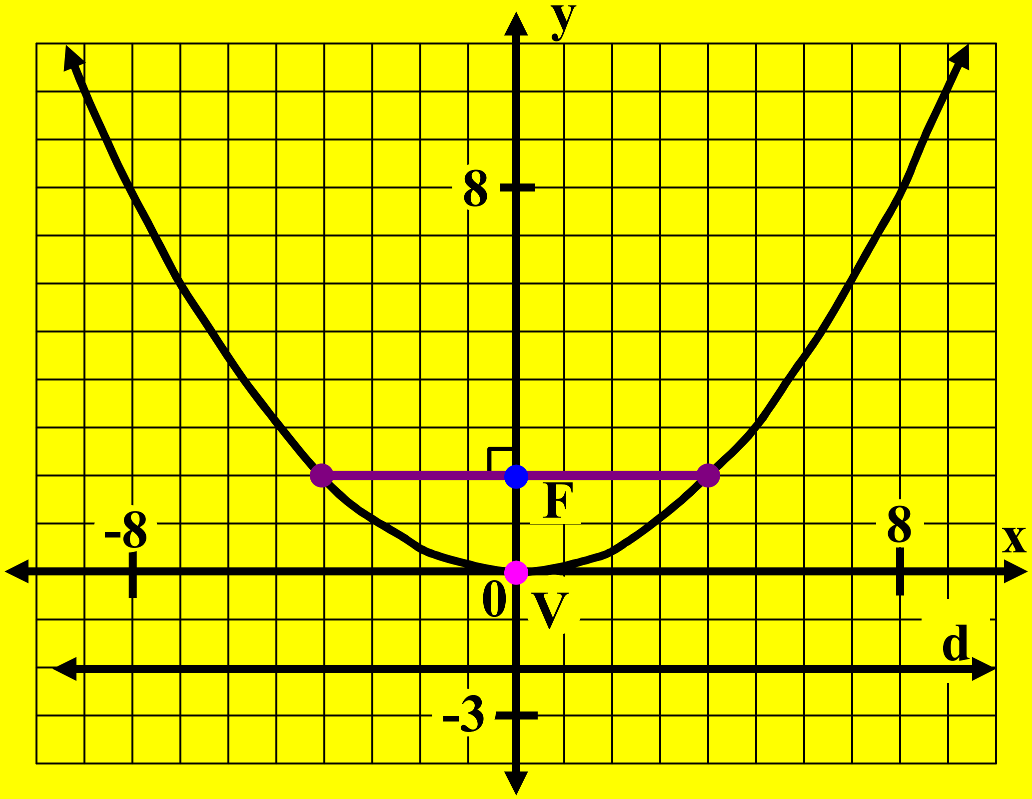

There are three key numbers that are part of the standard form equation.

The Equations of a Parabola.

Standard Form Equation

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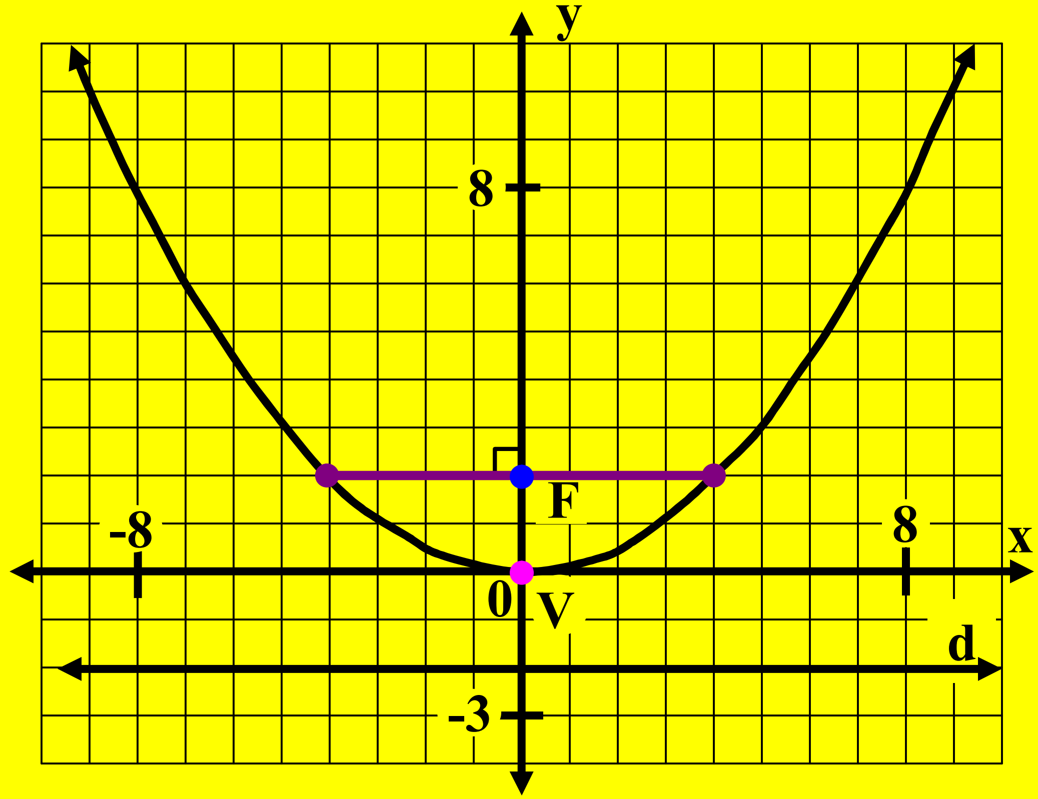
Type 1 Parabola
Standard form equation

$$y - k = a(x - h)^2$$

Vertex: (h, k) $\quad a = \frac{1}{4p}$

p is the <u>directed distance</u> from the vertex to the focus.
Latus Rectum: |4p| units long



There are three key numbers that are part of the standard form equation. The first two,

The Equations of a Parabola.

Standard Form Equation

$$y = \frac{1}{8}x^2$$

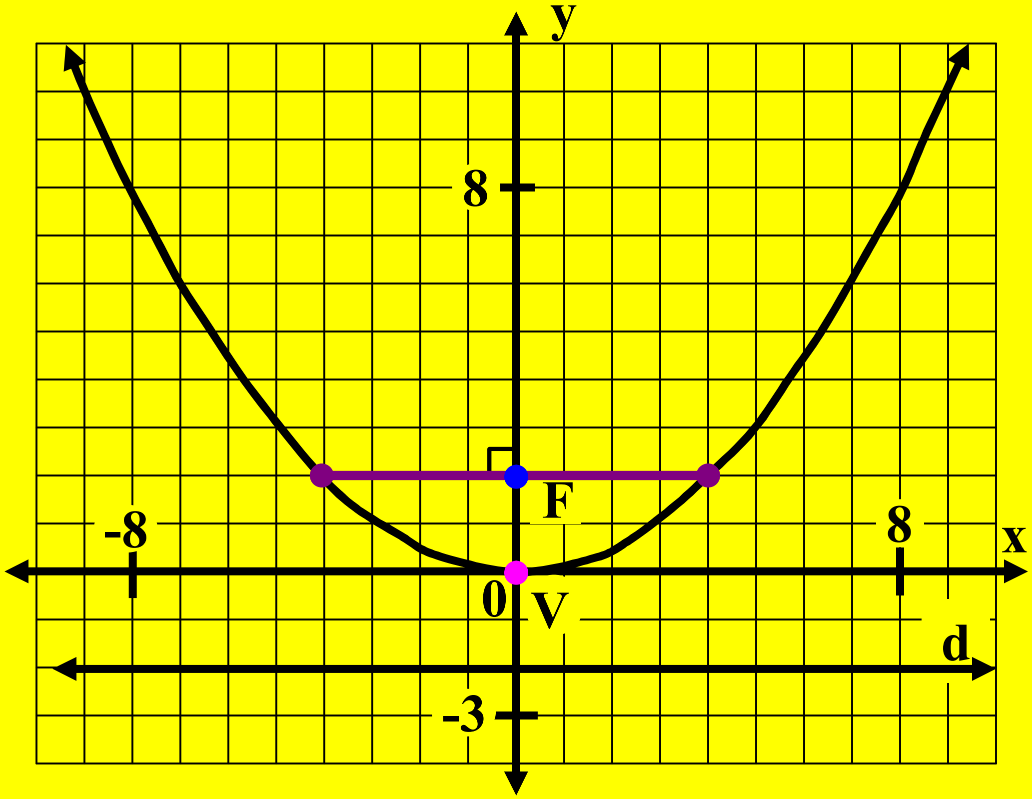
Type 1 Parabola
Standard form equation

$$y - k = a(x - h)^2$$

Vertex: (h, k) $a = \frac{1}{4p}$

p is the directed distance from the vertex to the focus.

Latus Rectum: |4p| units long



There are three key numbers that are part of the standard form equation. The first two, h and k,

The Equations of a Parabola.

Standard Form Equation

$$y = \frac{1}{8}x^2$$

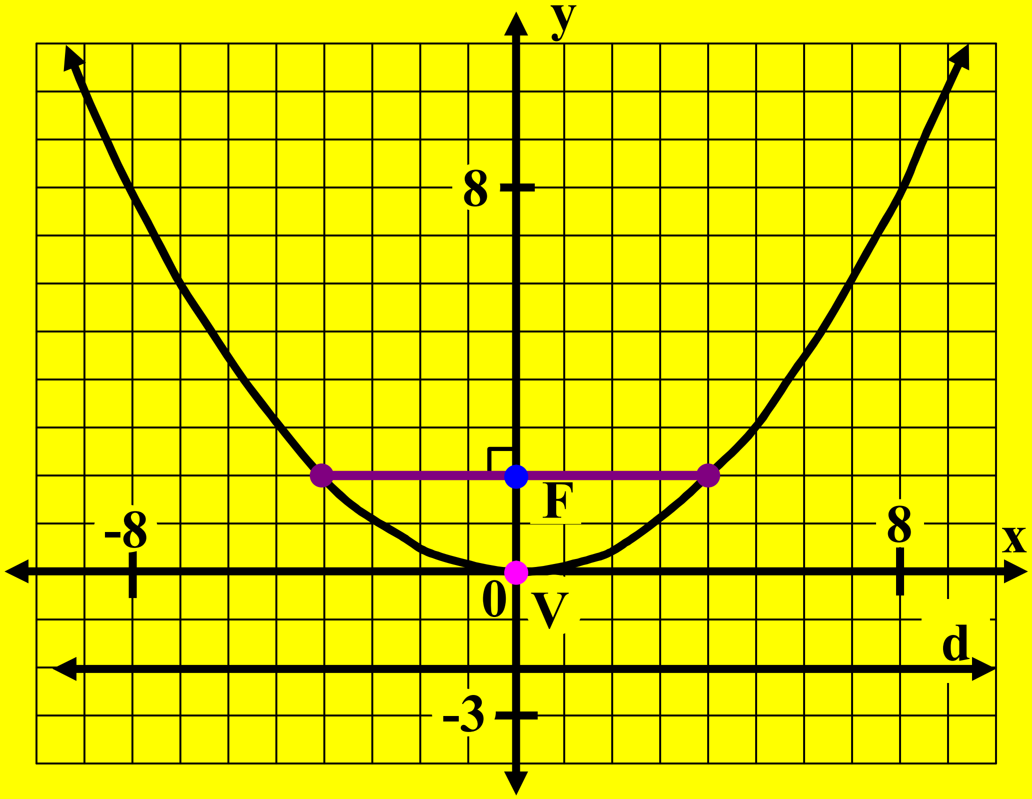
Type 1 Parabola
Standard form equation

$$y - k = a(x - h)^2$$

Vertex: (h, k) $\quad a = \frac{1}{4p}$

p is the directed distance from the vertex to the focus.

Latus Rectum: |4p| units long



There are three key numbers that are part of the standard form equation. The first two, h and k, determine the vertex of the parabola.

The Equations of a Parabola.

Standard Form Equation

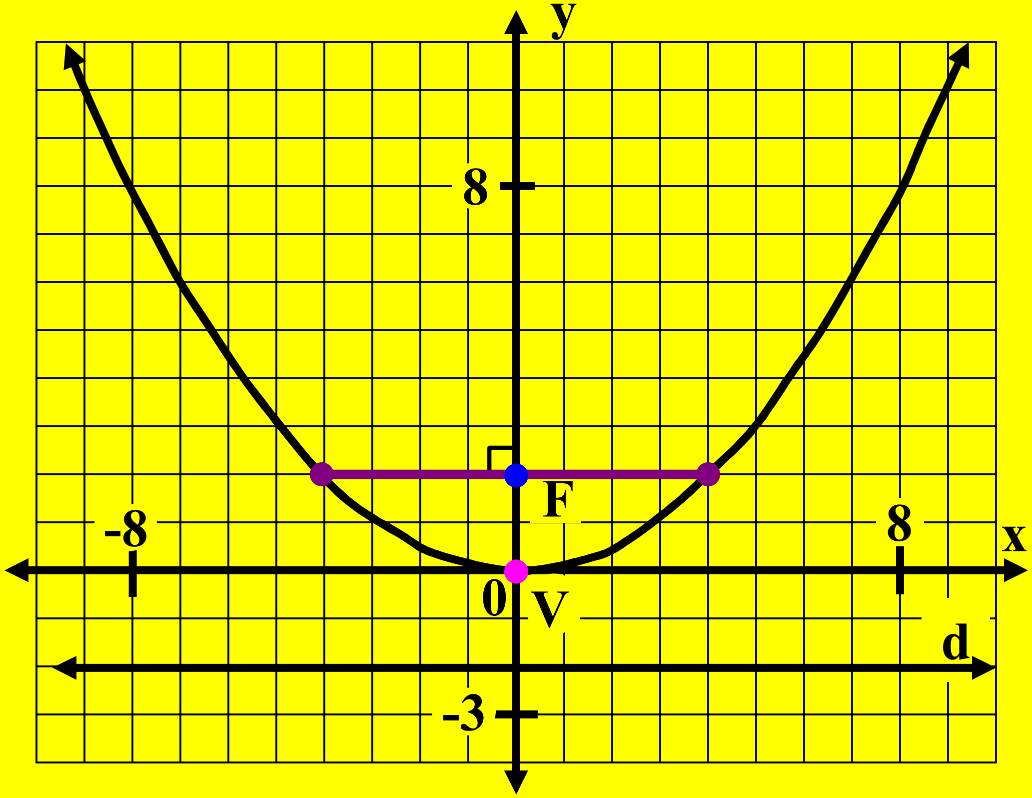
$$y = \frac{1}{8}x^2$$

Type 1 Parabola
Standard form equation

$$y - k = a(x - h)^2$$

Vertex: (h, k) $a = \frac{1}{4p}$

p is the <u>directed distance</u> from the vertex to the focus.
Latus Rectum: |4p| units long



There are three key numbers that are part of the standard form equation. The first two, <u>h</u> and <u>k</u>, determine the vertex of the parabola. It is the third number,

The Equations of a Parabola.

Standard Form Equation

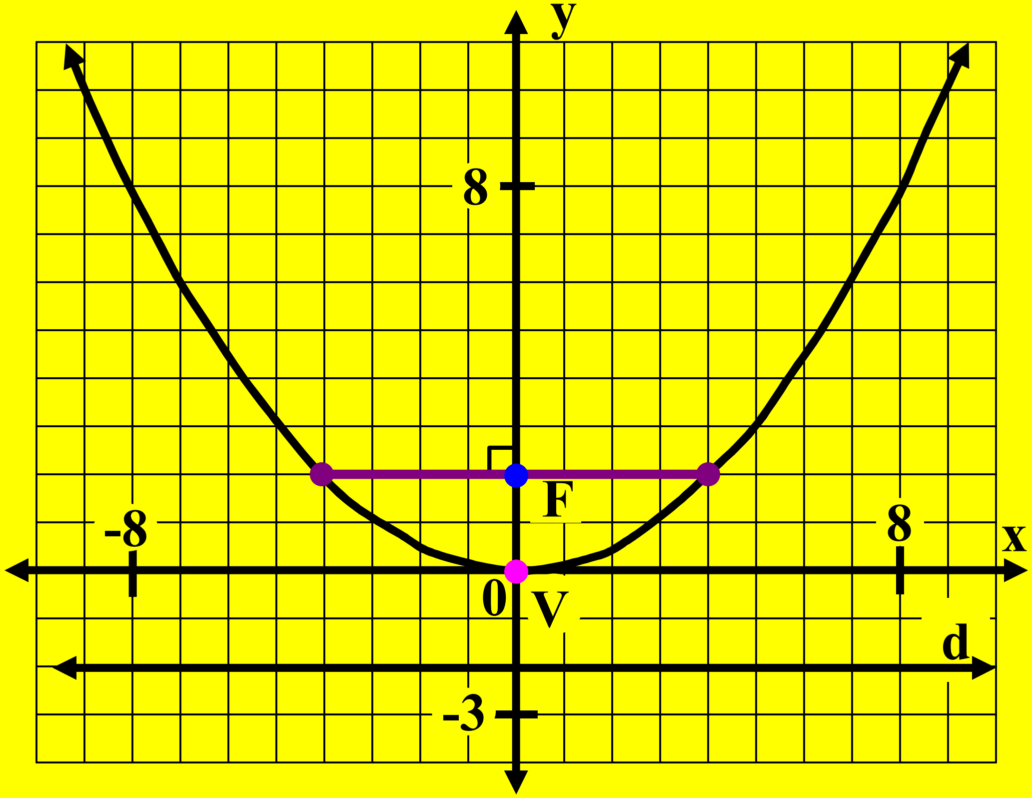
$$y = \frac{1}{8}x^2$$

Type 1 Parabola
Standard form equation

$$y - k = a(x - h)^2$$

Vertex: (h, k) $a = \frac{1}{4p}$

p is the directed distance from the vertex to the focus.
Latus Rectum: |4p| units long



There are three key numbers that are part of the standard form equation. The first two, h and k, determine the vertex of the parabola. It is the third number, a,

The Equations of a Parabola.

Standard Form Equation

$$y = \frac{1}{8}x^2$$

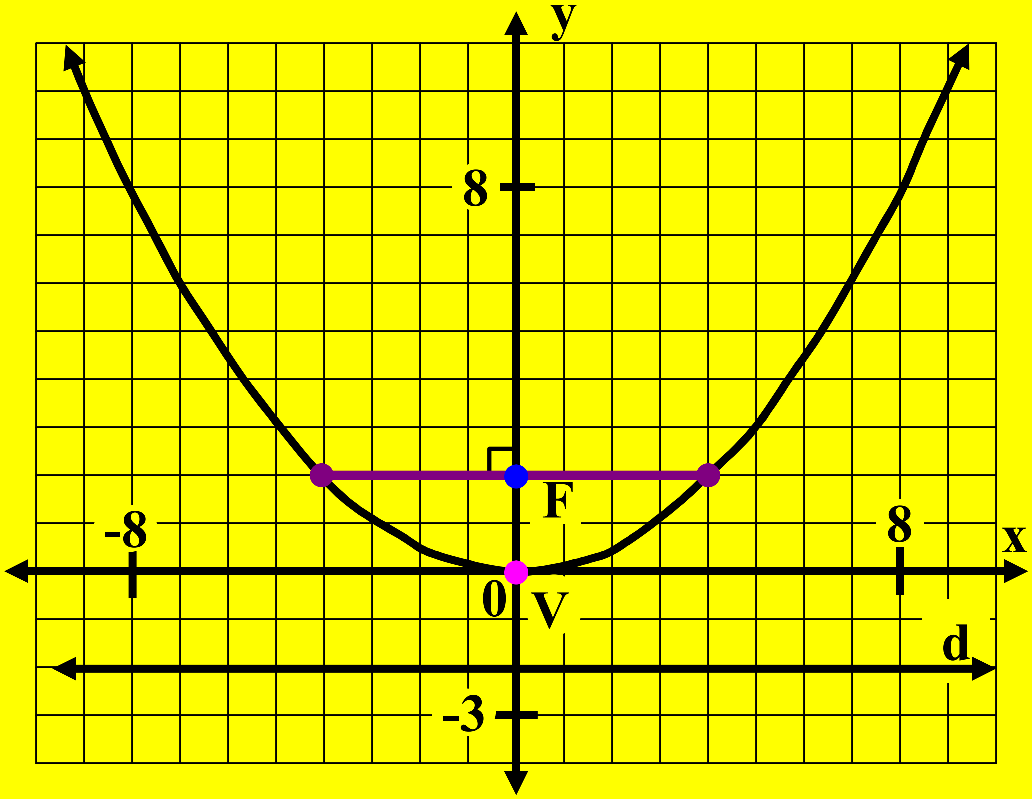
Type 1 Parabola
Standard form equation

$$y - k = a(x - h)^2$$

Vertex: (h, k) $\quad a = \frac{1}{4p}$

p is the directed distance from the vertex to the focus.

Latus Rectum: |4p| units long



There are three key numbers that are part of the standard form equation. The first two, h and k, determine the vertex of the parabola. It is the third number, a, that may be most interesting.

The Equations of a Parabola.

Standard Form Equation

$$y = \frac{1}{8}x^2$$

Type 1 Parabola

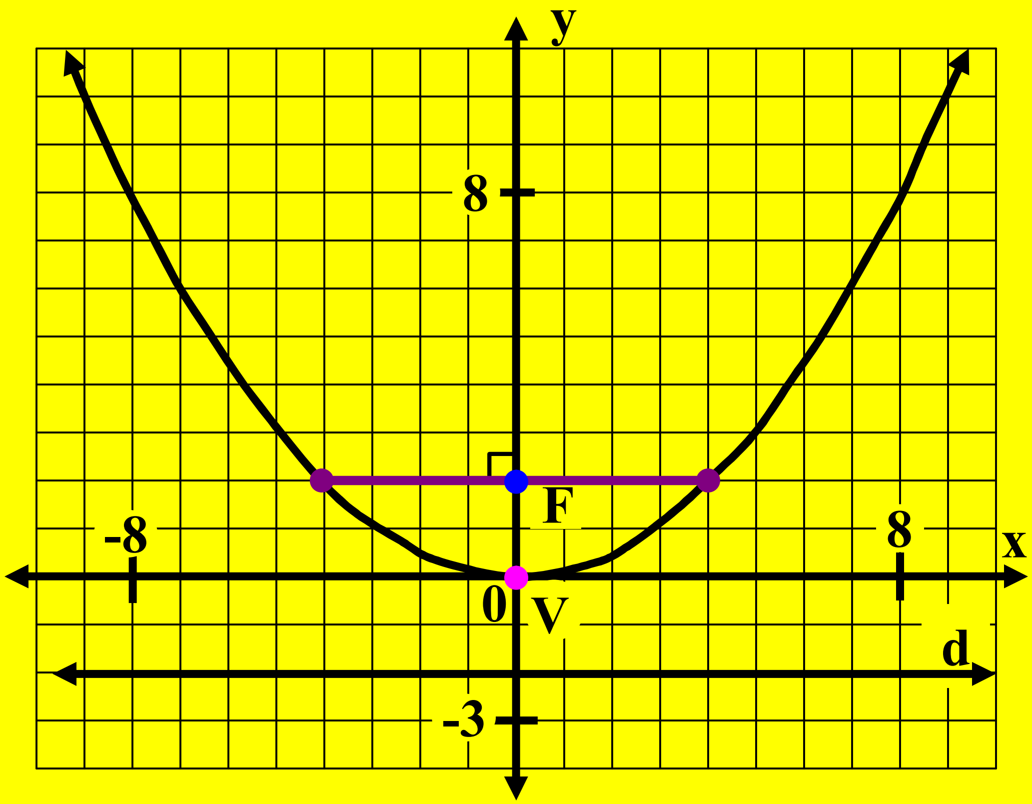
Standard form equation

$$y - k = a(x - h)^2$$

Vertex: (h, k) $\quad a = \frac{1}{4p}$

p is the <u>directed distance</u> from the vertex to the focus.

Latus Rectum: |4p| units long



The Equations of a Parabola.

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Type 1 Parabola
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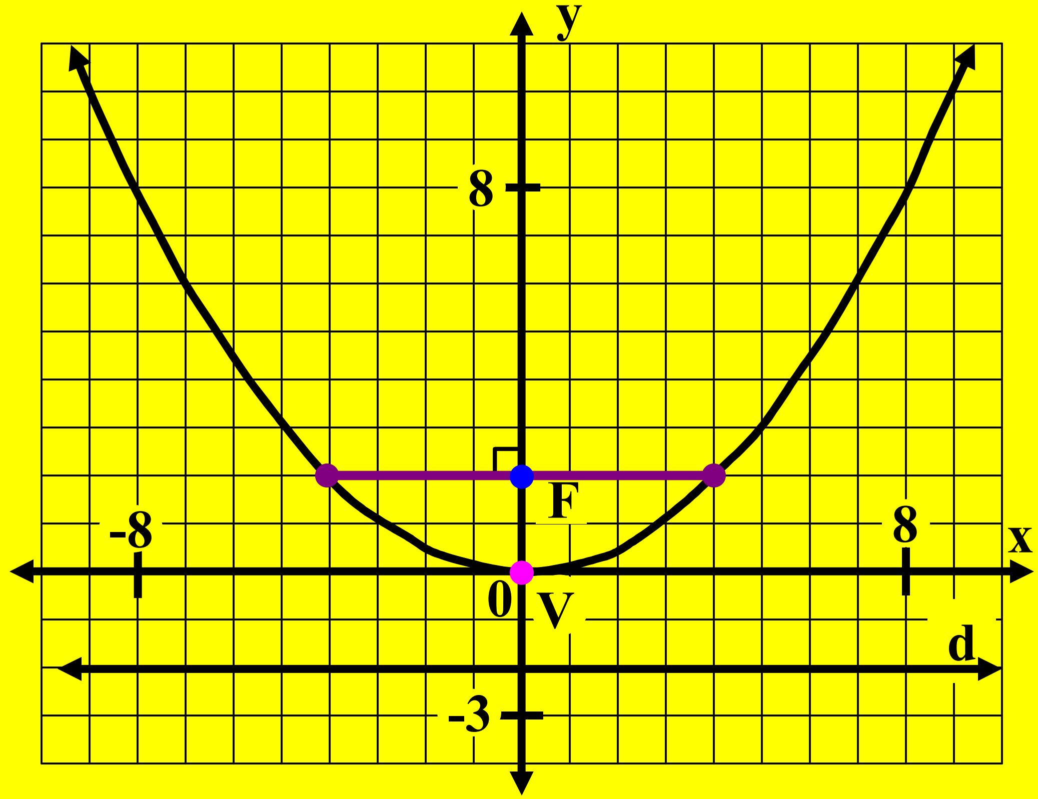
$$y - k = a(x - h)^2$$

Vertex: (h, k) $\quad a = \frac{1}{4p}$

p is the <u>directed distance</u> from the vertex to the focus.

Latus Rectum: |4p| units long



In type 1 parabolas,

The Equations of a Parabola.

Standard Form Equation

$$y = \frac{1}{8}x^2$$

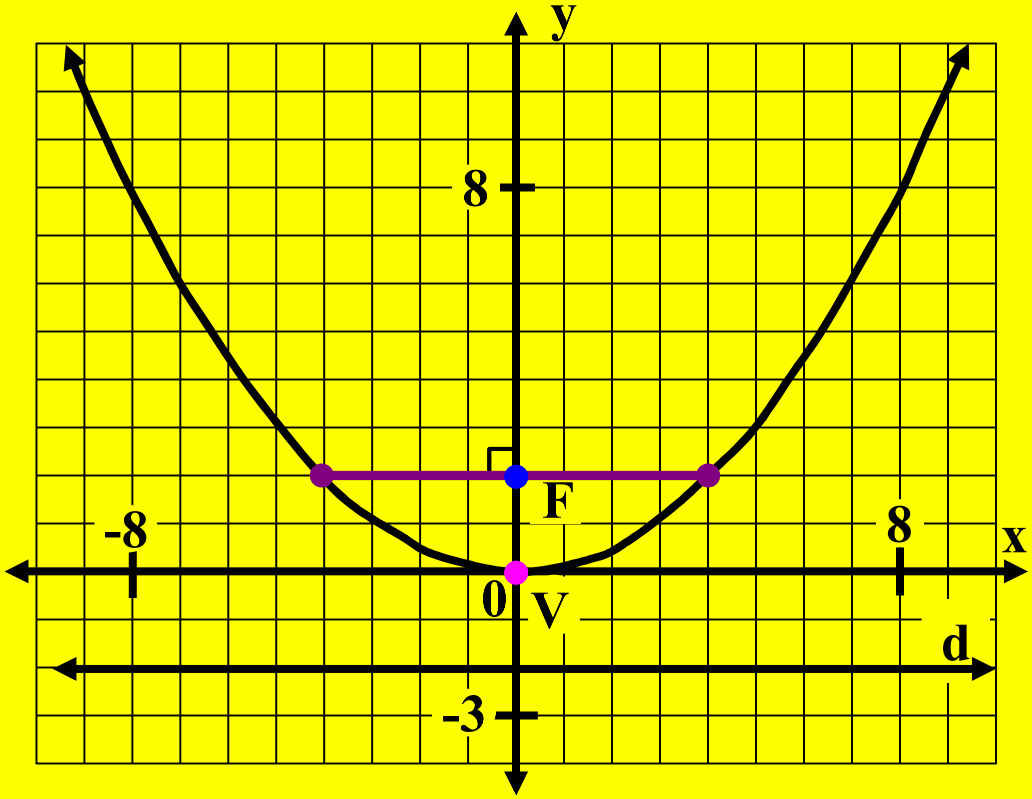
Type 1 Parabola
Standard form equation

$$y - k = a(x - h)^2$$

Vertex: (h, k) $a = \frac{1}{4p}$

p is the directed distance from the vertex to the focus.

Latus Rectum: |4p| units long



In type 1 parabolas, when a is positive,

The Equations of a Parabola.

Standard Form Equation

$$y = \frac{1}{8}x^2$$

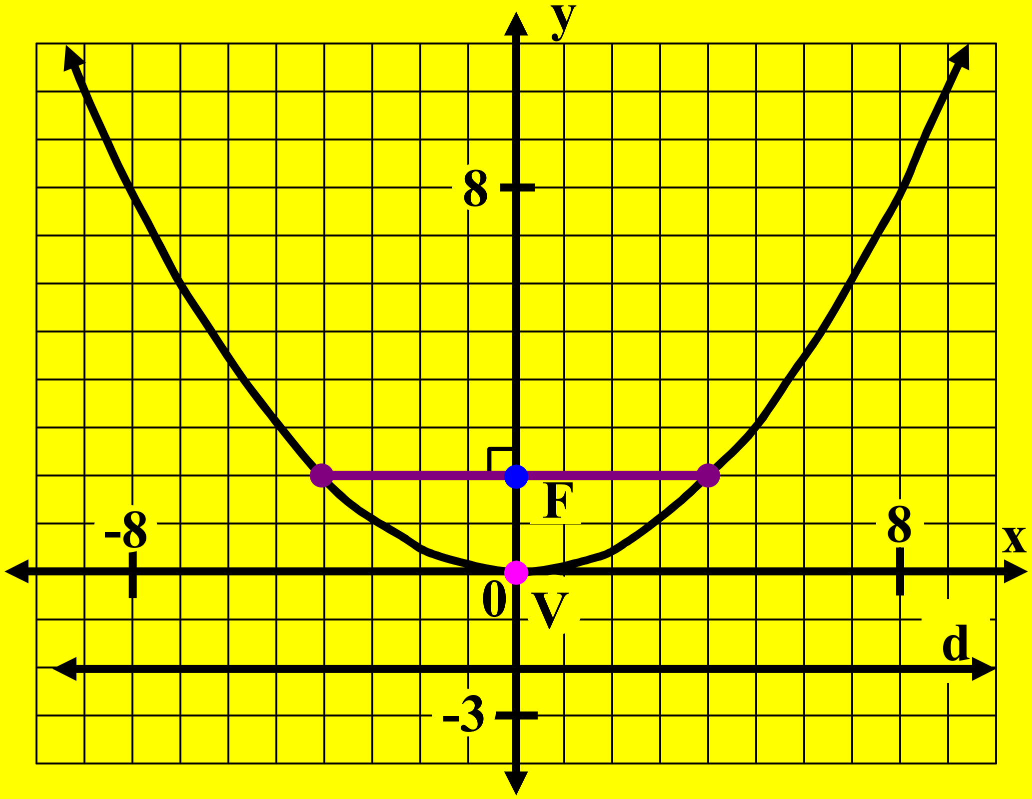
Type 1 Parabola
Standard form equation

$$y - k = a(x - h)^2$$

Vertex: (h, k) $a = \frac{1}{4p}$

p is the directed distance from the vertex to the focus.

Latus Rectum: |4p| units long



In type 1 parabolas, when a is positive, the parabola 'open upward',

The Equations of a Parabola.

Standard Form Equation

$$y = \frac{1}{8}x^2$$

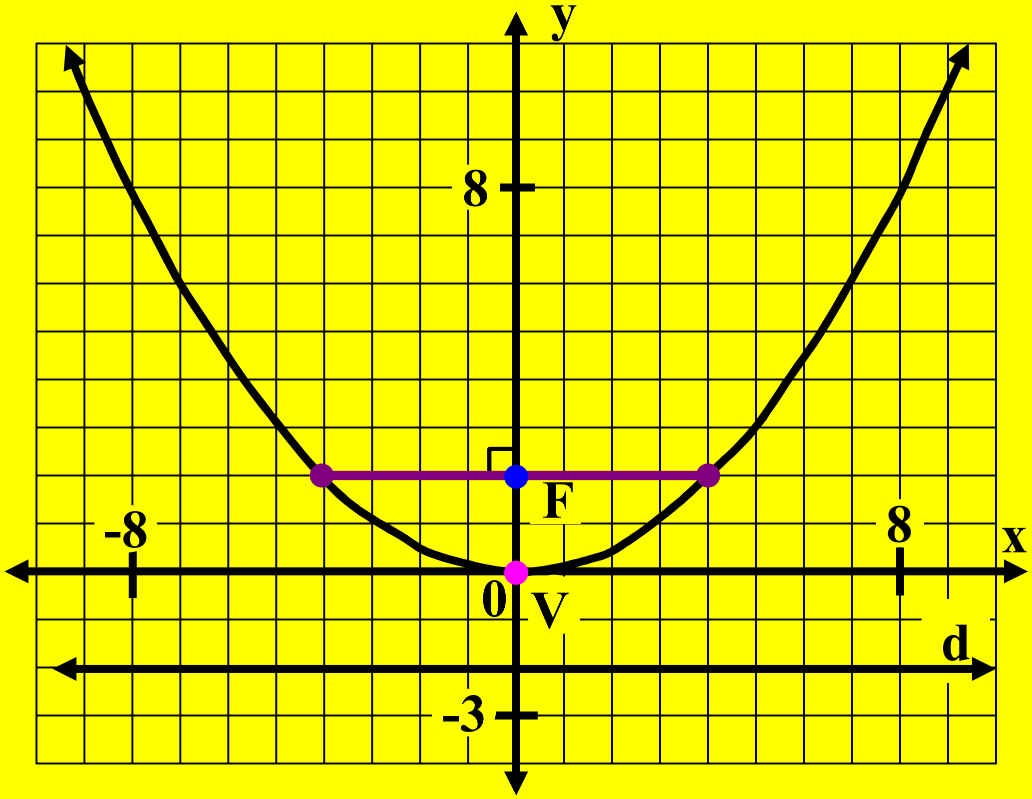
Type 1 Parabola
Standard form equation

$$y - k = a(x - h)^2$$

Vertex: (h, k) $\quad a = \frac{1}{4p}$

p is the <u>directed distance</u> from the vertex to the focus.

Latus Rectum: |4p| units long



In type 1 parabolas, when <u>a</u> is positive, the parabola 'open upward', and when <u>a</u> is negative,

The Equations of a Parabola.

Standard Form Equation

$$y = \frac{1}{8}x^2$$

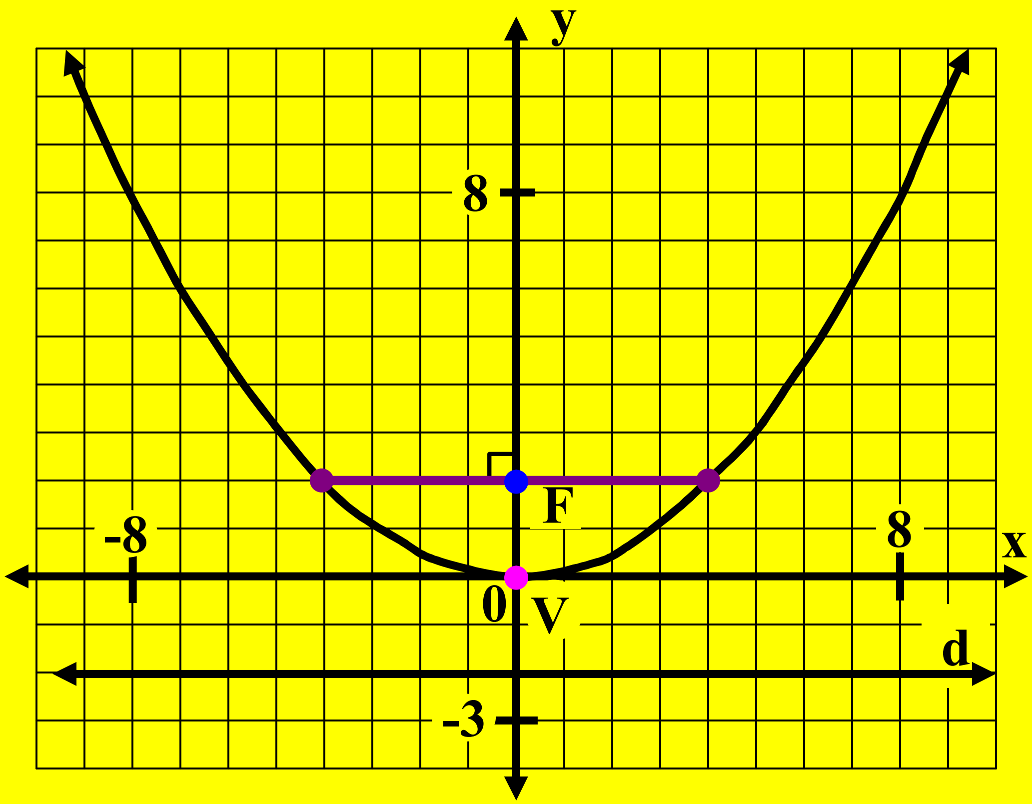
Type 1 Parabola
Standard form equation

$$y - k = a(x - h)^2$$

Vertex: (h, k) $a = \frac{1}{4p}$

p is the <u>directed distance</u> from the vertex to the focus.

Latus Rectum: |4p| units long



In type 1 parabolas, when <u>a</u> is positive, the parabola 'open upward', and when <u>a</u> is negative, the parabola 'opens downward'.

The Equations of a Parabola.

Standard Form Equation

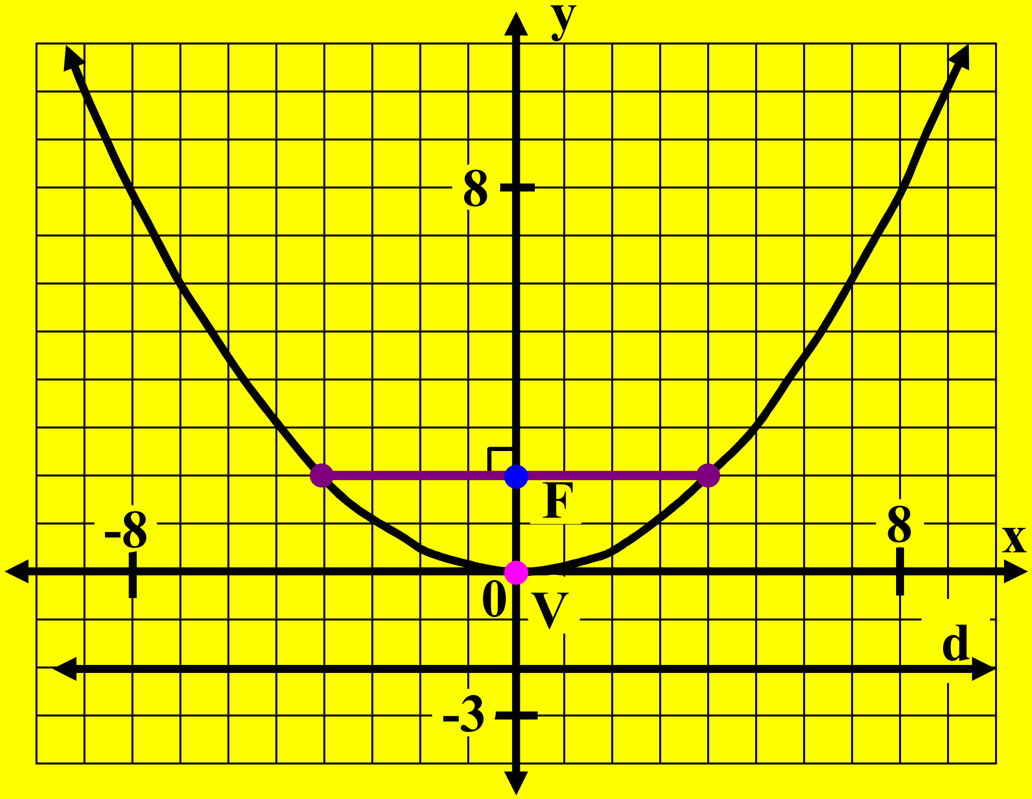
$$y = \frac{1}{8}x^2$$

Type 1 Parabola
Standard form equation

$$y - k = a(x - h)^2$$

Vertex: (h, k) $a = \frac{1}{4p}$

p is the directed distance from the vertex to the focus.
Latus Rectum: |4p| units long



In type 1 parabolas, when a is positive, the parabola 'open upward', and when a is negative, the parabola 'opens downward'. But the value of a also determines the shape of the parabola.

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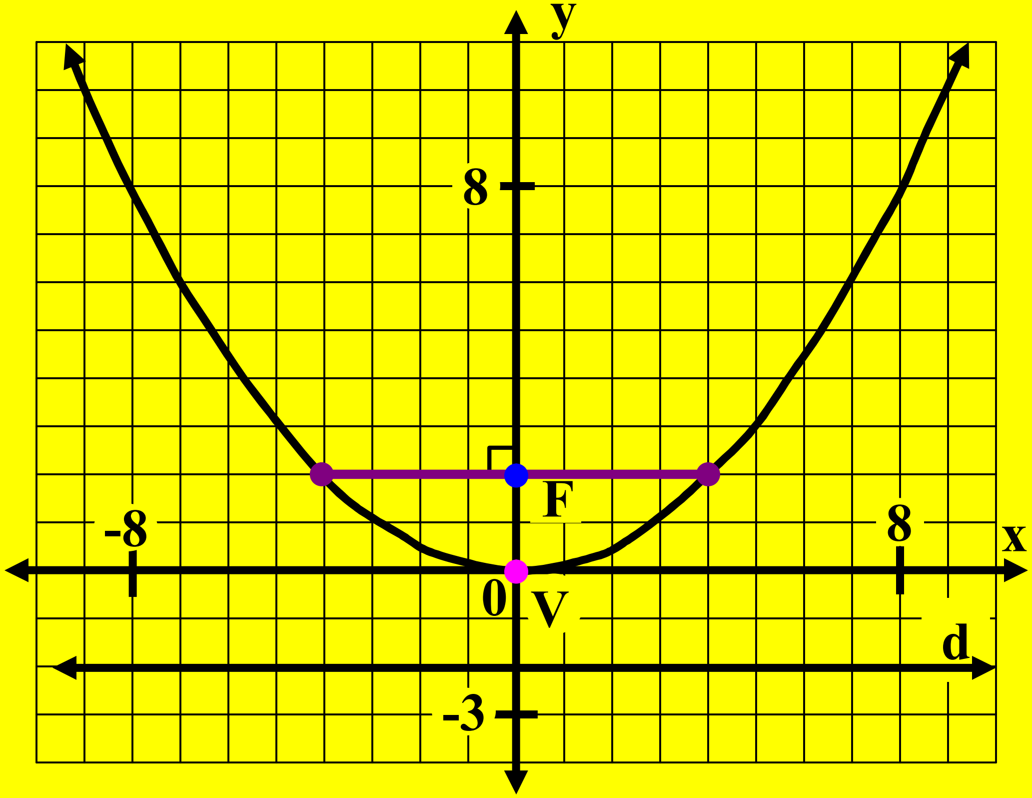

In type 1 parabolas, when a is positive, the parabola 'open upward', and when a is negative, the parabola 'opens downward'. But the value of a also determines the shape of the parabola. Let's take a look at this relationship.

The Shape of a Parabola.

The Shape of a Parabola.

We will look at some parabolas with equation
$y = ax^2$, where $a > 0$.

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In each case, the vertex will be at (0, 0)

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We will look at some parabolas with equation

$y = ax^2$, where $a > 0$.

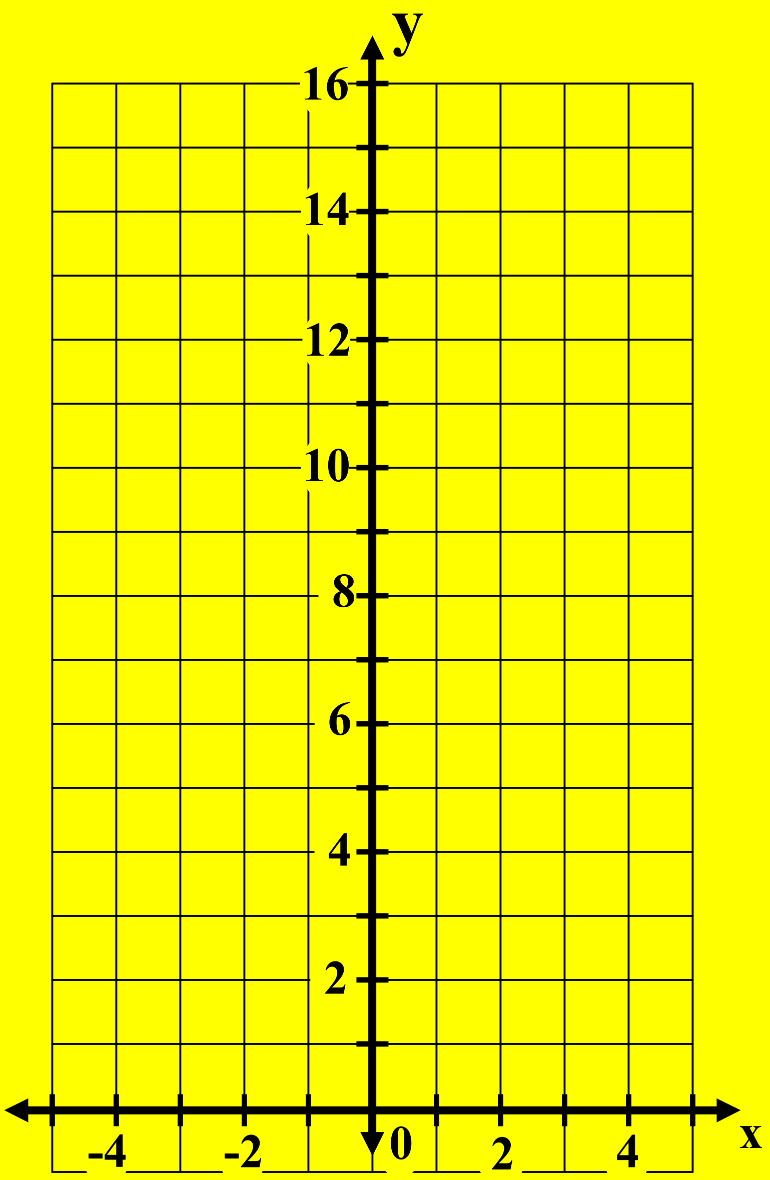
In each case, the vertex will be at (0, 0) and the parabolas will 'open upward'. We will compare to see how the different values of <u>a</u> affect the shape of the parabolas involved.

The Shape of a Parabola.

$$y = ax^2$$

$$a = \frac{1}{2} \Rightarrow y = \frac{1}{2}x^2$$

x	y
0	
± 1	
± 2	
± 3	
± 4	
± 5	



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0	
± 1	
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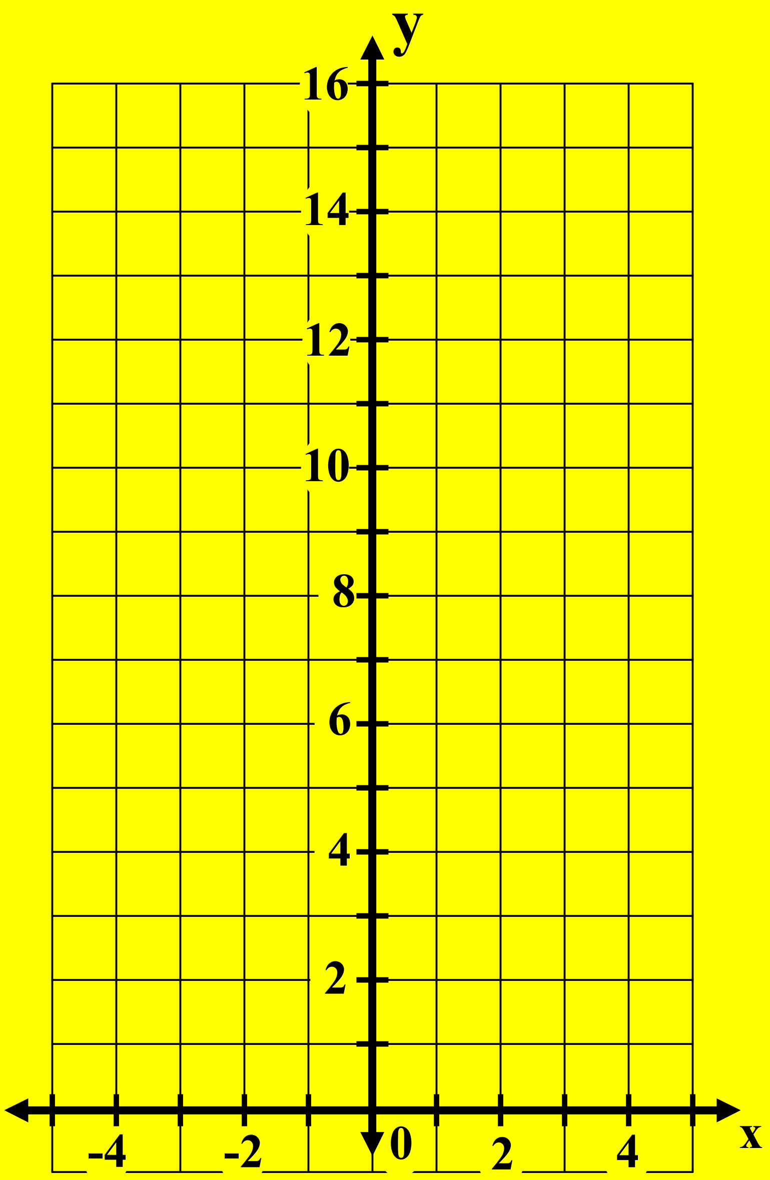
± 4	
± 5	

First we will fill out the table.



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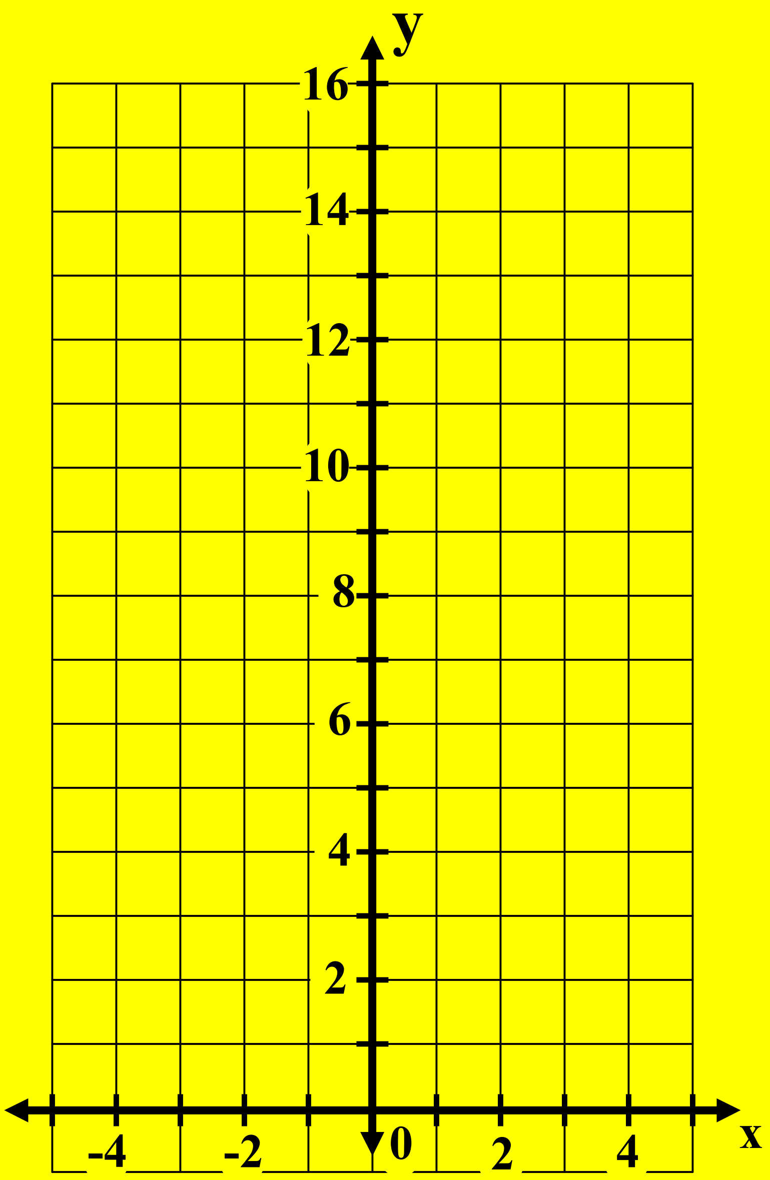

First we will fill out the table.
In each case,

The Shape of a Parabola.

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x	y
0	
± 1	
± 2	
± 3	
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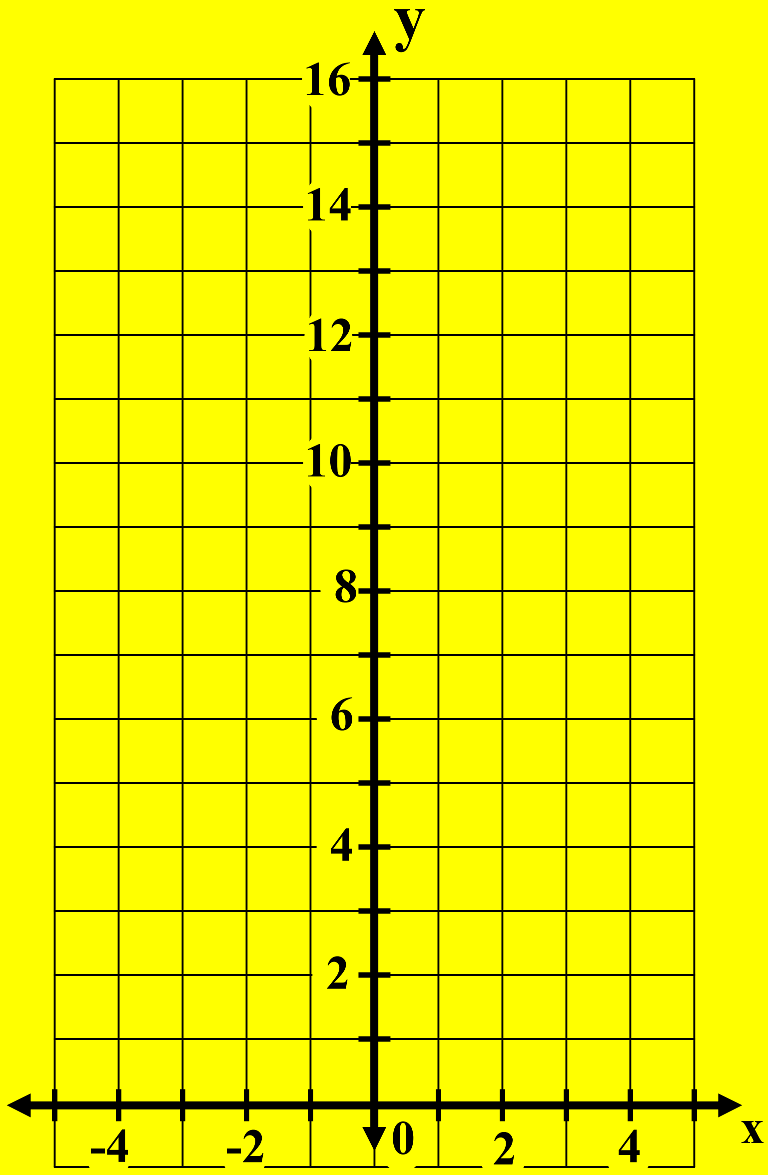

First we will fill out the table. In each case, square the value of x,

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x	y
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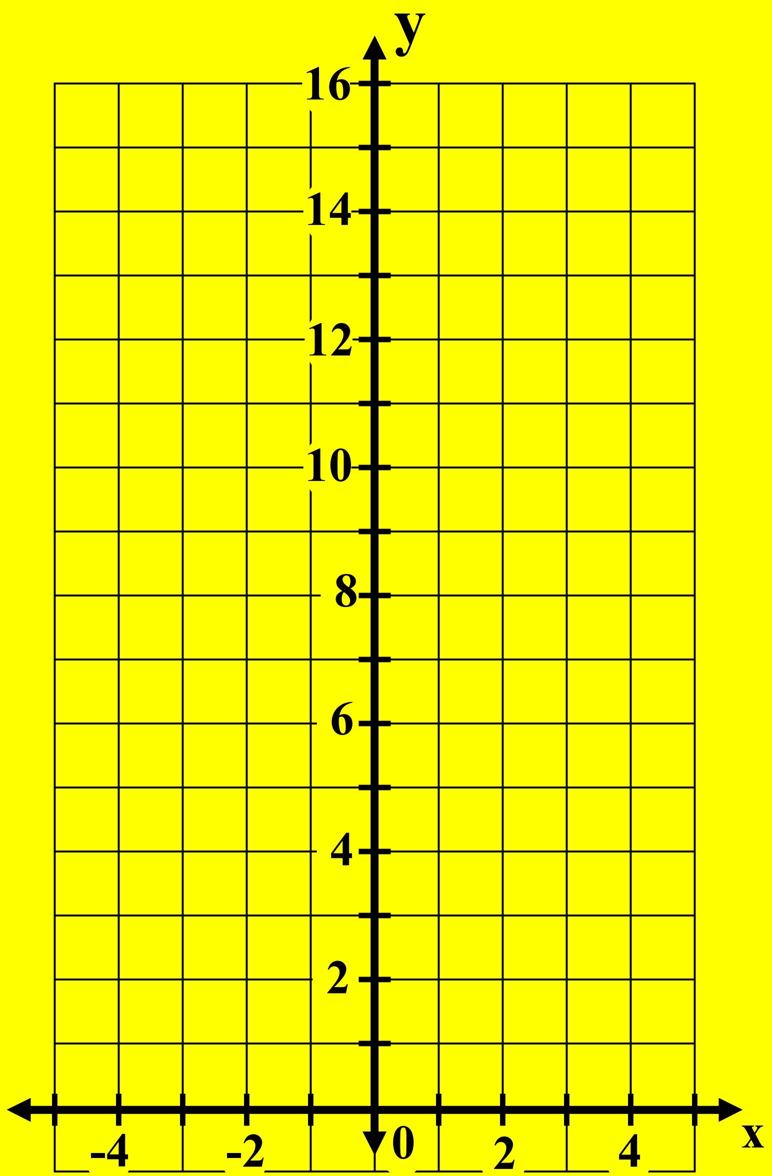
± 3	
± 4	
± 5	



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The Shape of a Parabola.

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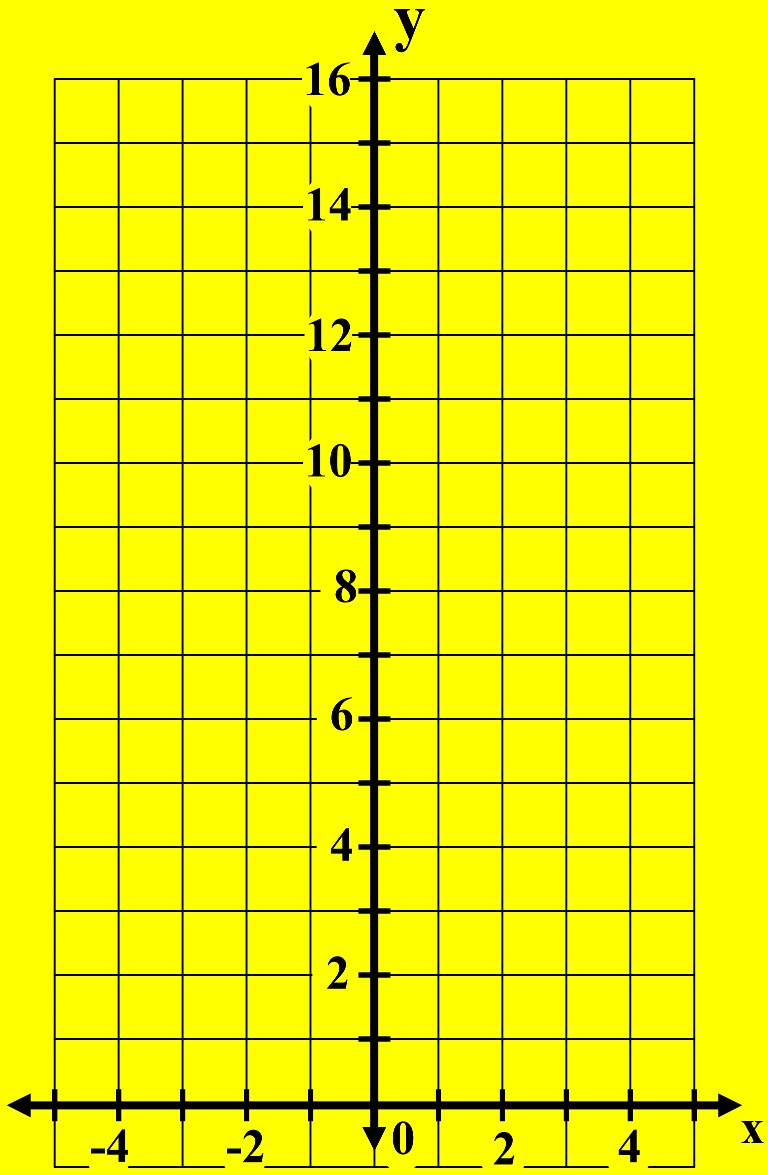

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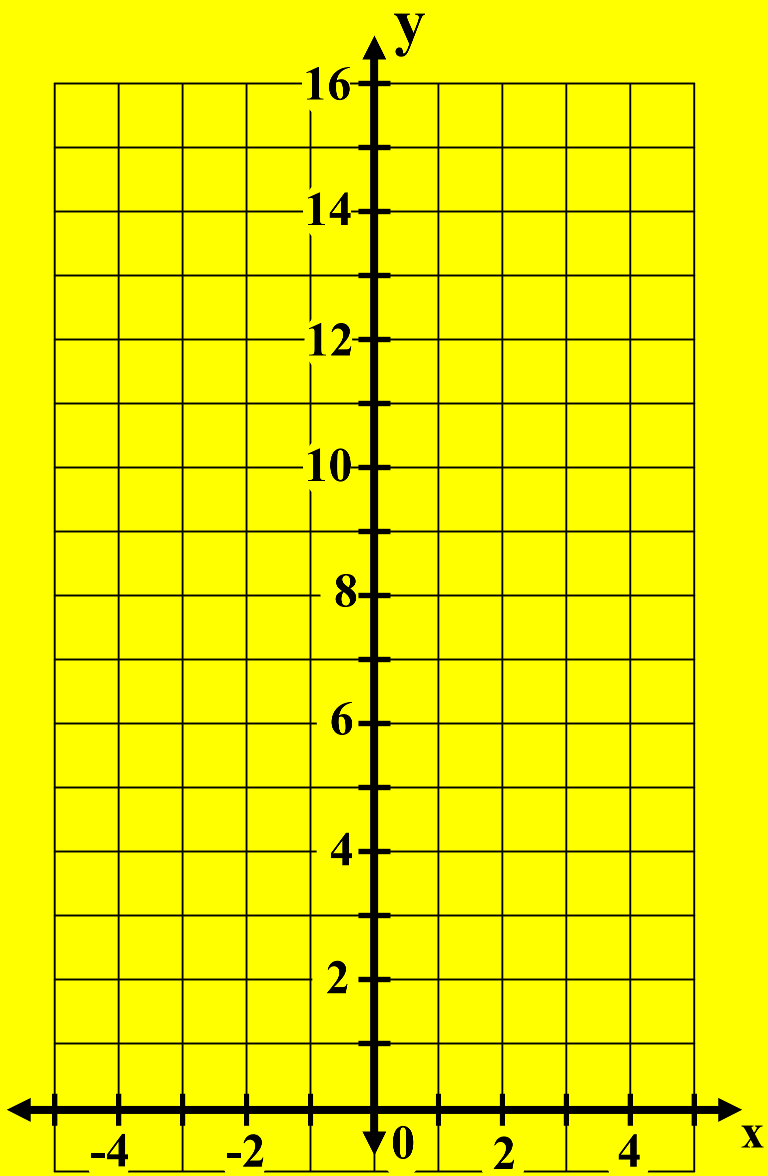

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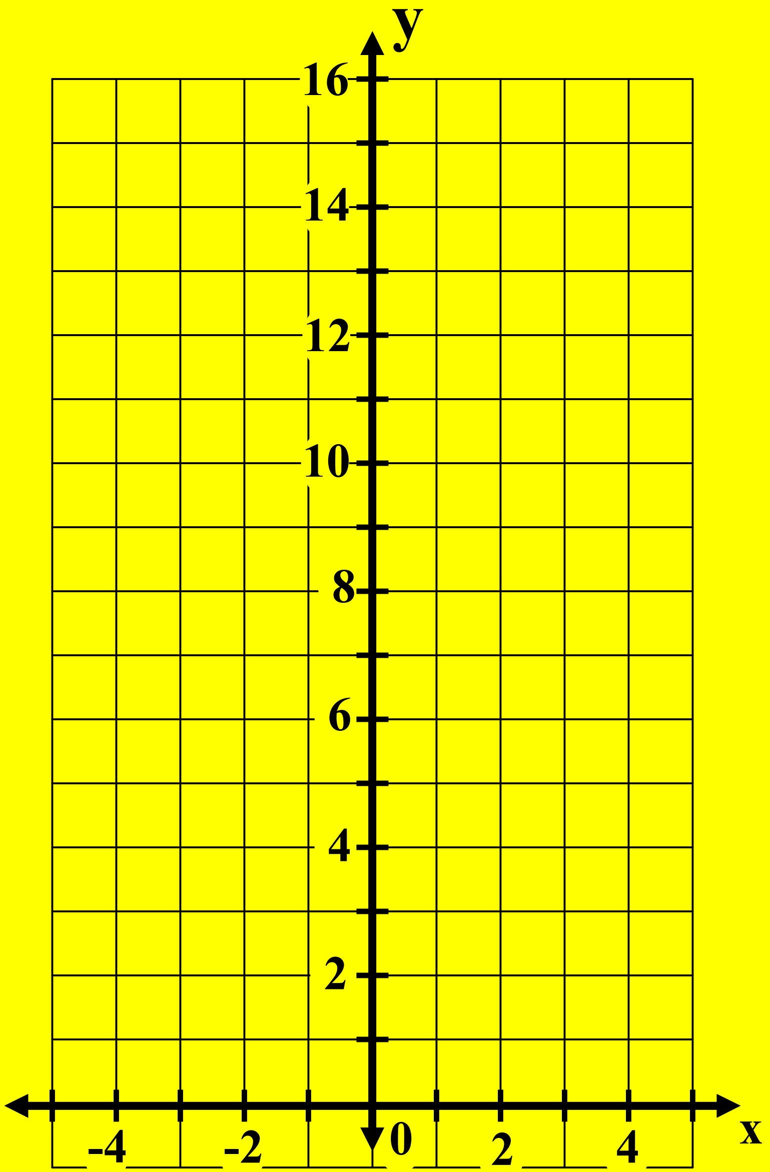

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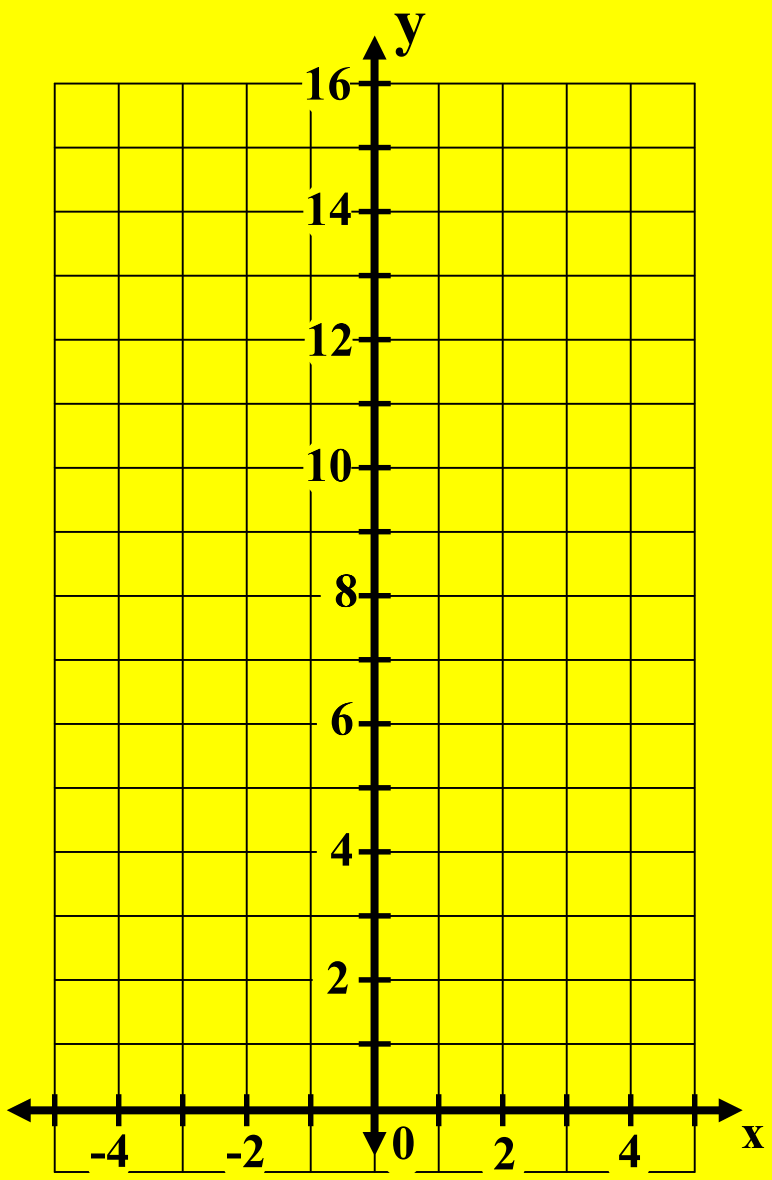

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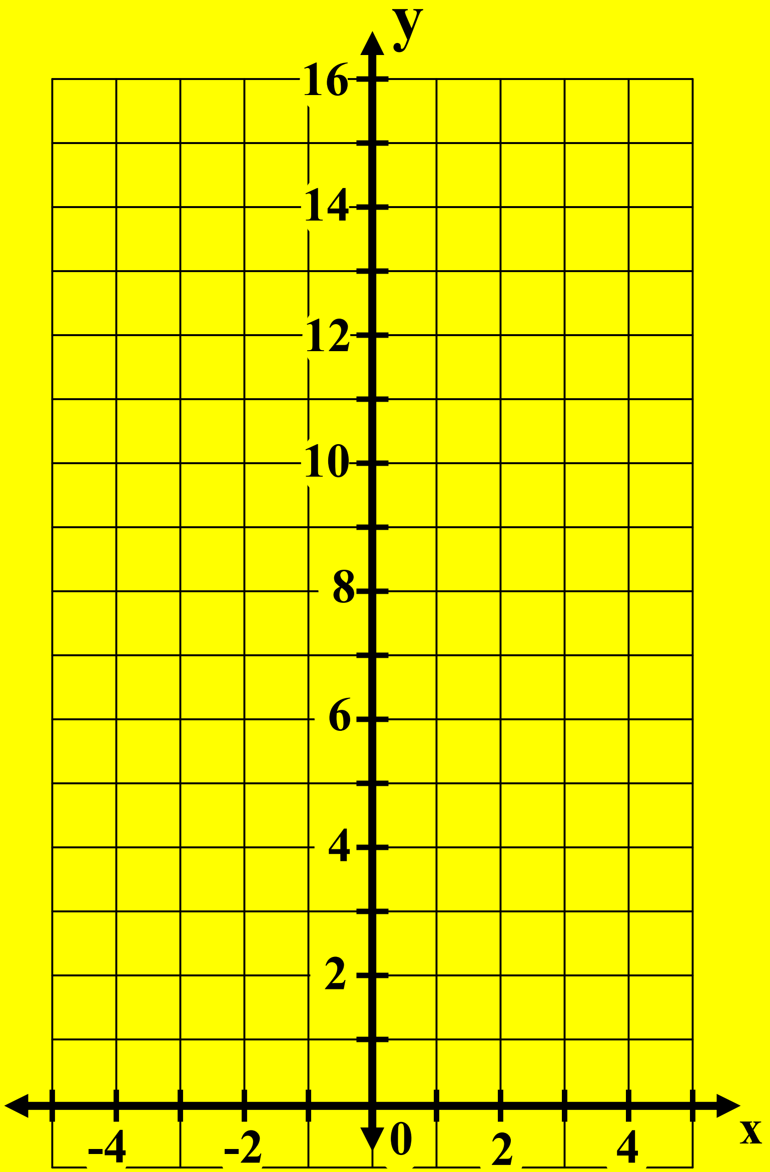

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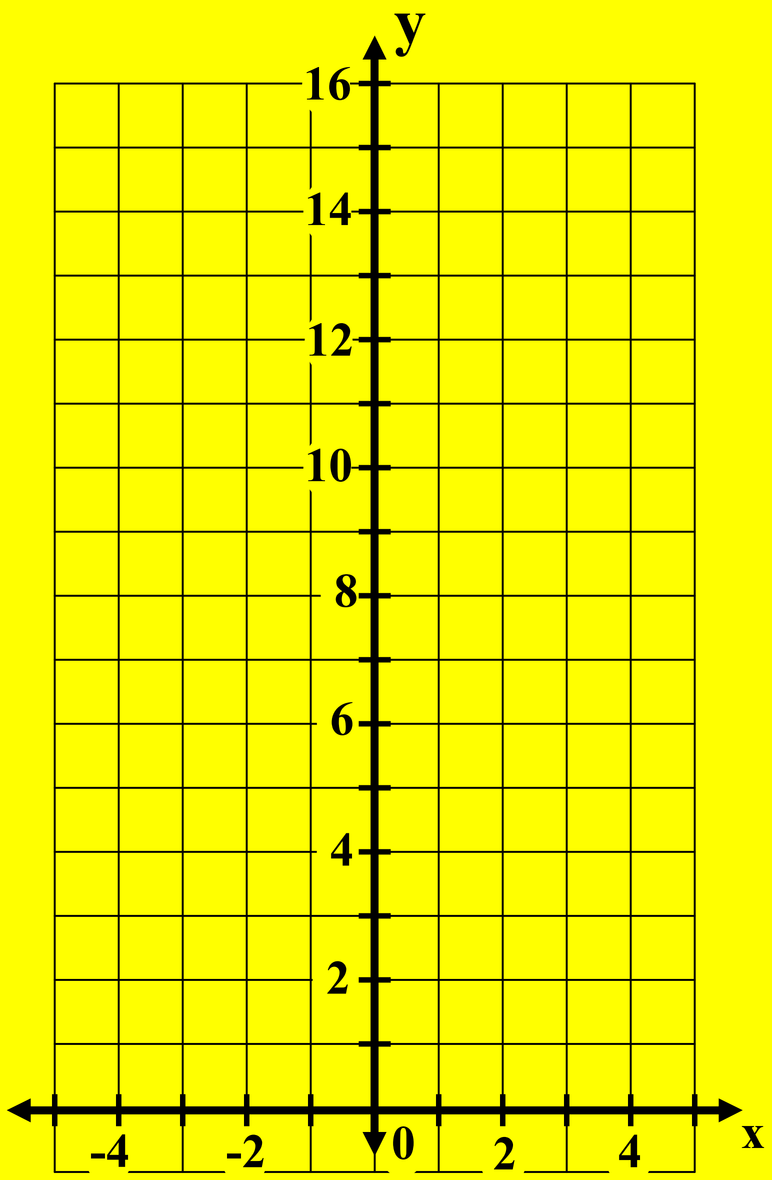

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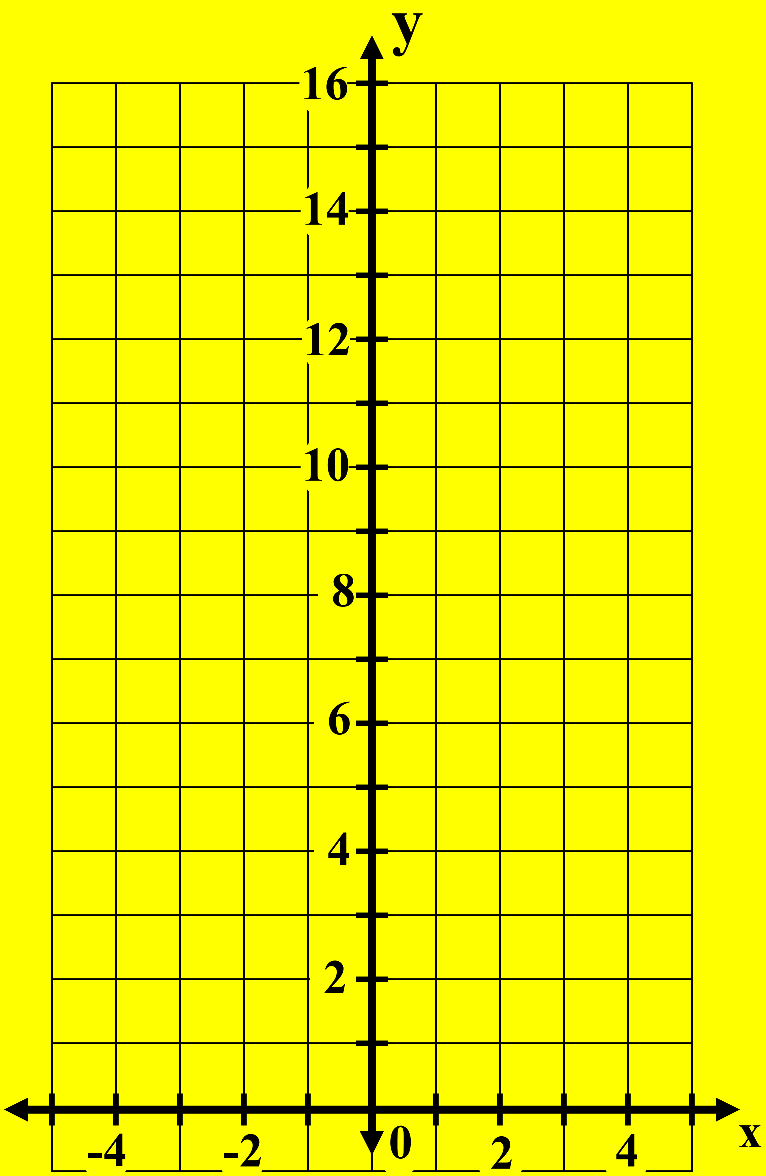

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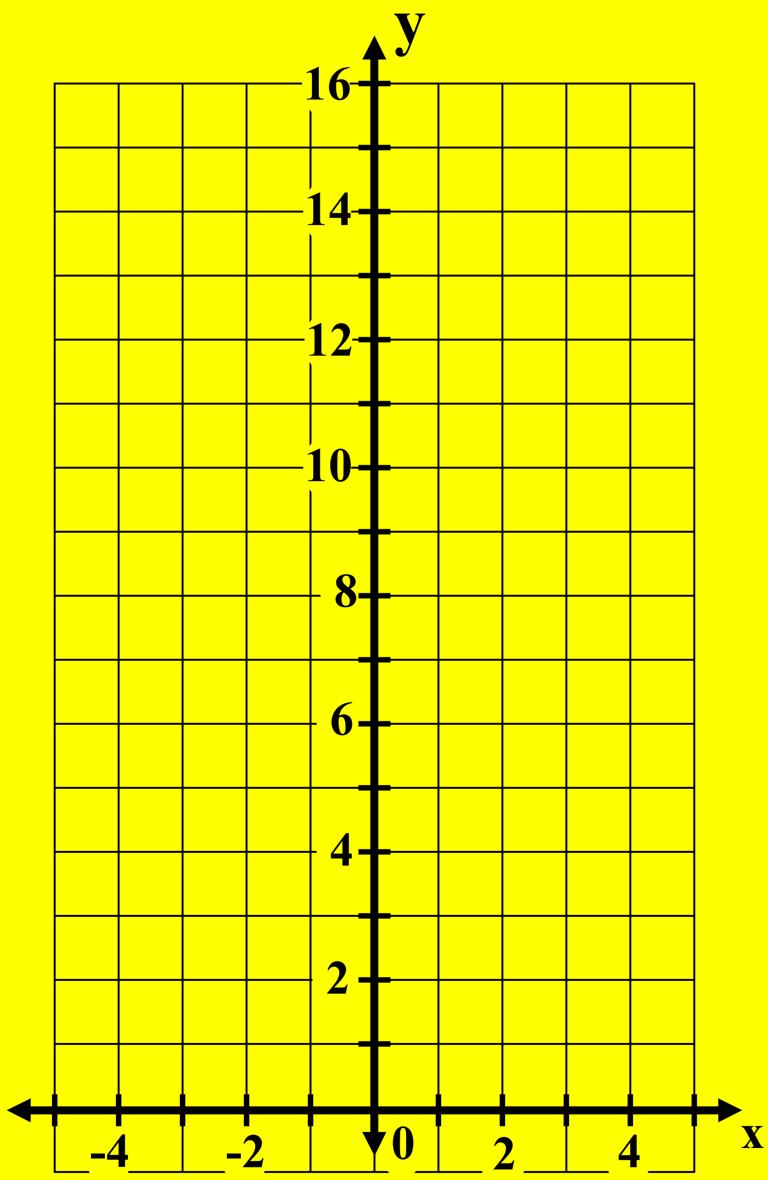

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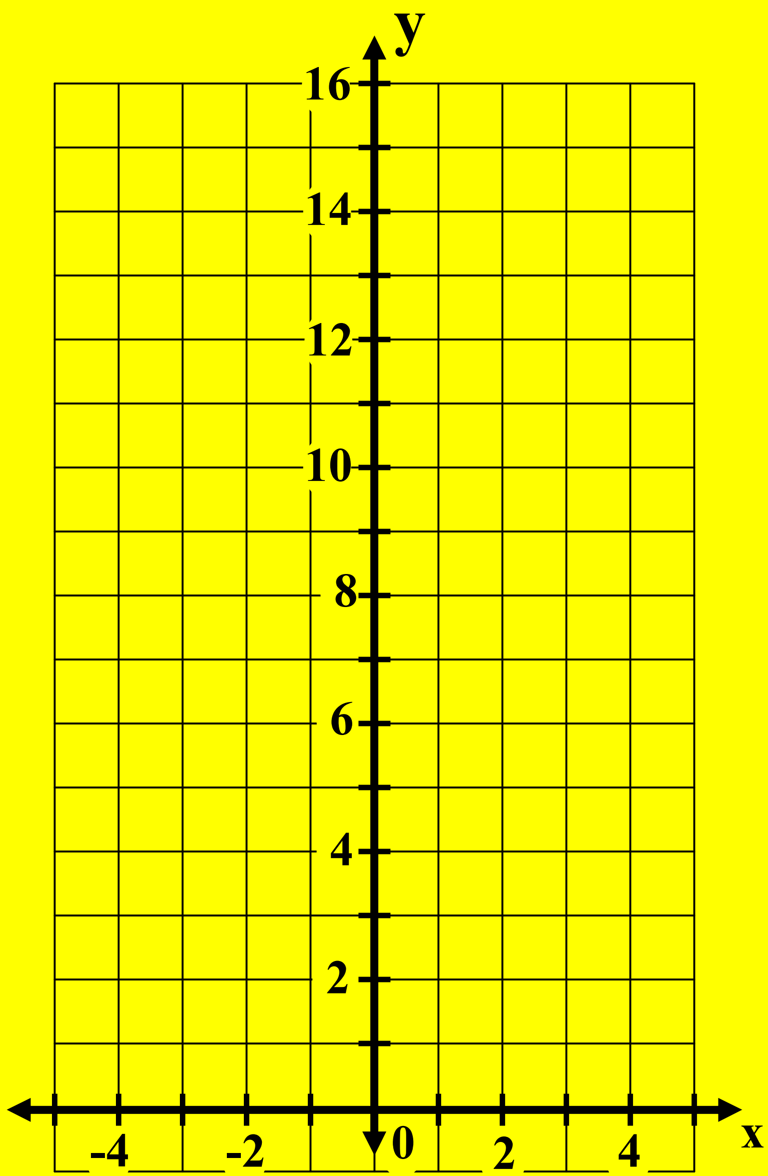

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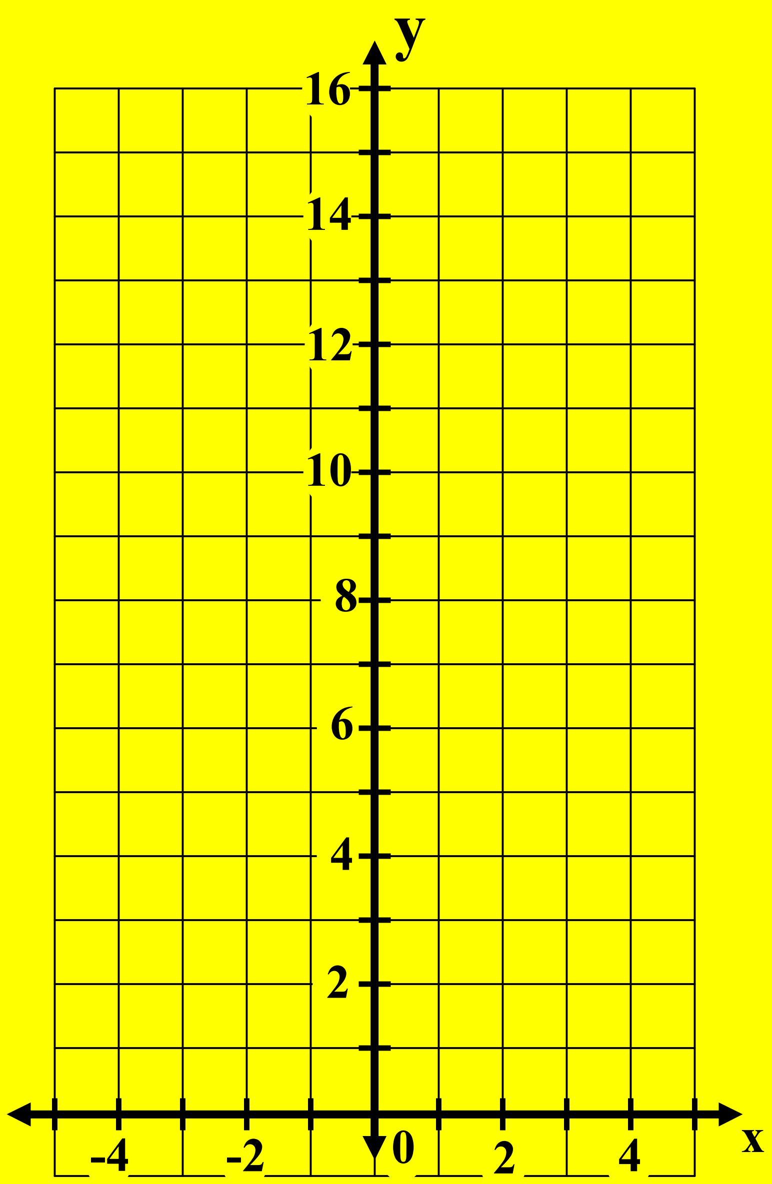

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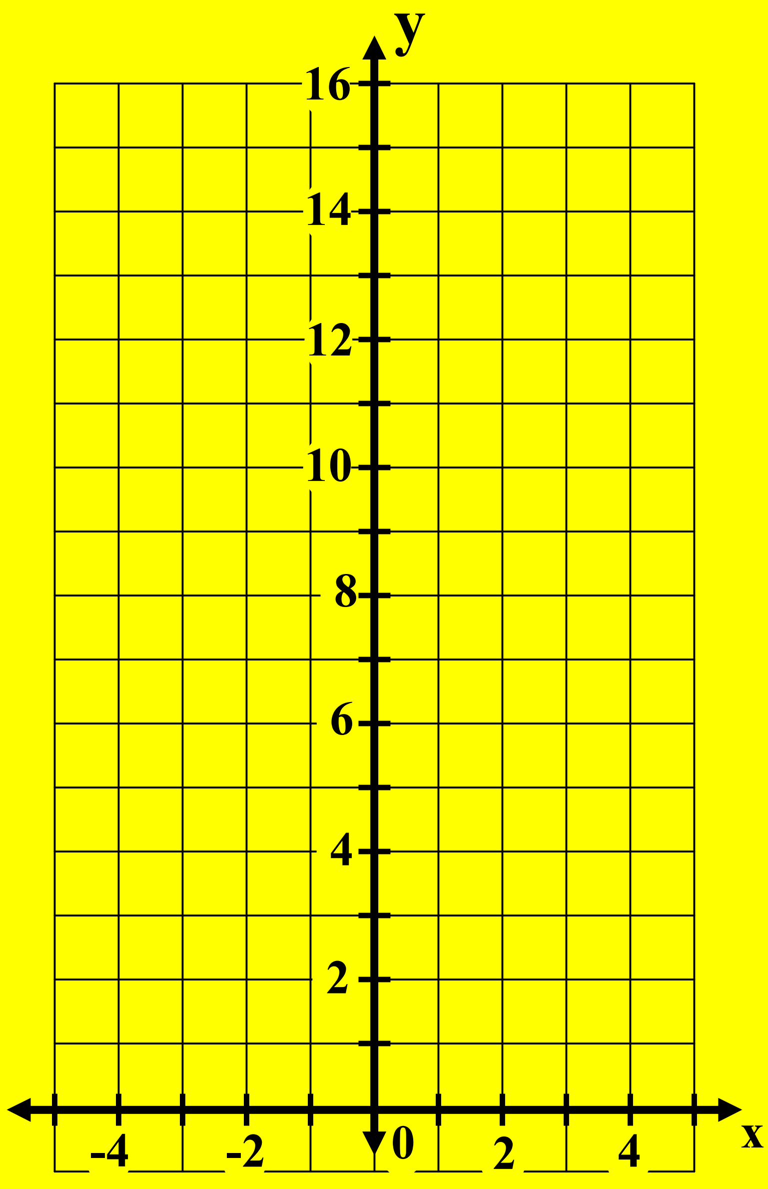

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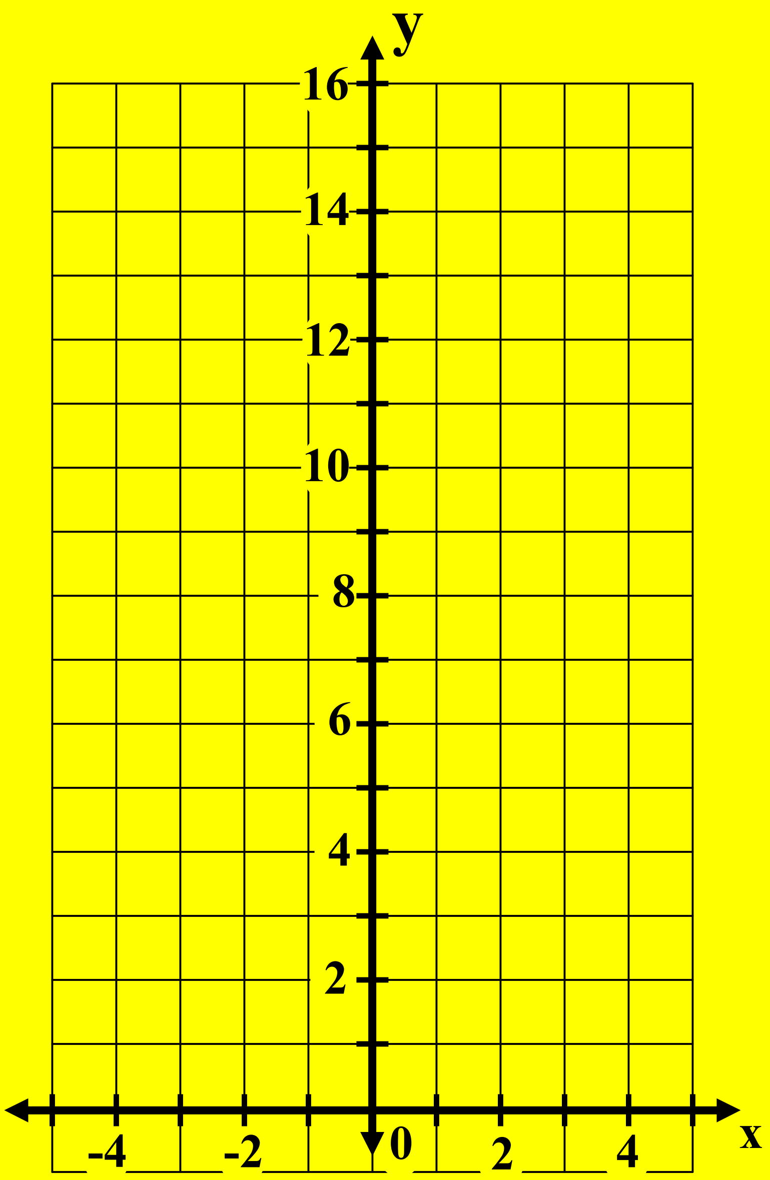

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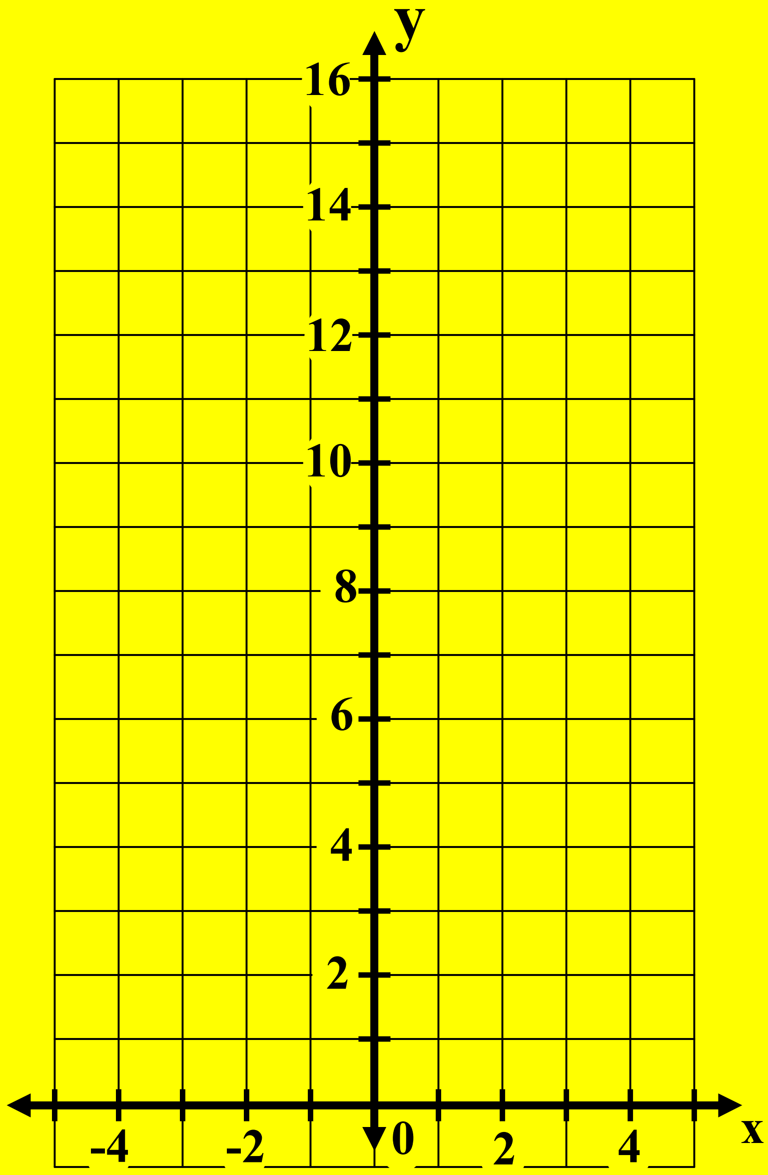

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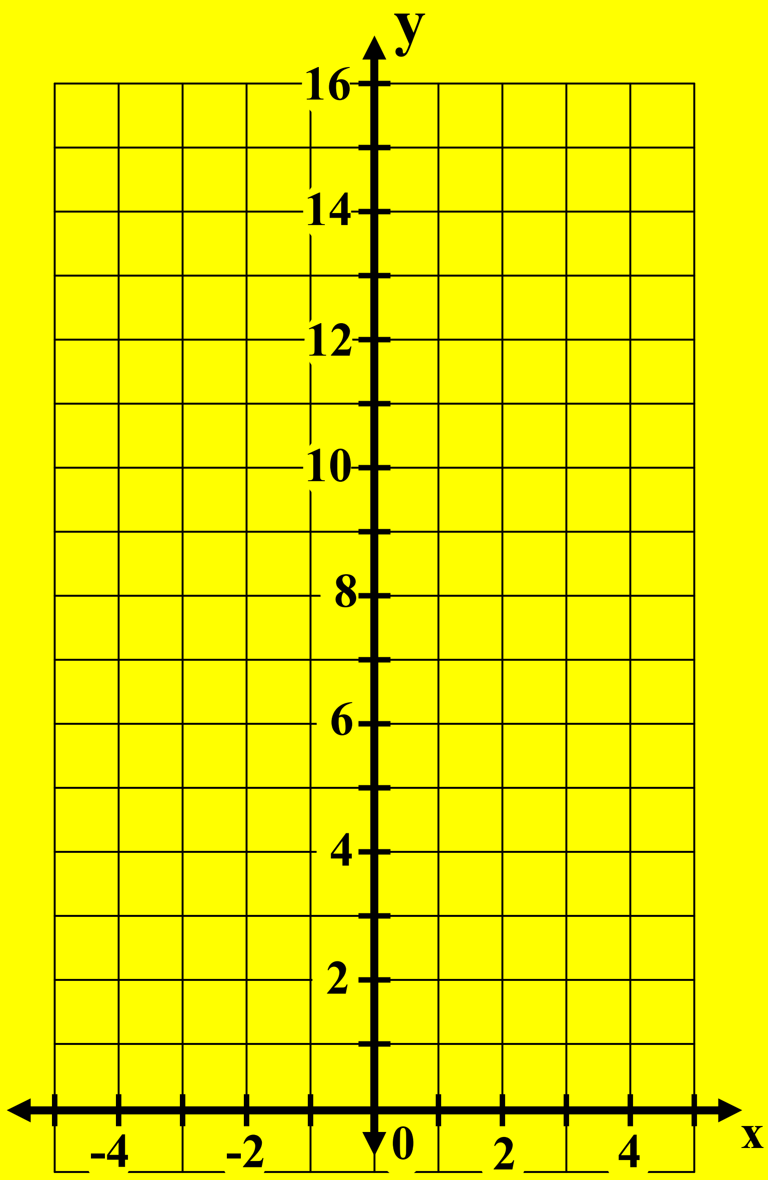

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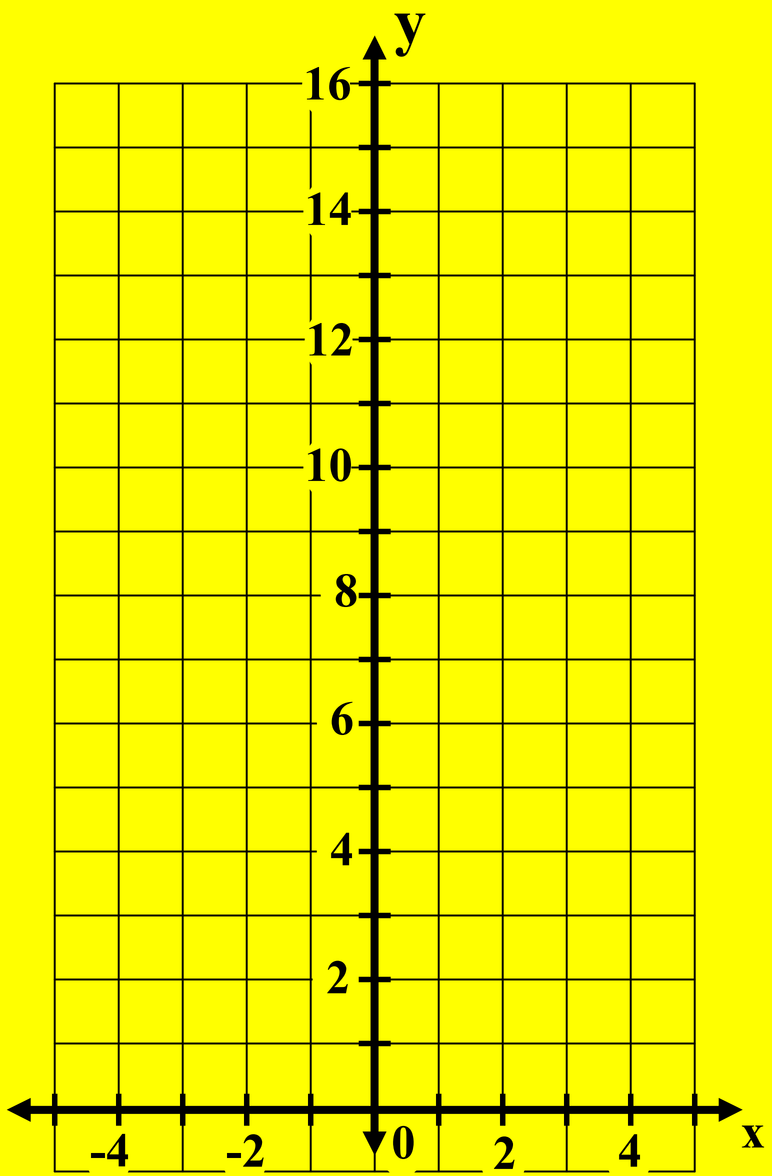

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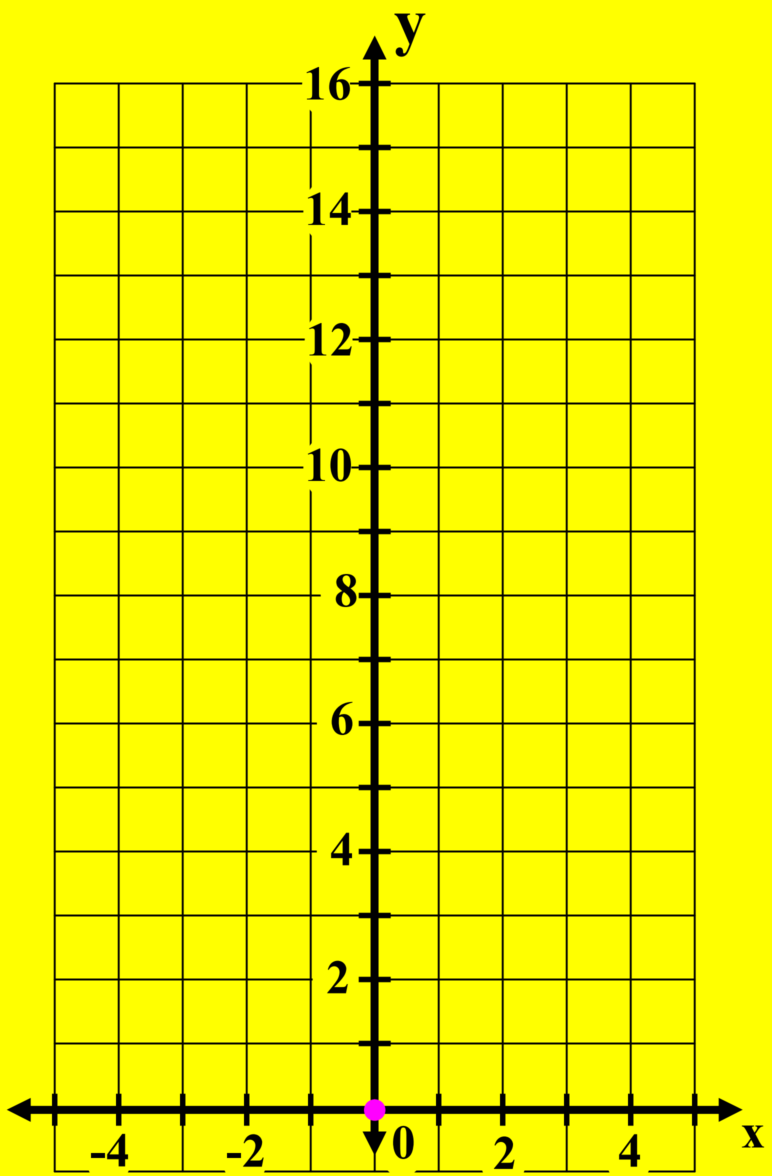

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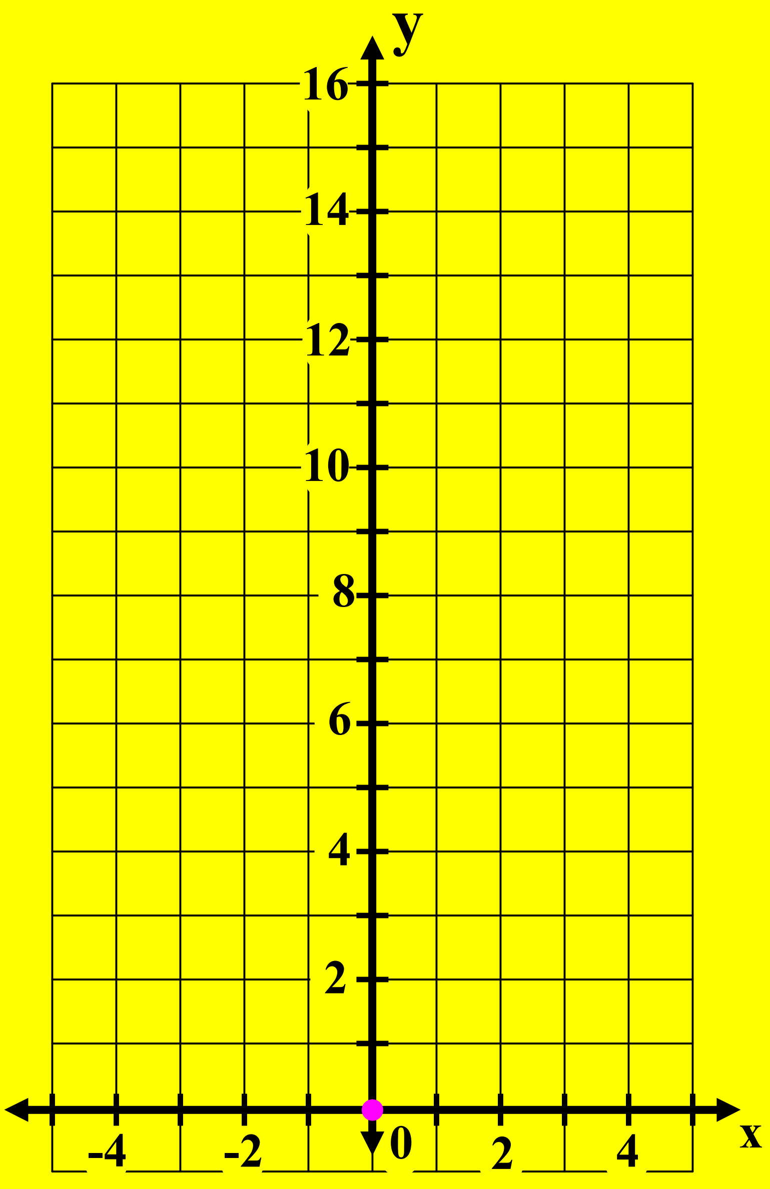

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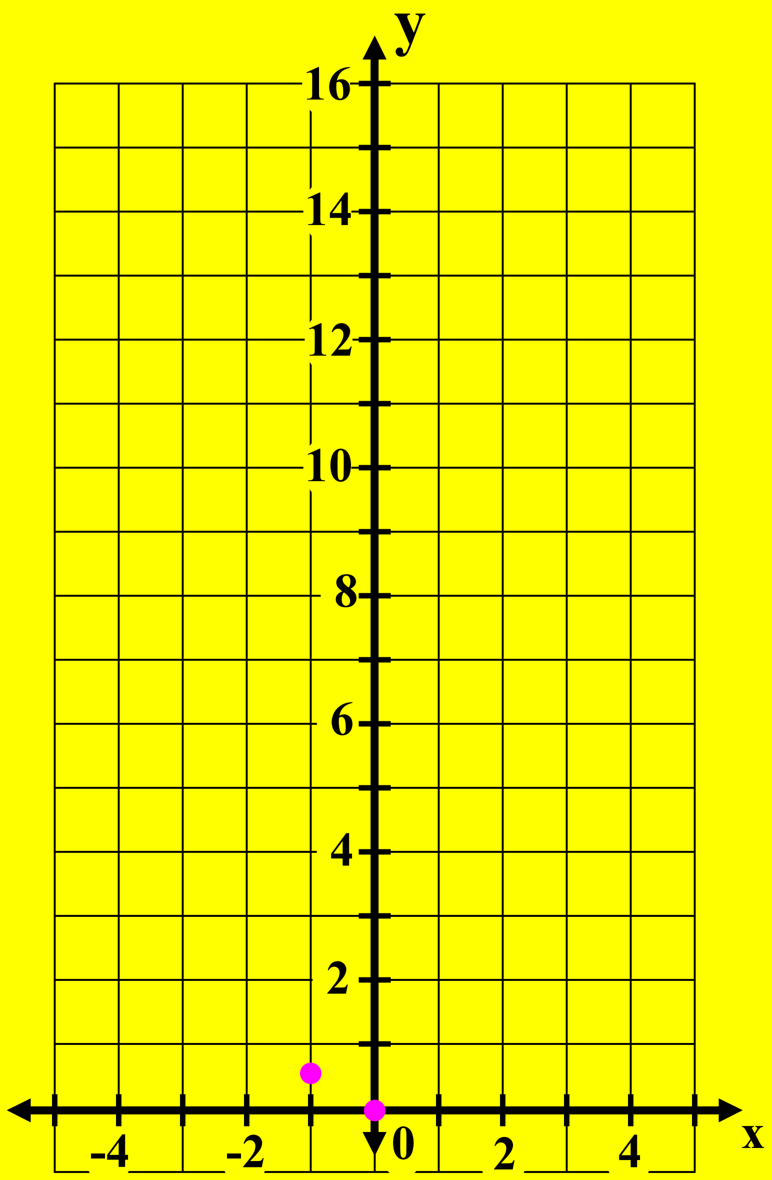

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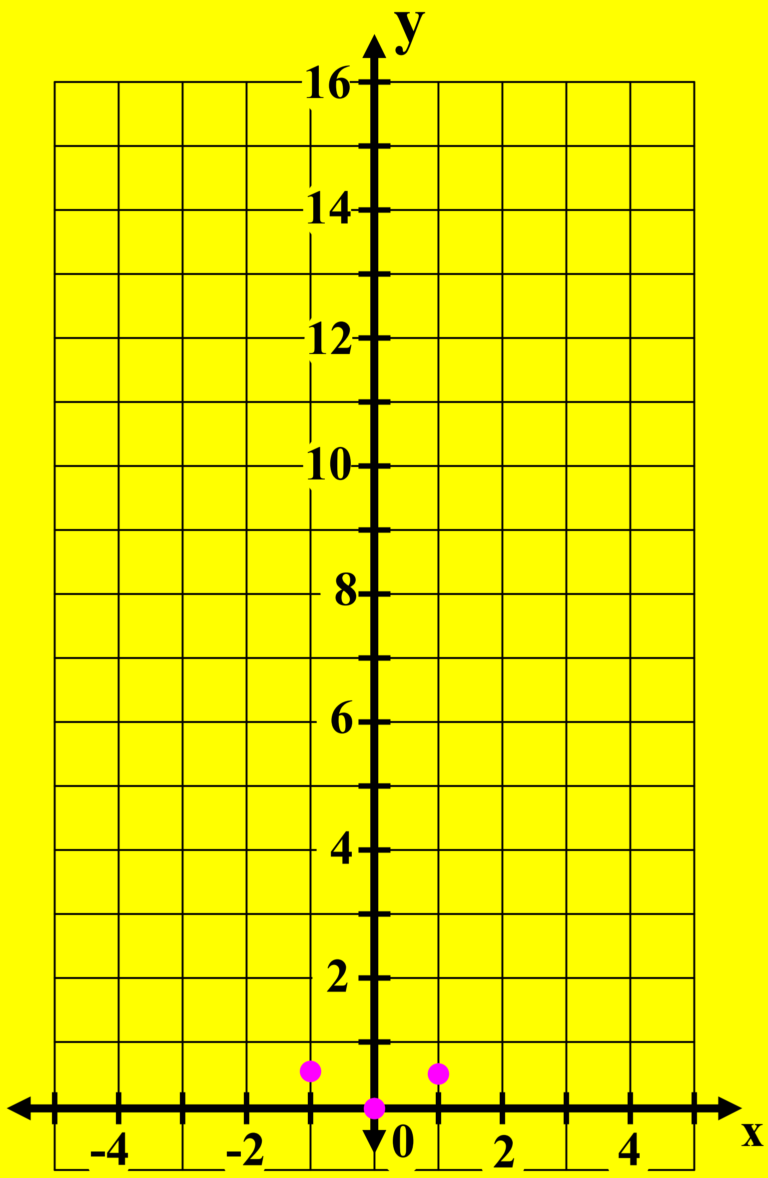

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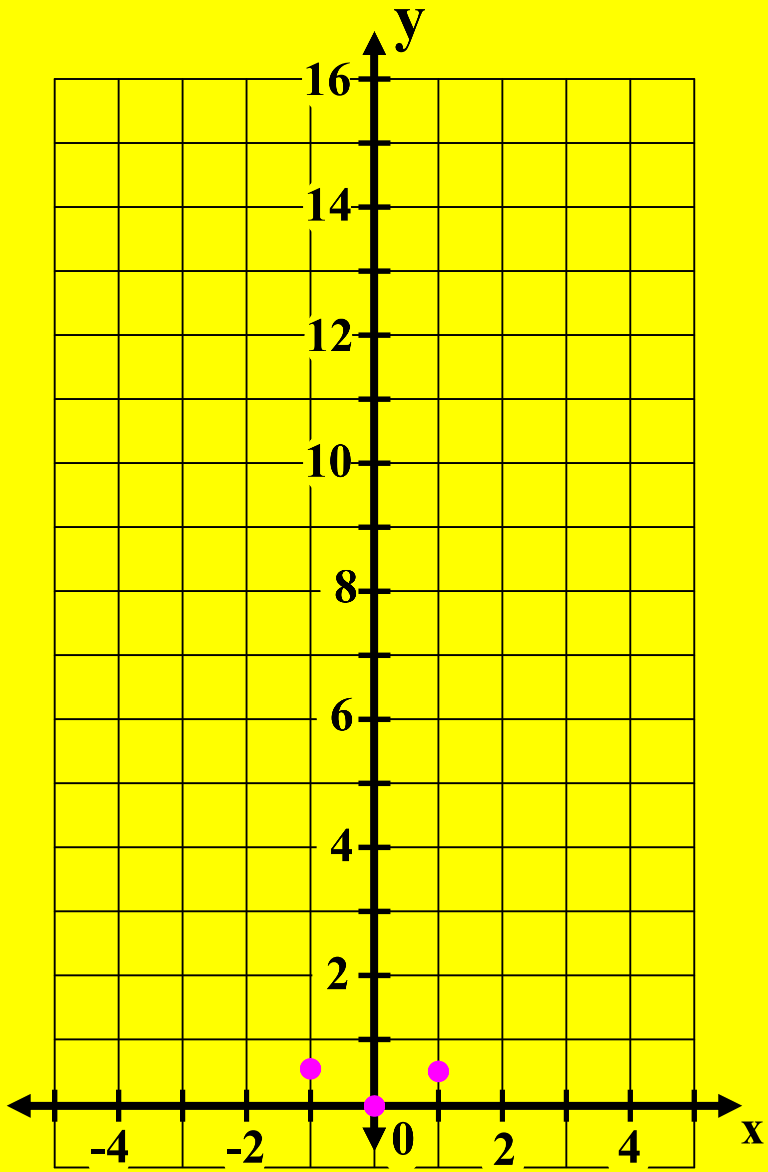

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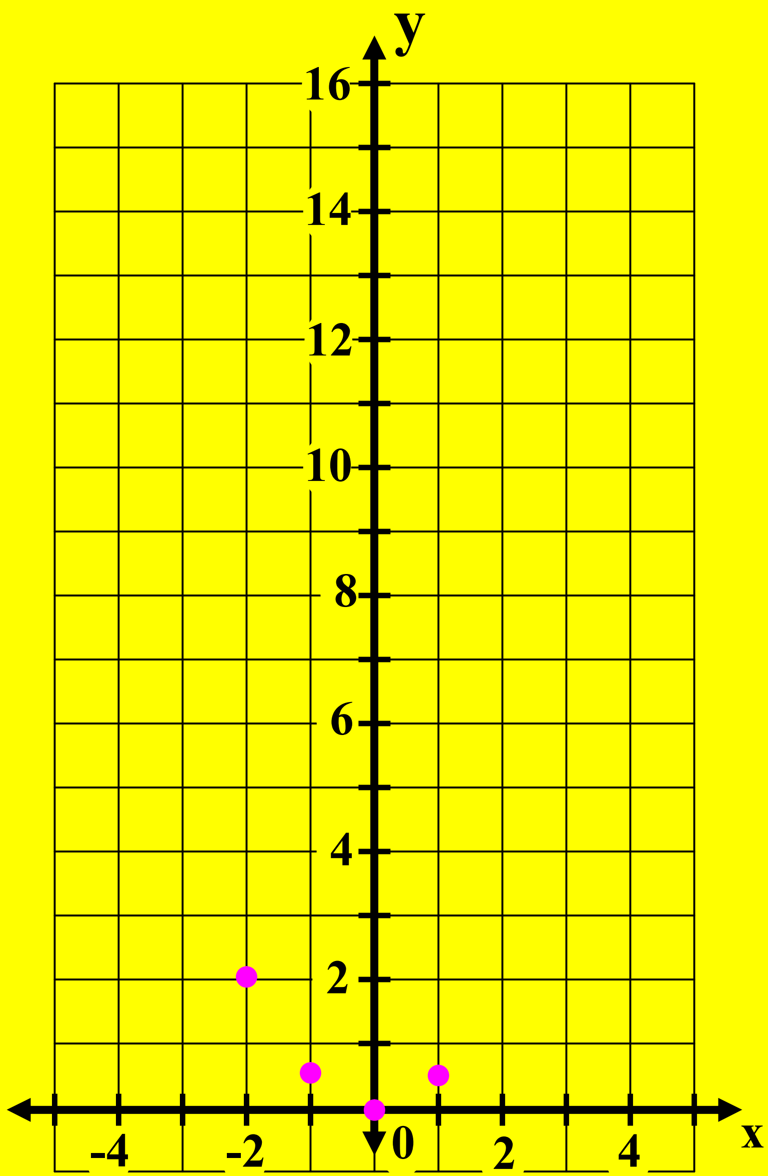

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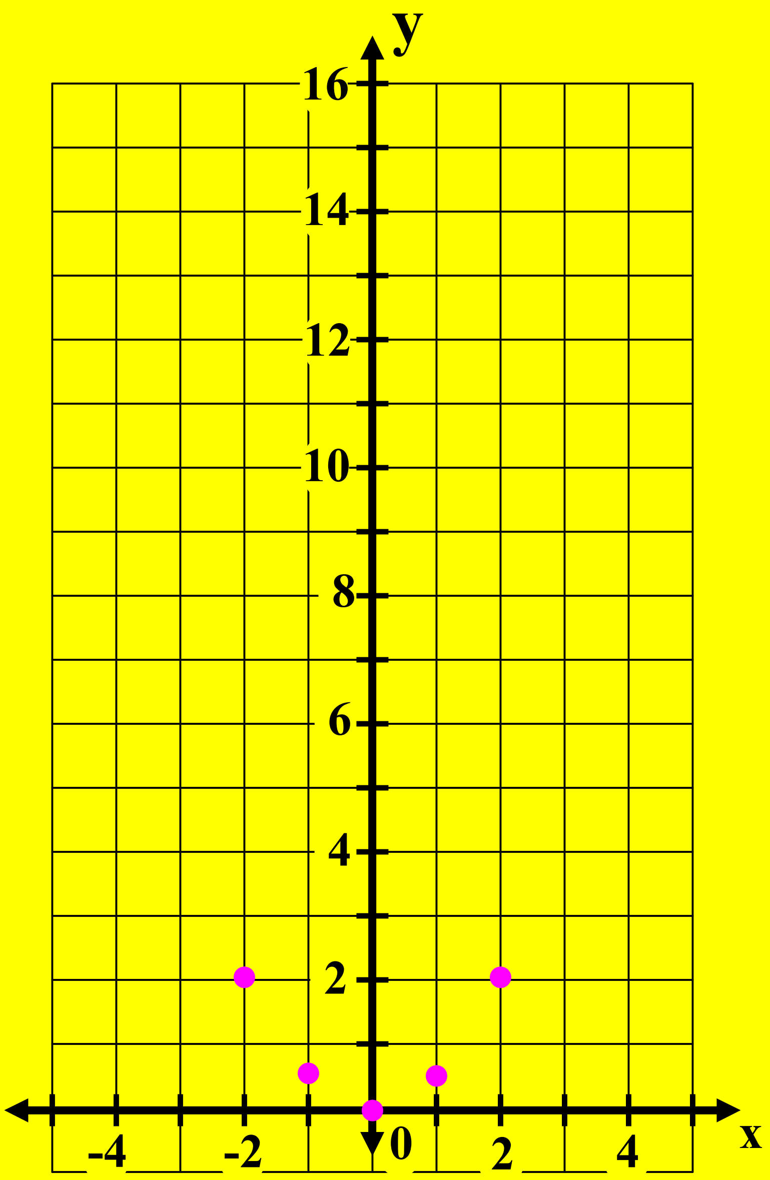

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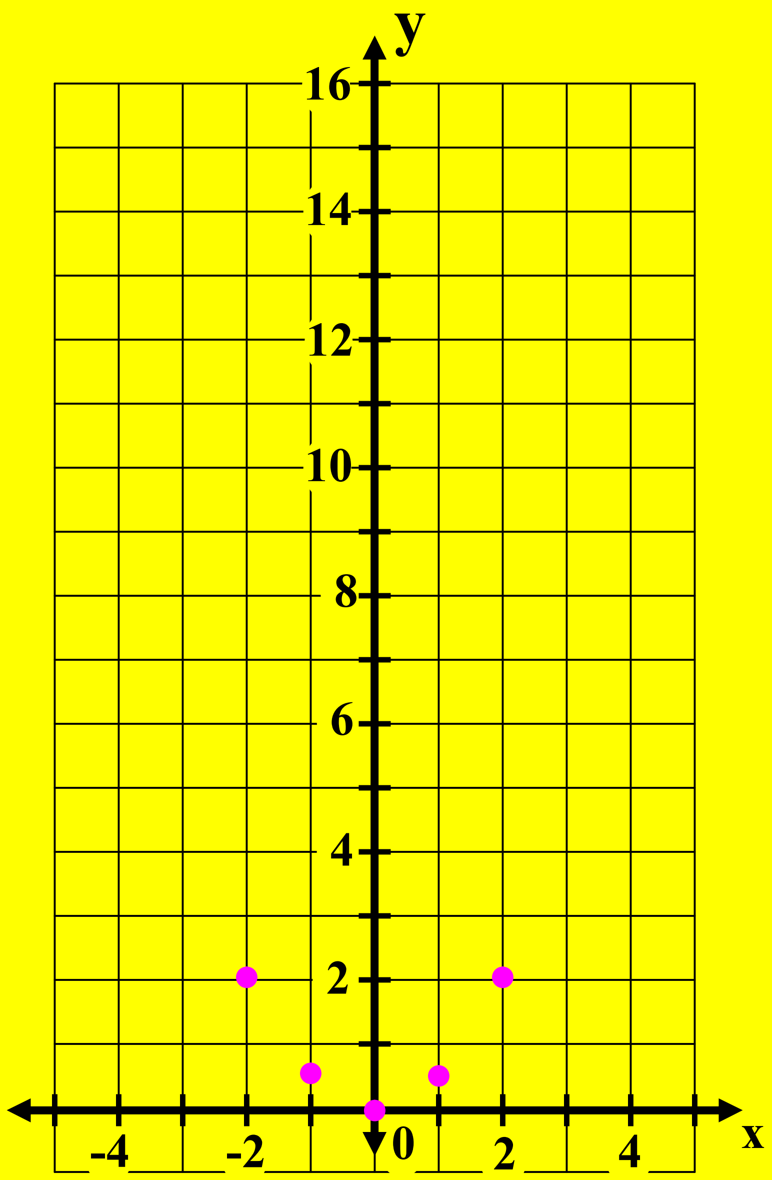

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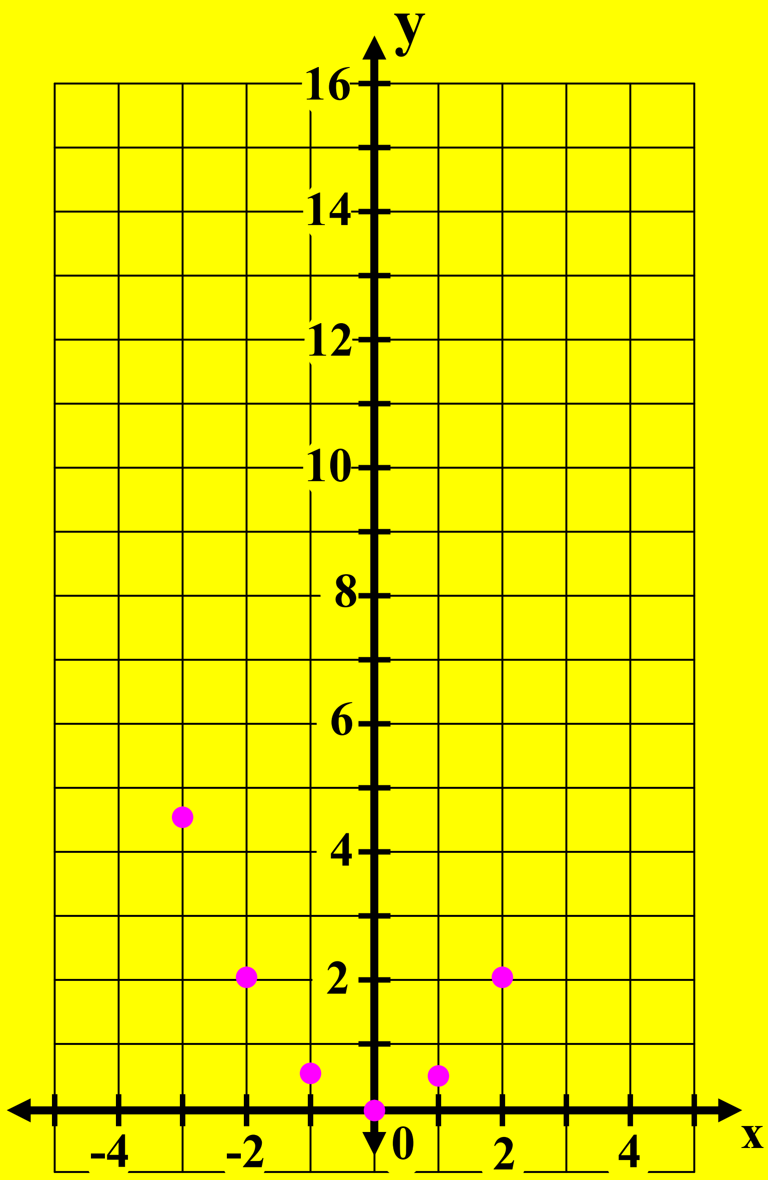

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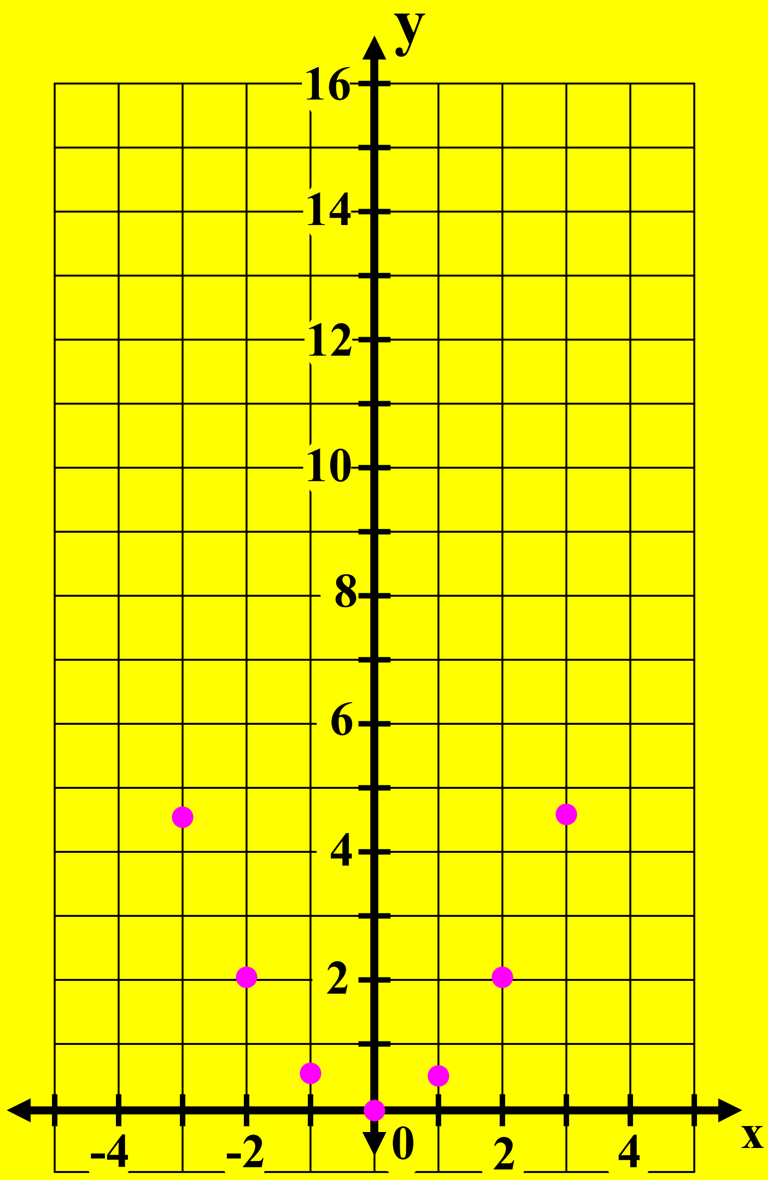

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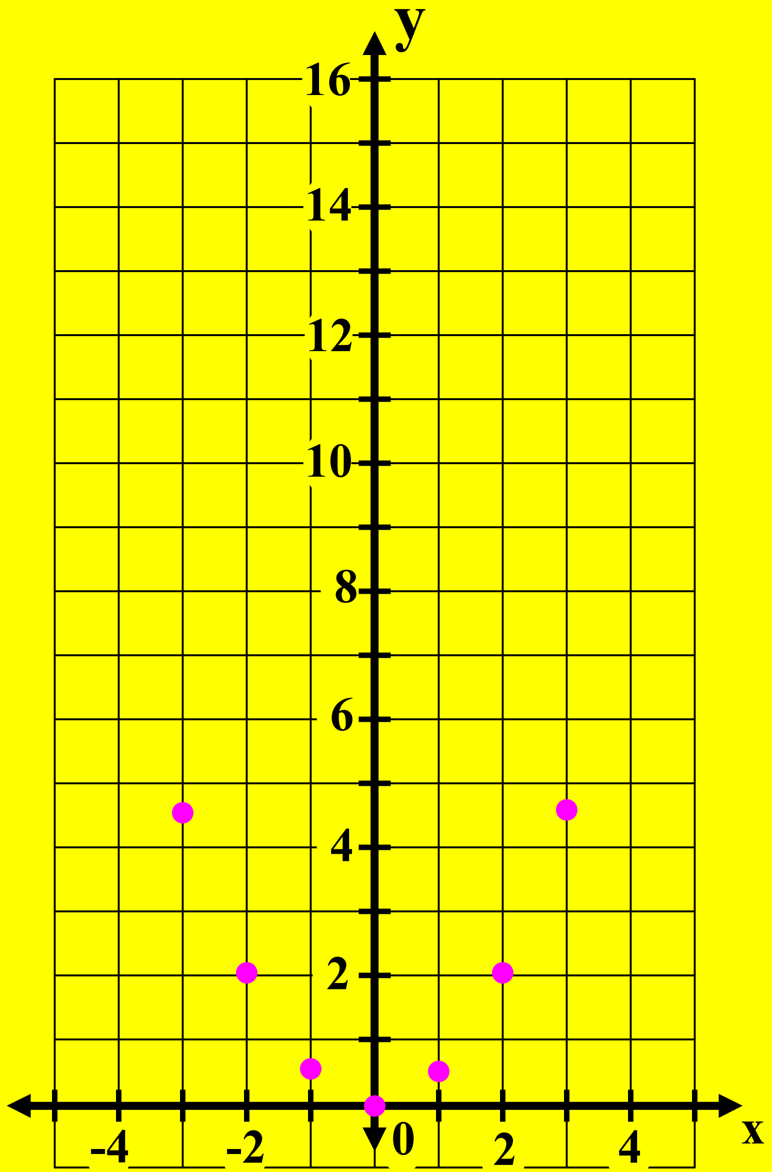

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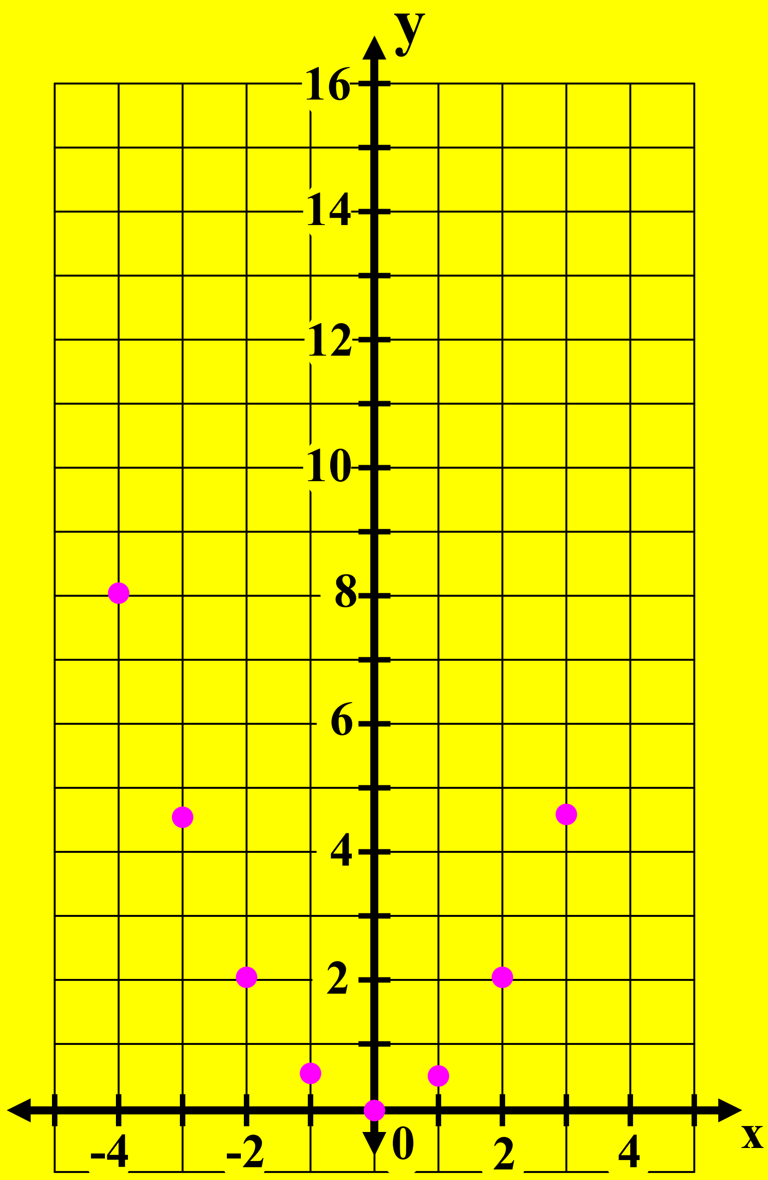

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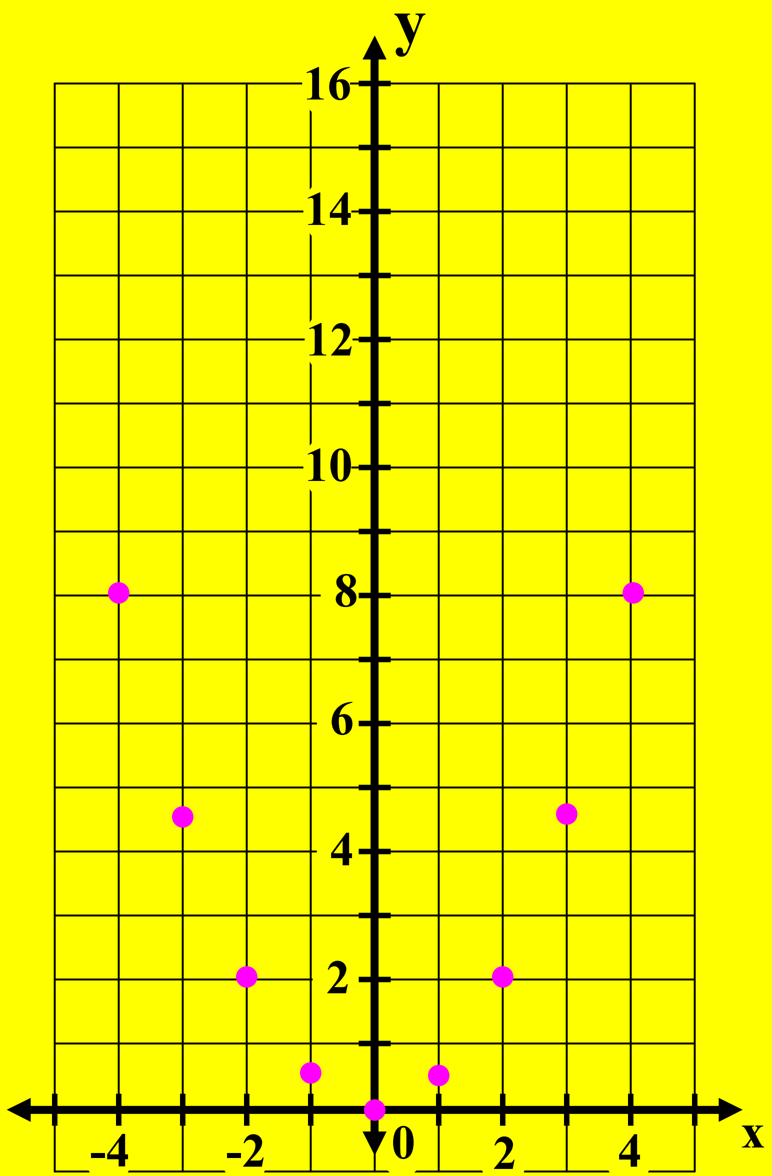
± 5	$\frac{25}{2}$

Now we will plot the points and draw the graph.

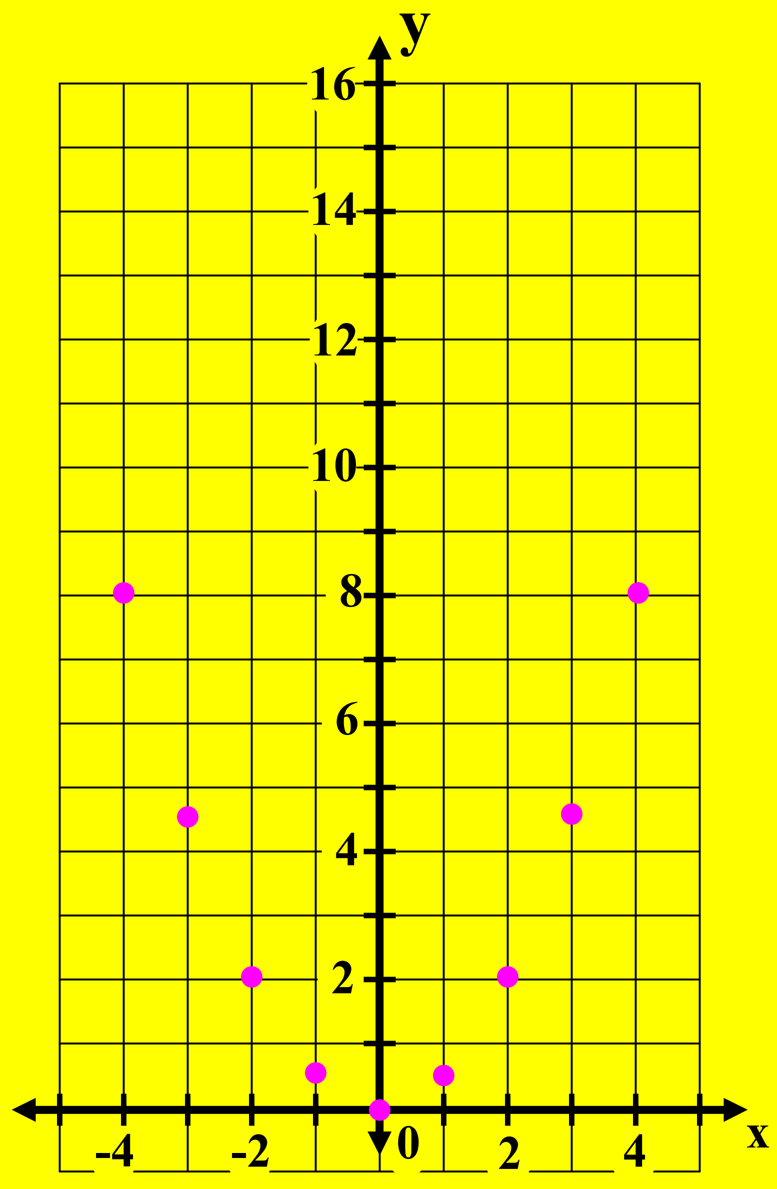


The Shape of a Parabola.

$y = ax^2$

$a = \frac{1}{2} \Rightarrow y = \frac{1}{2}x^2$

x	y
0	0
± 1	$\frac{1}{2}$
± 2	2
± 3	$\frac{9}{2}$
± 4	8
± 5	$\frac{25}{2}$



Now we will plot the points and draw the graph.

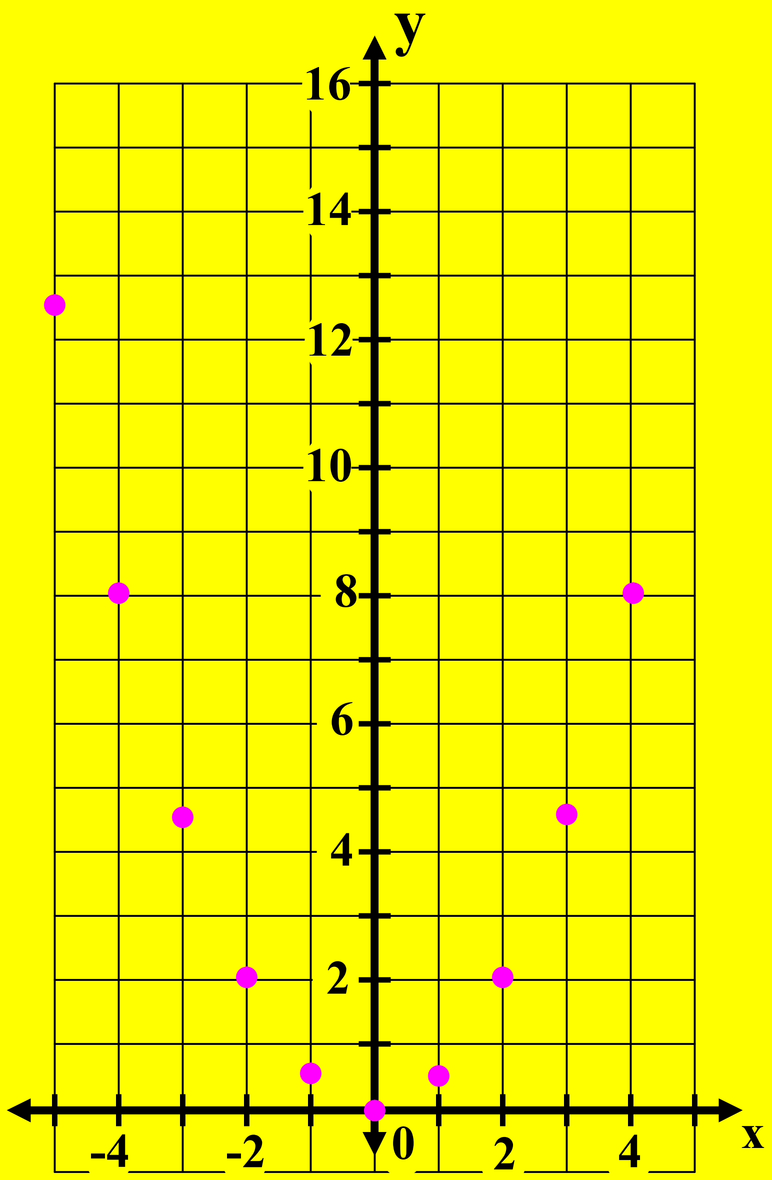
The Shape of a Parabola.

$$y = ax^2$$

$$a = \frac{1}{2} \Rightarrow y = \frac{1}{2}x^2$$

x	y
0	0
± 1	$\frac{1}{2}$
± 2	2
± 3	$\frac{9}{2}$
± 4	8
± 5	$\frac{25}{2}$

Now we will plot the points and draw the graph.

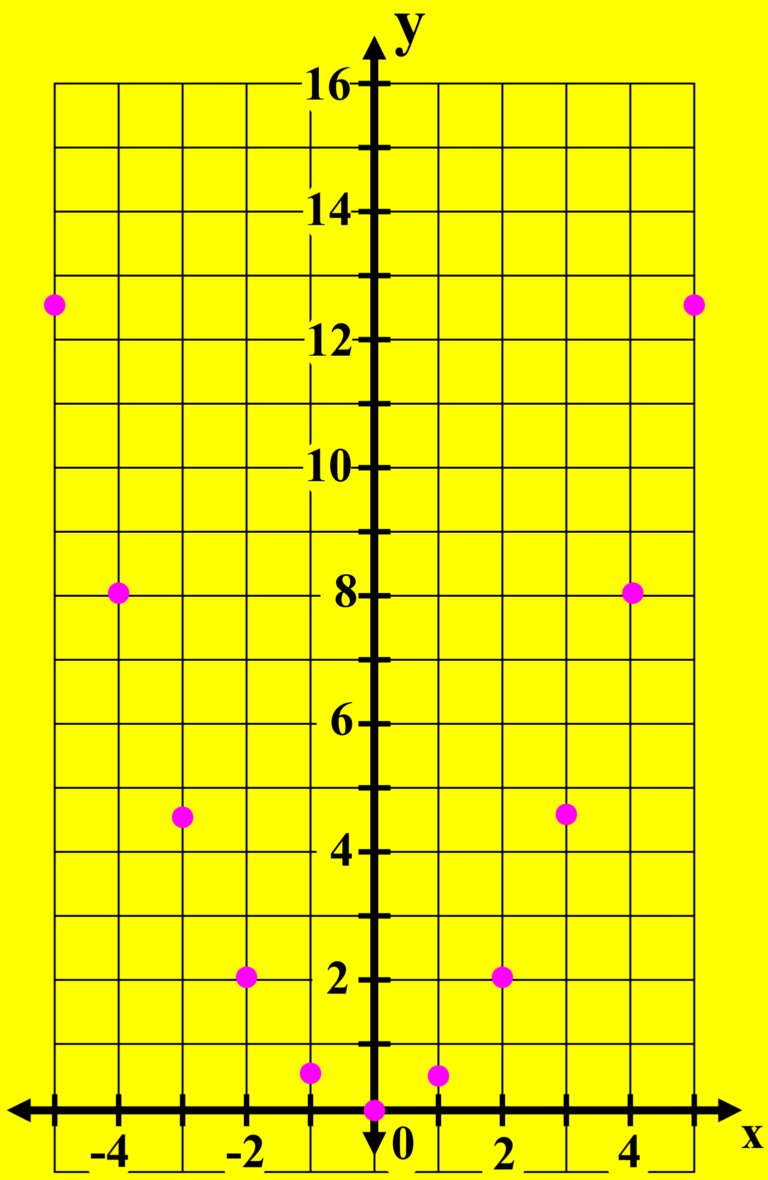


The Shape of a Parabola.

$$y = ax^2$$

$a = \frac{1}{2}$ ⇨ $y = \frac{1}{2}x^2$

x	y
0	0
± 1	$\frac{1}{2}$
± 2	2
± 3	$\frac{9}{2}$
± 4	8
± 5	$\frac{25}{2}$



Now we will plot the points and draw the graph.

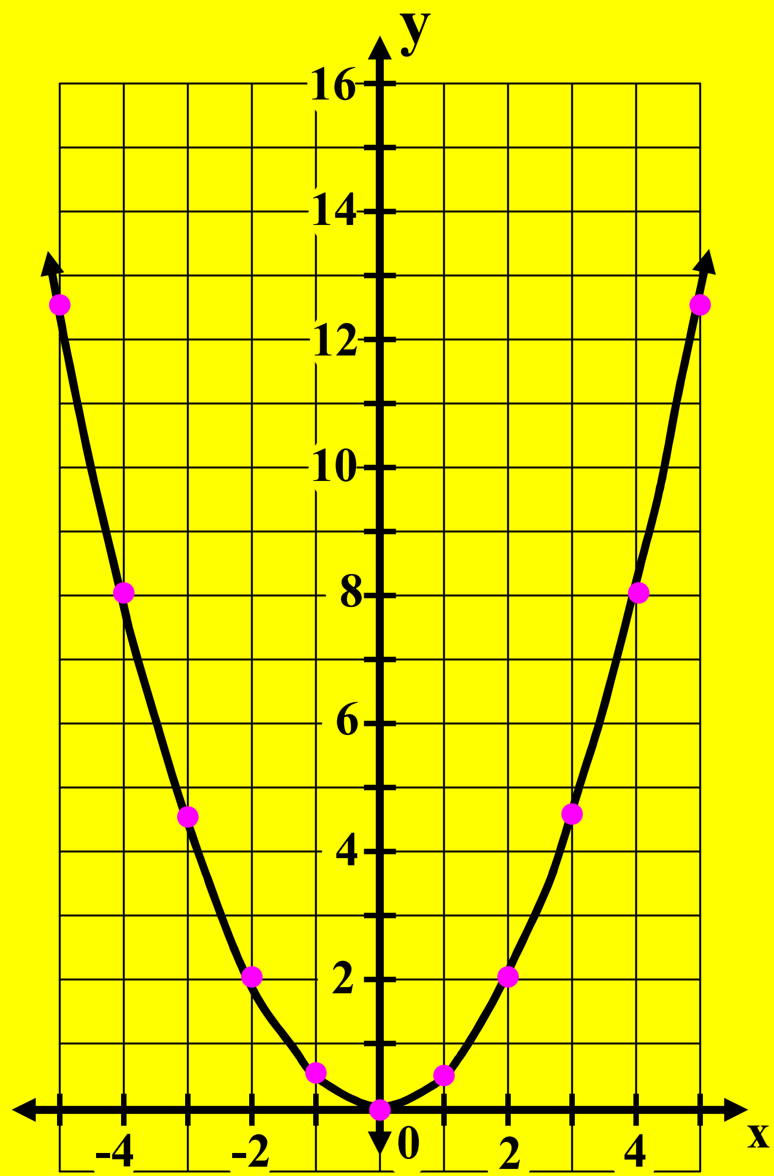
The Shape of a Parabola.

$$y = ax^2$$

$$a = \frac{1}{2} \Rightarrow y = \frac{1}{2}x^2$$

x	y
0	0
± 1	$\frac{1}{2}$
± 2	2
± 3	$\frac{9}{2}$
± 4	8
± 5	$\frac{25}{2}$

Now we will plot the points and draw the graph.

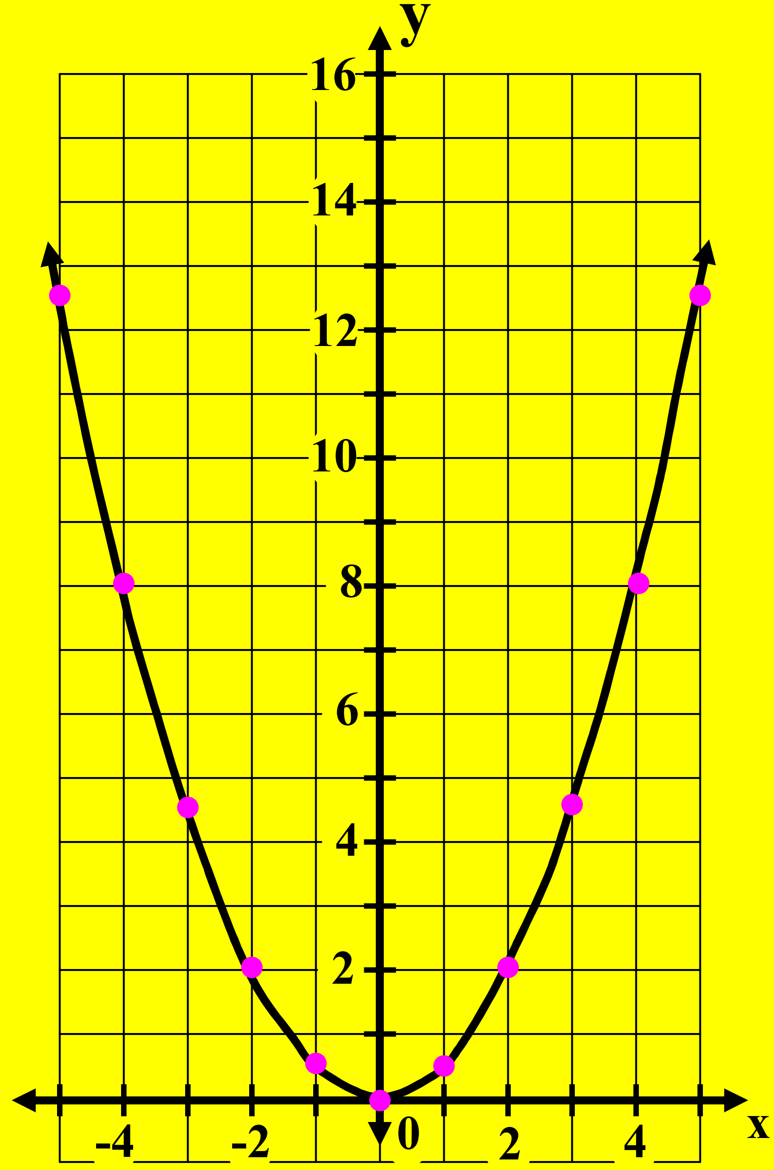


The Shape of a Parabola.

$$y = ax^2$$

$a = \frac{1}{2}$ ⇨ $y = \frac{1}{2}x^2$

x	y
0	0
± 1	$\frac{1}{2}$
± 2	2
± 3	$\frac{9}{2}$
± 4	8
± 5	$\frac{25}{2}$

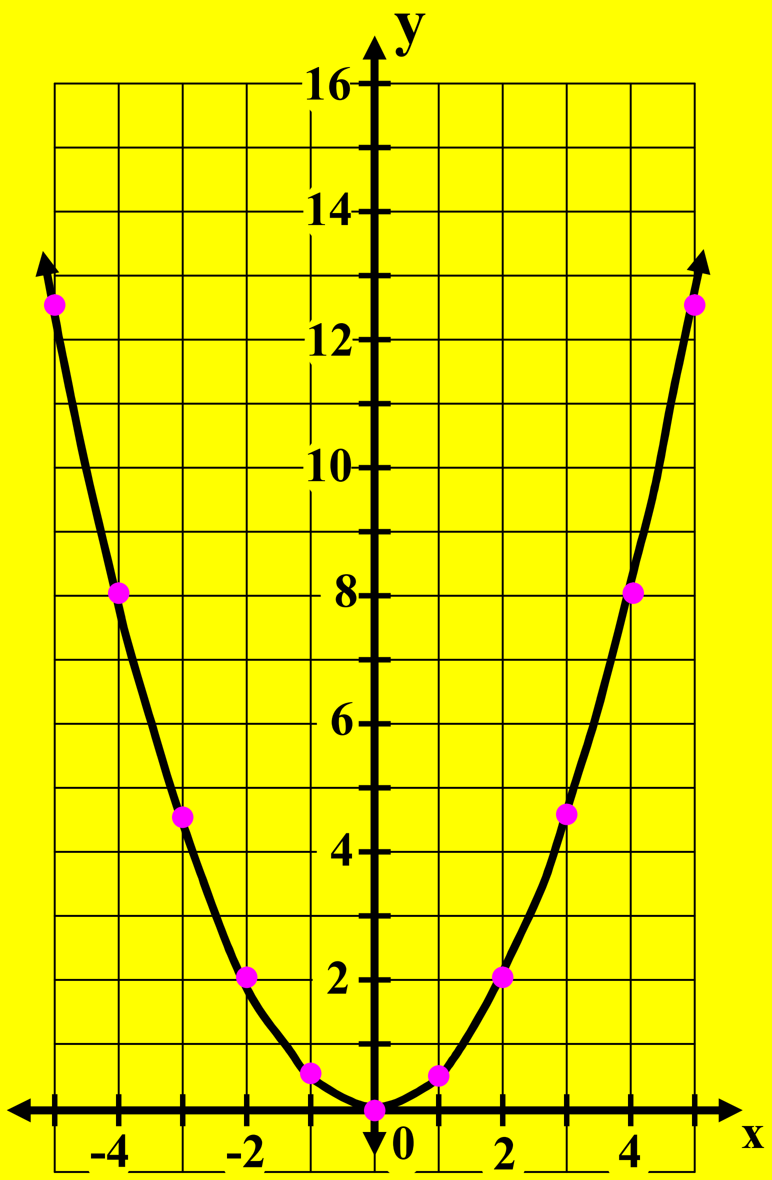


The Shape of a Parabola.

$$y = ax^2$$

$a = \frac{1}{2}$ ⇨ $y = \frac{1}{2}x^2$

x	y
0	0
± 1	$\frac{1}{2}$
± 2	2
± 3	$\frac{9}{2}$
± 4	8
± 5	$\frac{25}{2}$



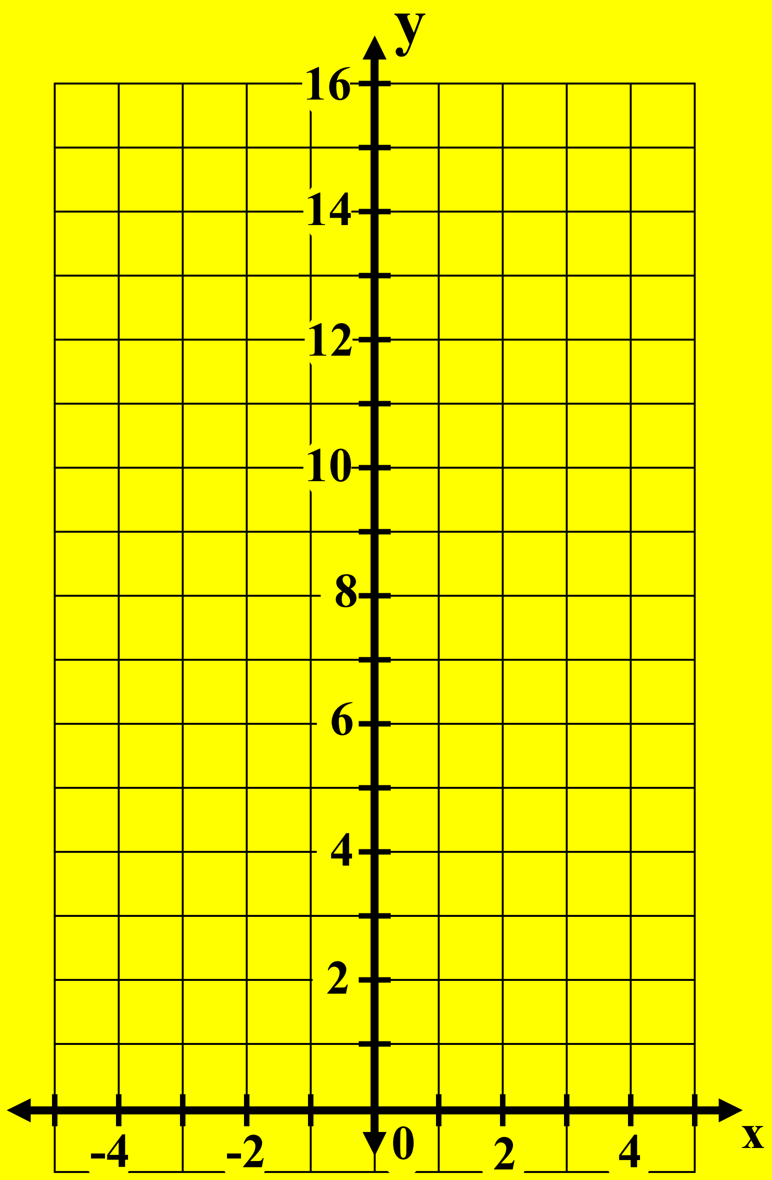
We will graph a different equation next.

The Shape of a Parabola.

$$y = ax^2$$

$a = 1 \Rightarrow y = x^2$

x	y
0	
± 1	
± 2	
± 3	
± 4	
± 5	



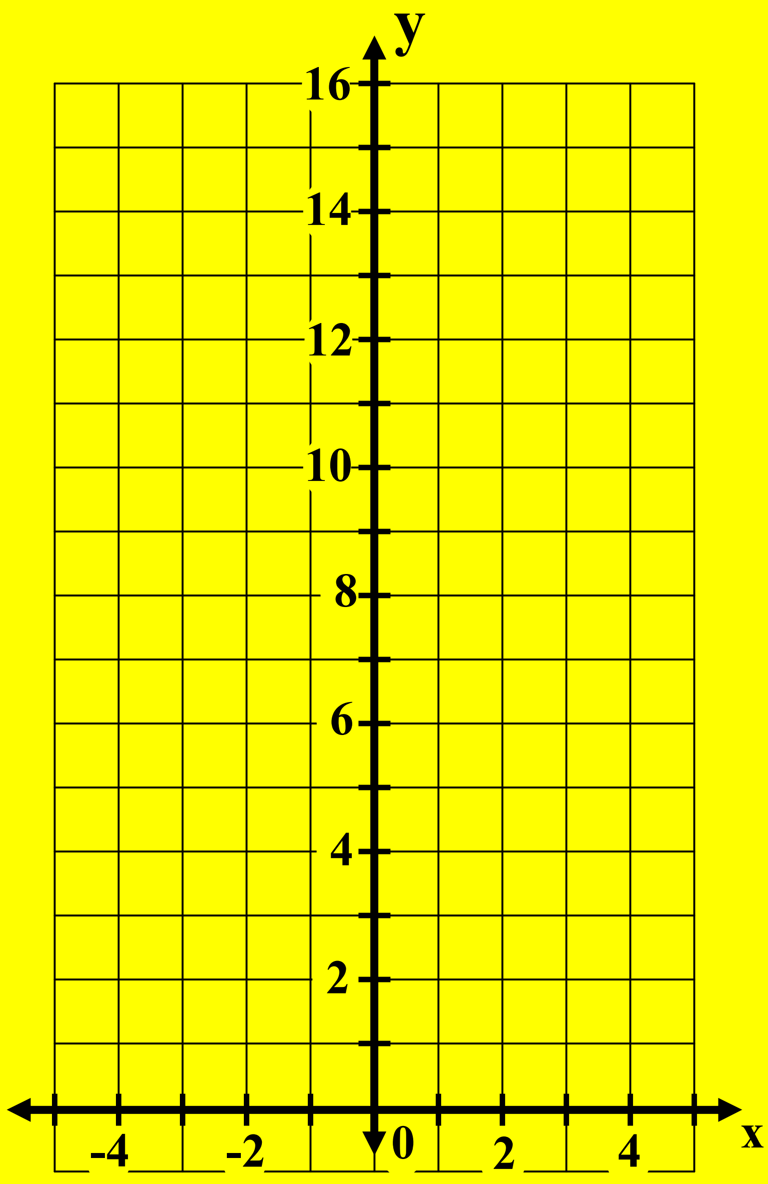
The Shape of a Parabola.

$$y = ax^2$$

$a = 1 \Rightarrow y = x^2$

x	y
0	
± 1	
± 2	
± 3	
± 4	
± 5	

Once again, we will fill out the table.



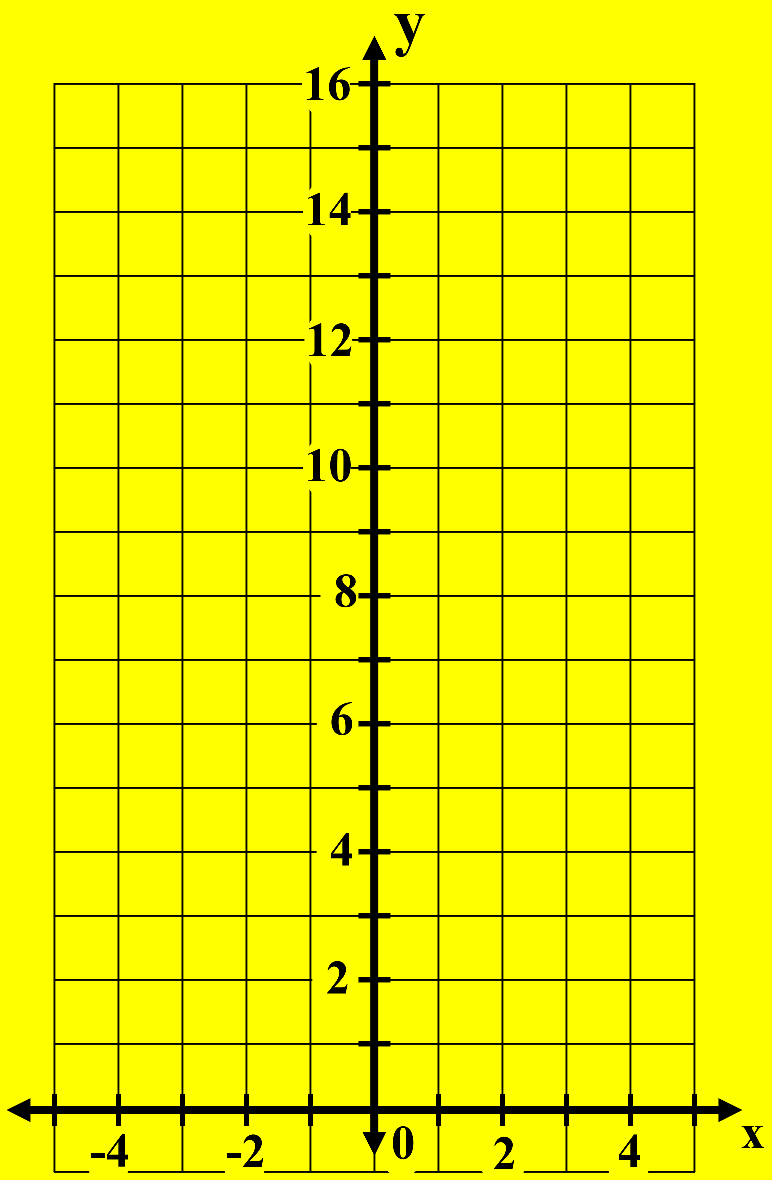
The Shape of a Parabola.

$y = ax^2$

$a = 1 \Rightarrow y = x^2$

x	y
0	
± 1	
± 2	
± 3	
± 4	
± 5	

Once again, we will fill out the table. This time we only have to square the value of x.

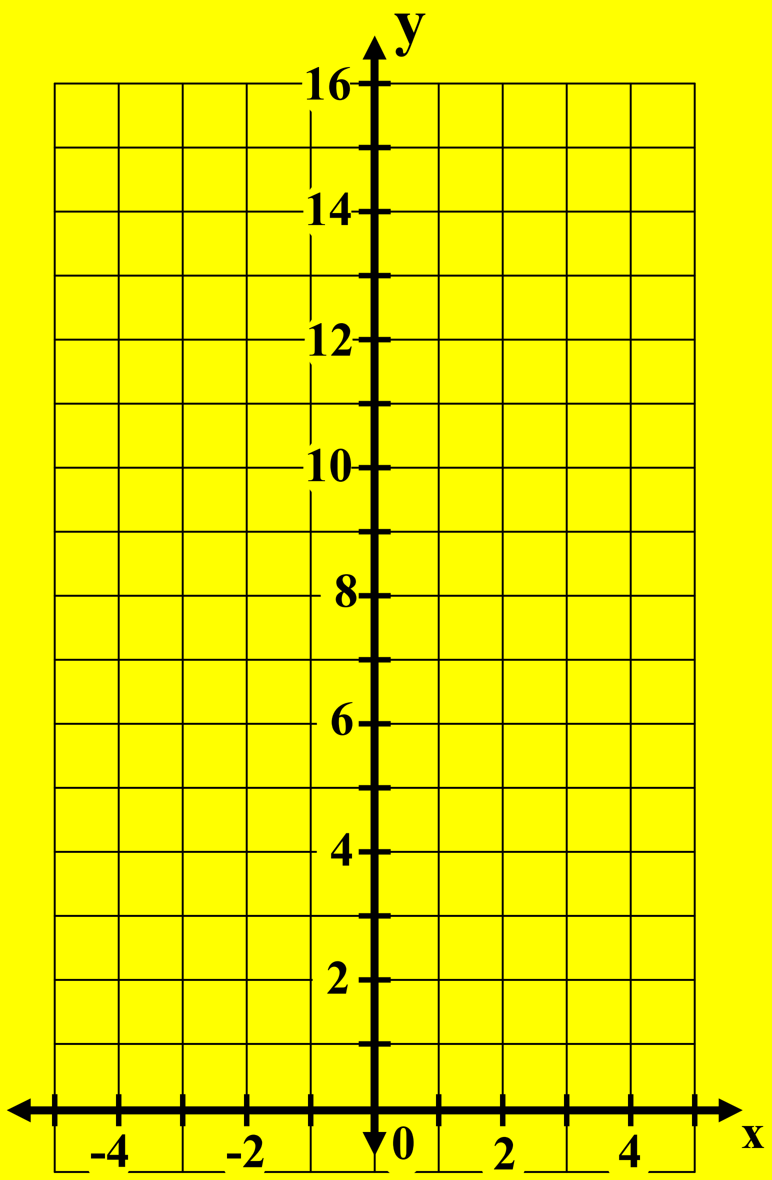


The Shape of a Parabola.

$y = ax^2$

$a = 1 \Rightarrow y = x^2$

x	y
0	
± 1	
± 2	
± 3	
± 4	
± 5	



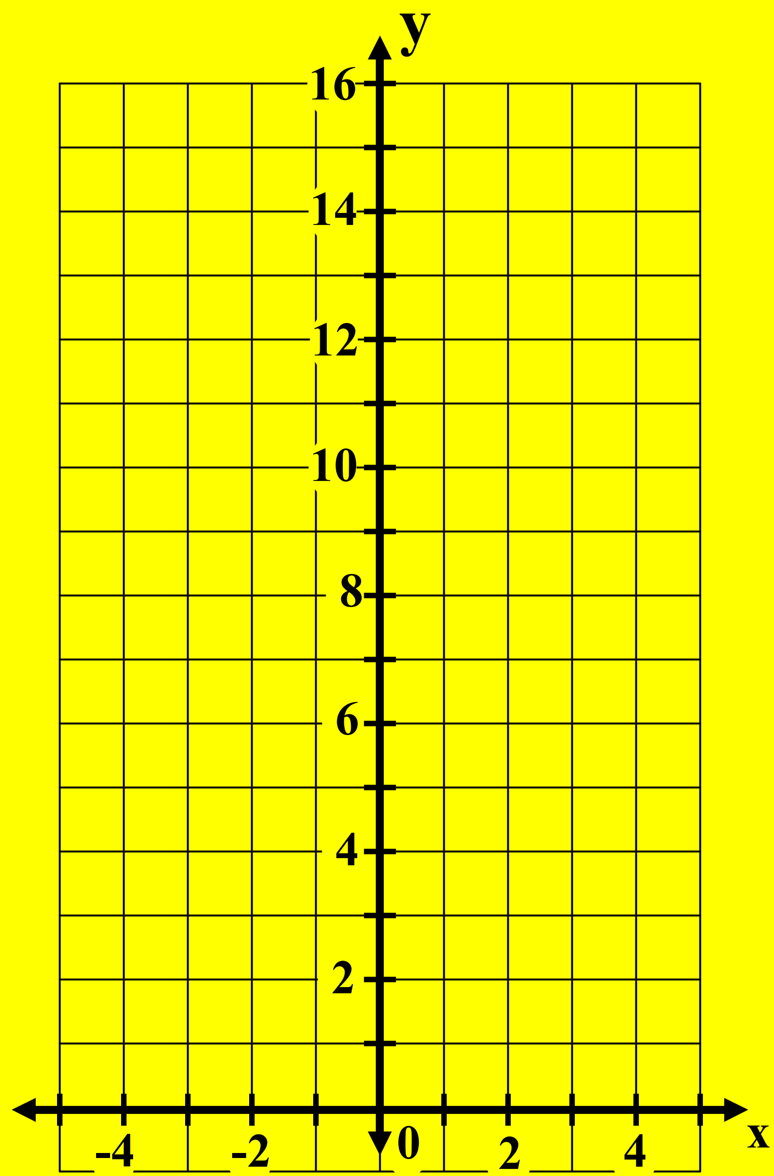
Once again, we will fill out the table. This time we only have to square the value of x.

The Shape of a Parabola.

$$y = ax^2$$

$a = 1$ ⇨ $y = x^2$

x	y
0	0
± 1	
± 2	
± 3	
± 4	
± 5	



Once again, we will fill out the table. This time we only have to square the value of x.

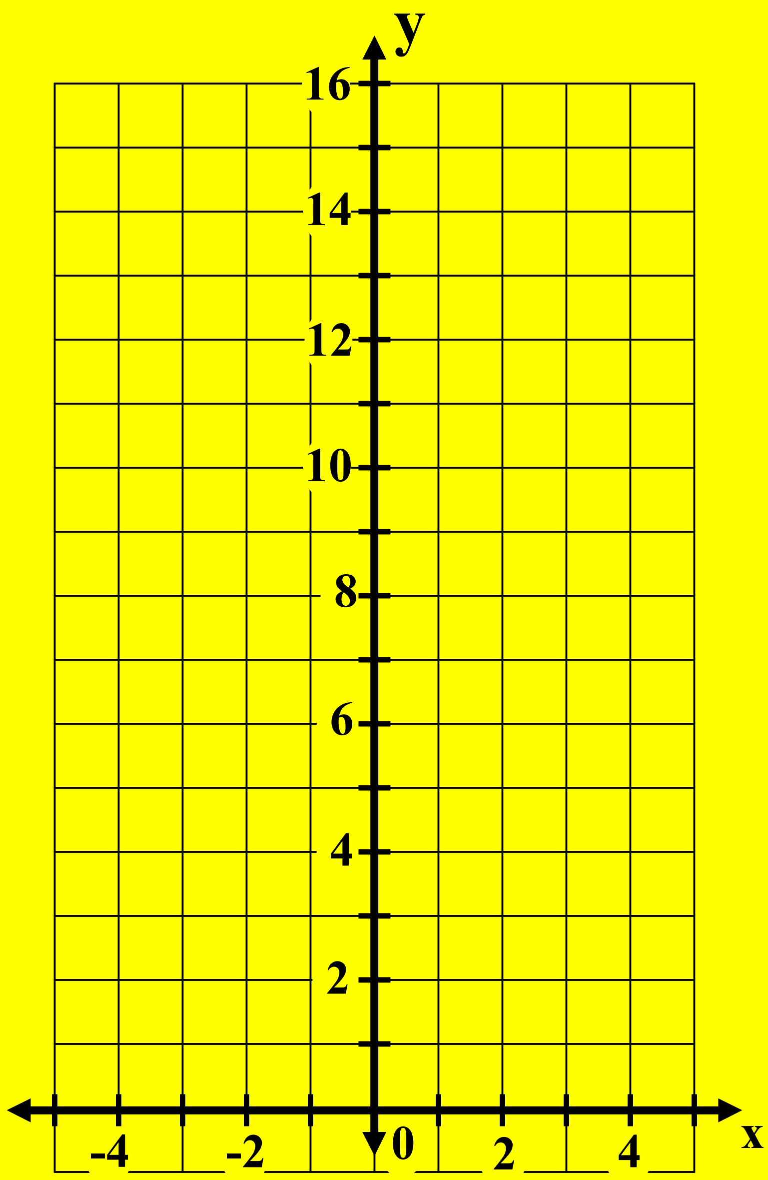
The Shape of a Parabola.

$y = ax^2$

$a = 1 \rightarrow y = x^2$

x	y
0	0
± 1	
± 2	
± 3	
± 4	
± 5	

Once again, we will fill out the table. This time we only have to square the value of x.

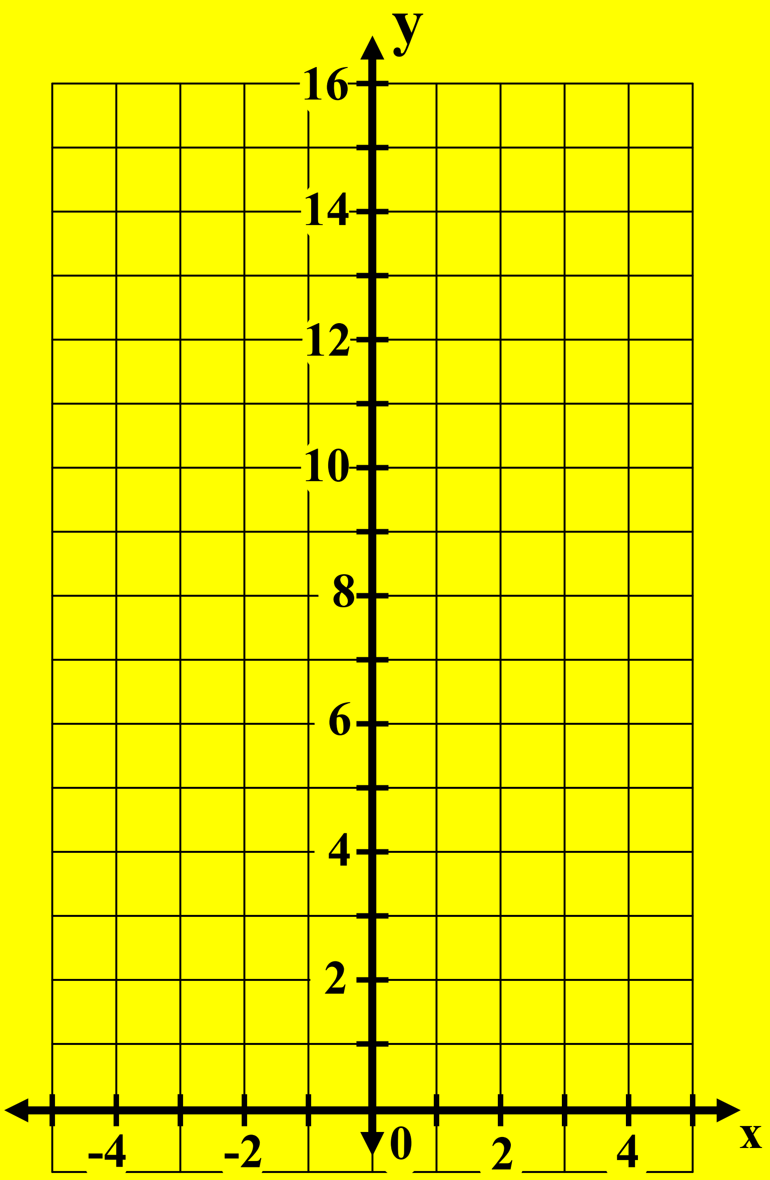


The Shape of a Parabola.

$y = ax^2$

$a = 1 \Rightarrow y = x^2$

x	y
0	0
± 1	1
± 2	
± 3	
± 4	
± 5	



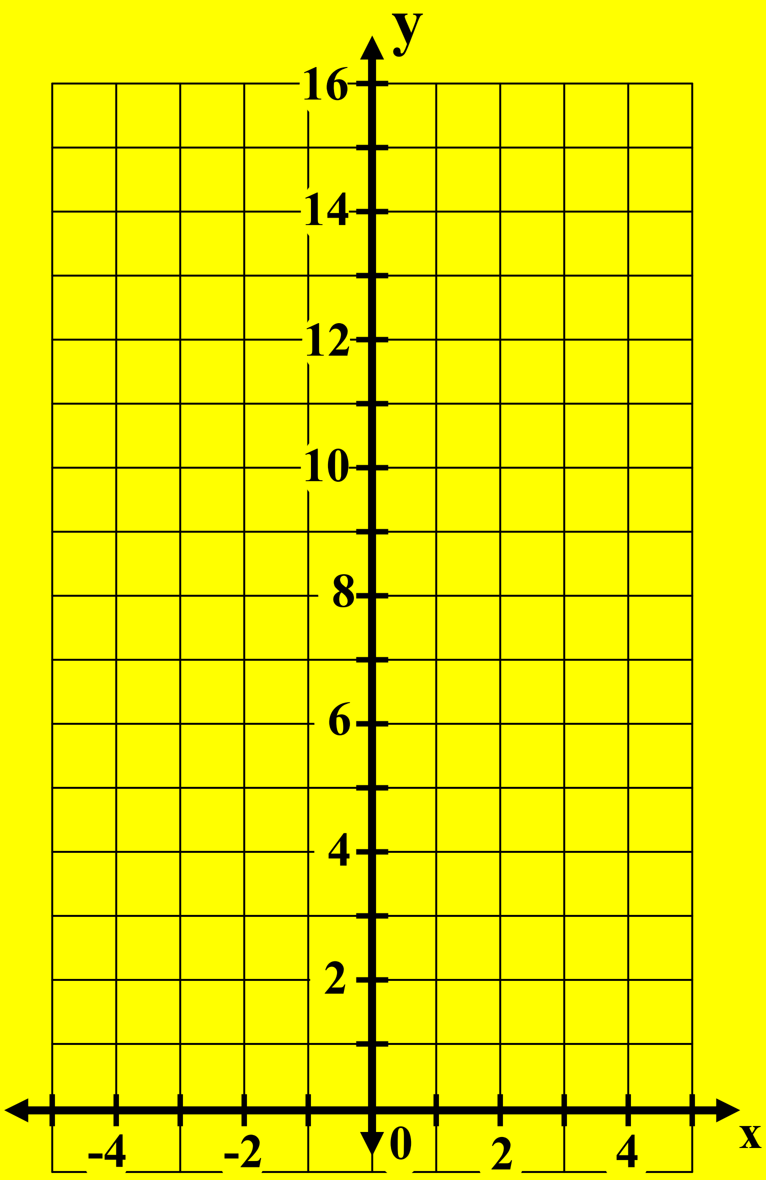
Once again, we will fill out the table. This time we only have to square the value of x.

The Shape of a Parabola.

$y = ax^2$

$a = 1 \Rightarrow y = x^2$

x	y
0	0
± 1	1
± 2	
± 3	
± 4	
± 5	



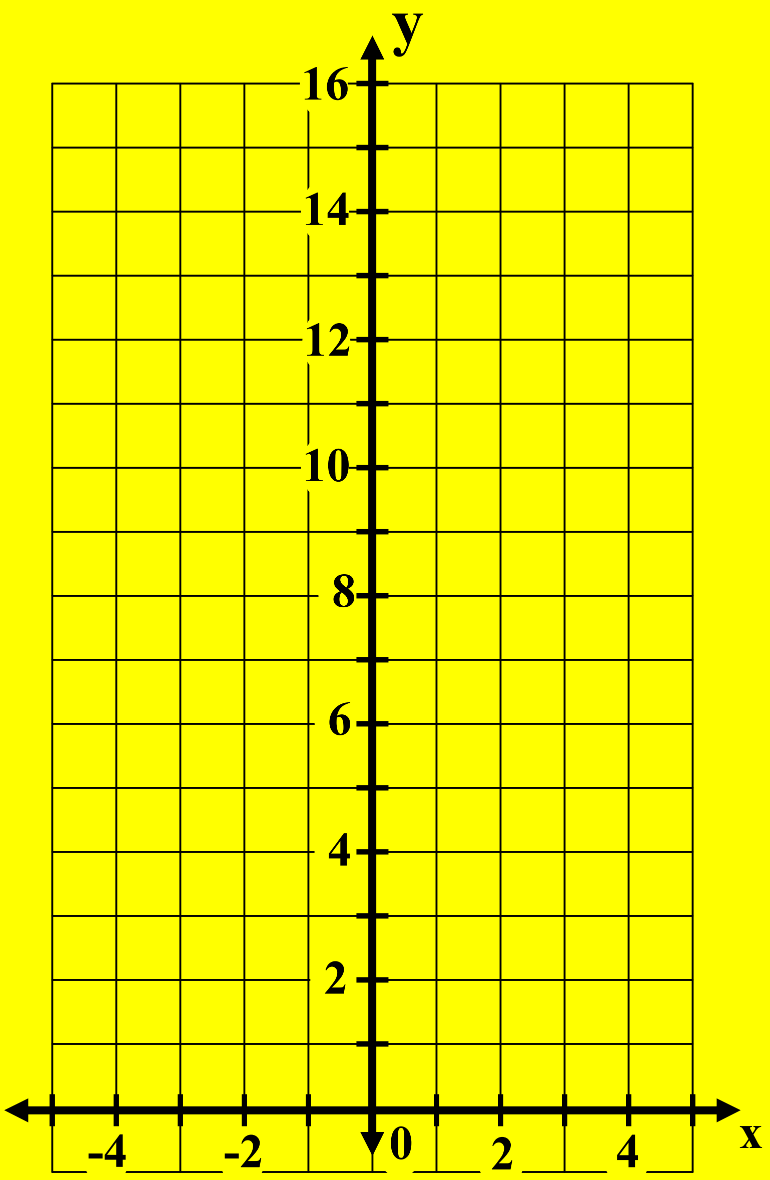
Once again, we will fill out the table. This time we only have to square the value of x.

The Shape of a Parabola.

$y = ax^2$

$a = 1 \rightarrow y = x^2$

x	y
0	0
± 1	1
± 2	4
± 3	
± 4	
± 5	



Once again, we will fill out the table. This time we only have to square the value of x.

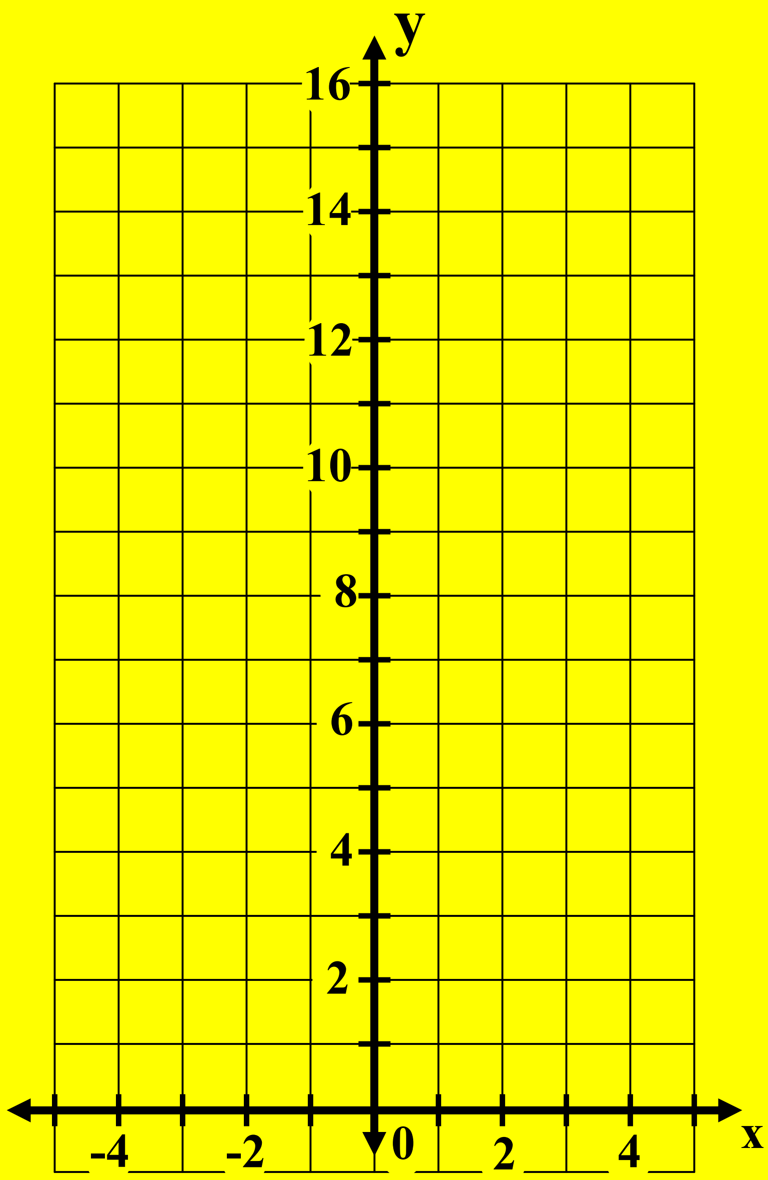
The Shape of a Parabola.

$y = ax^2$

$a = 1$ → $y = x^2$

x	y
0	0
± 1	1
± 2	4
± 3	
± 4	
± 5	

Once again, we will fill out the table. This time we only have to square the value of x.



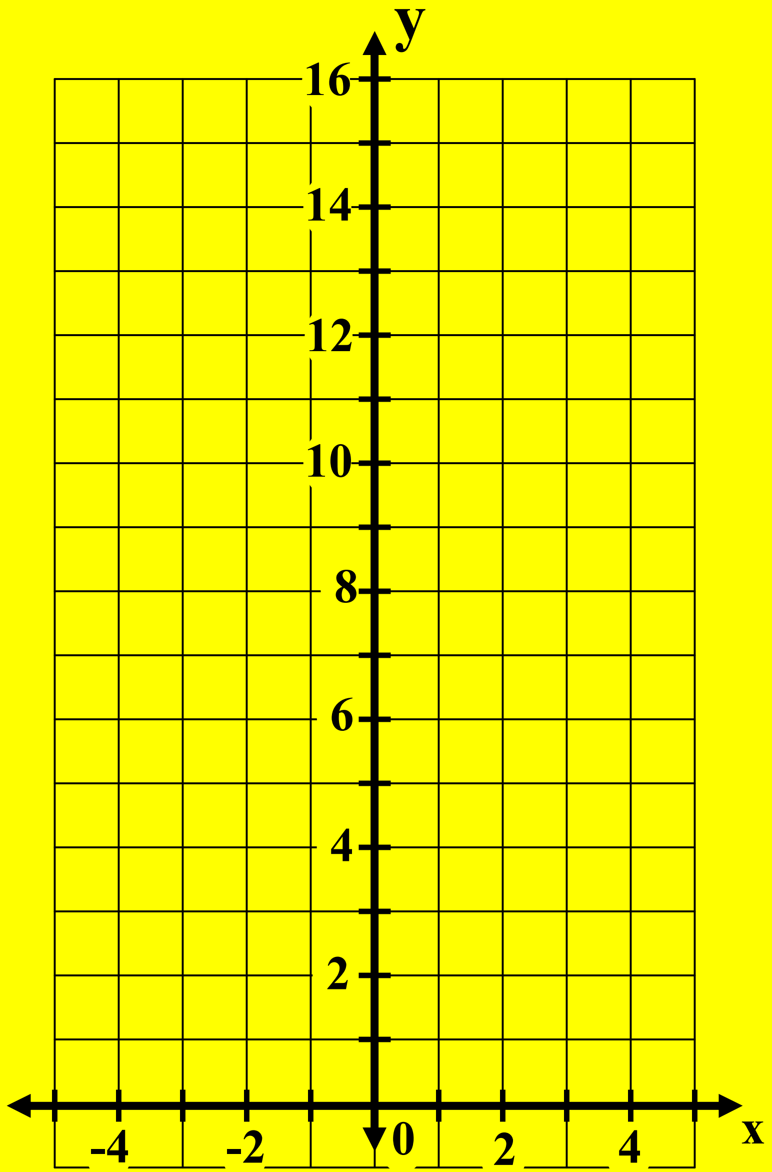
The Shape of a Parabola.

$y = ax^2$

$a = 1 \Rightarrow y = x^2$

x	y
0	0
± 1	1
± 2	4
± 3	9
± 4	
± 5	

Once again, we will fill out the table. This time we only have to square the value of x.



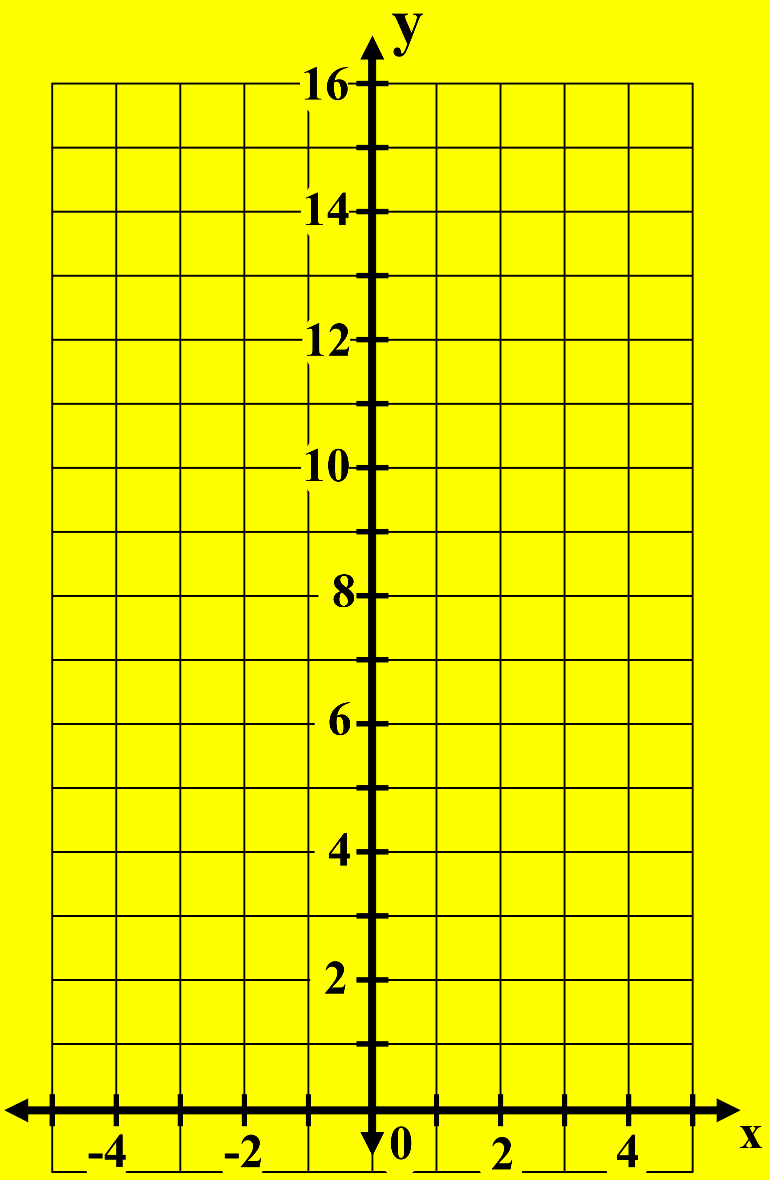
The Shape of a Parabola.

$y = ax^2$

$a = 1 \Rightarrow y = x^2$

x	y
0	0
± 1	1
± 2	4
± 3	9
± 4	
± 5	

Once again, we will fill out the table. This time we only have to square the value of x.

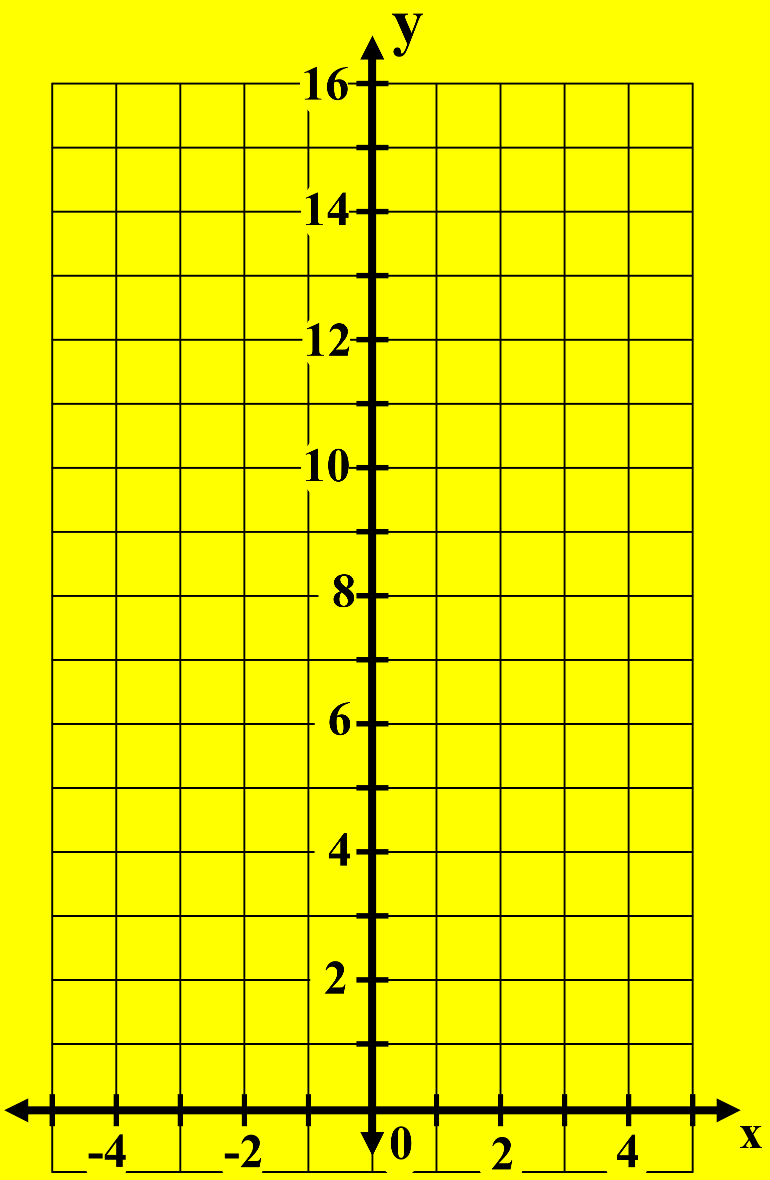


The Shape of a Parabola.

$y = ax^2$

$a = 1 \Rightarrow y = x^2$

x	y
0	0
± 1	1
± 2	4
± 3	9
± 4	16
± 5	



Once again, we will fill out the table. This time we only have to square the value of x.

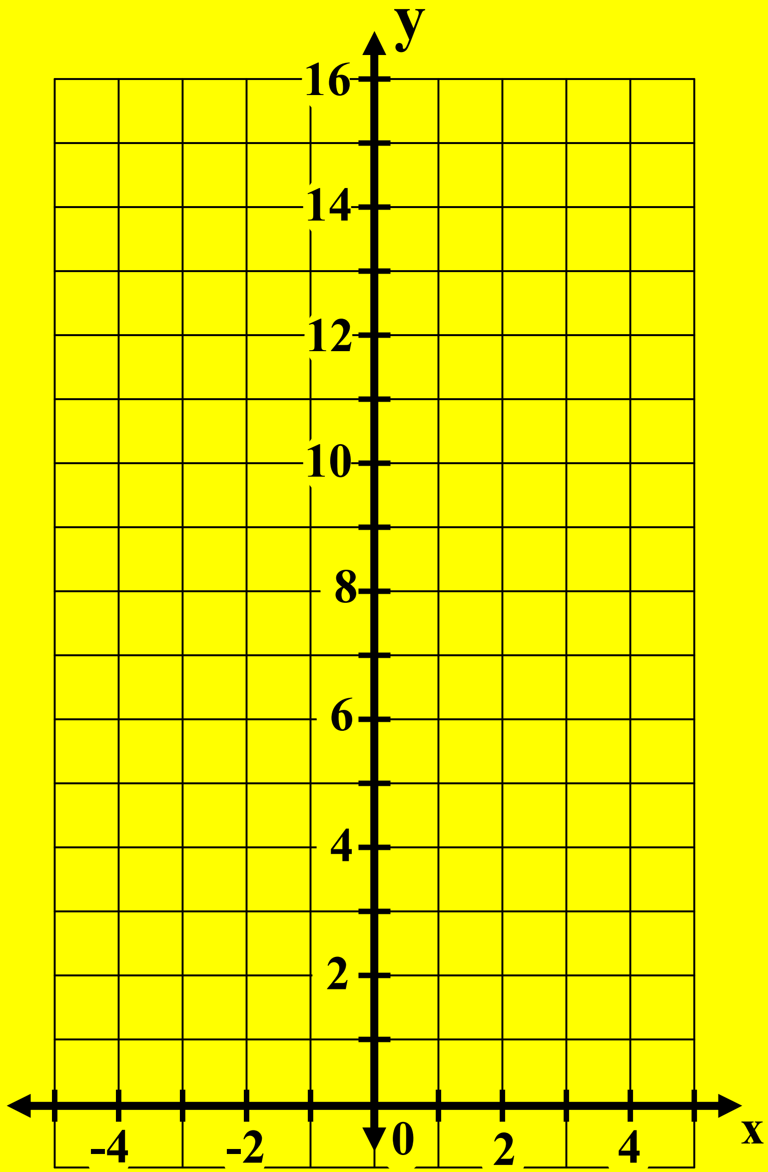
The Shape of a Parabola.

$y = ax^2$

$a = 1$ ⇨ $y = x^2$

x	y
0	0
± 1	1
± 2	4
± 3	9
± 4	16
± 5	

Once again, we will fill out the table. This time we only have to square the value of x.



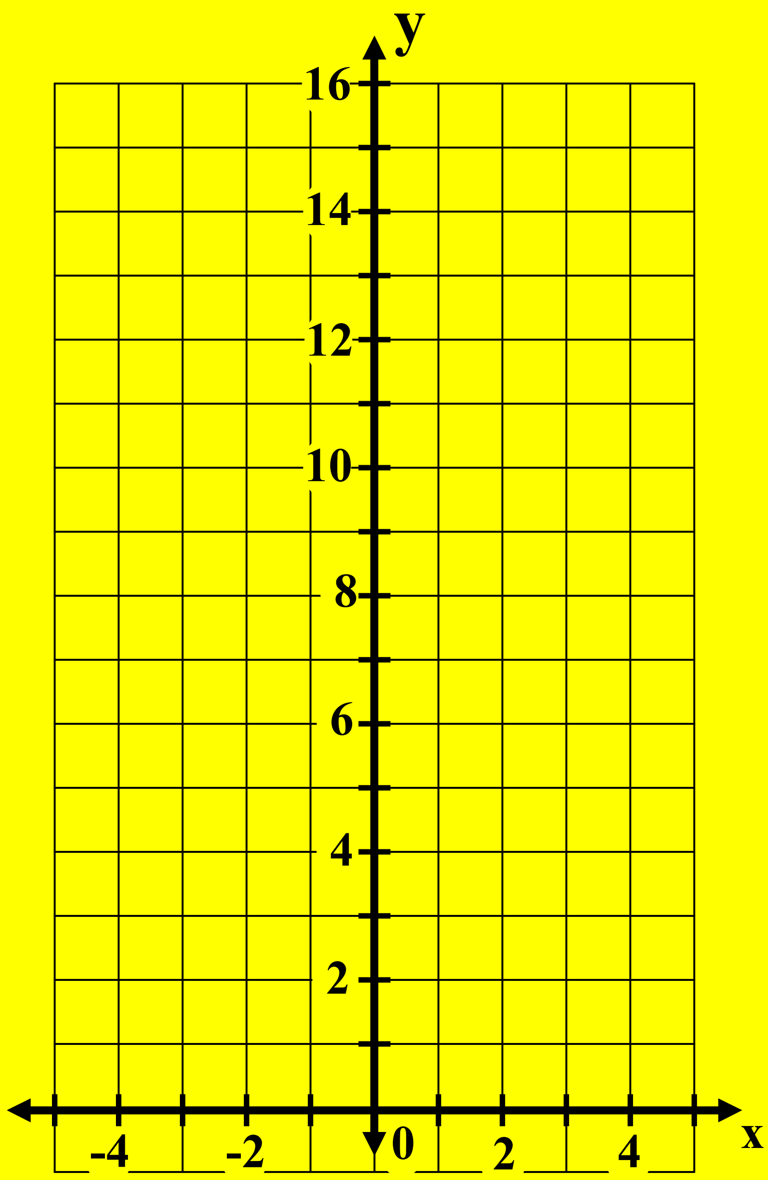
The Shape of a Parabola.

$y = ax^2$

$a = 1 \Rightarrow y = x^2$

x	y
0	0
± 1	1
± 2	4
± 3	9
± 4	16
± 5	25

Once again, we will fill out the table. This time we only have to square the value of x.



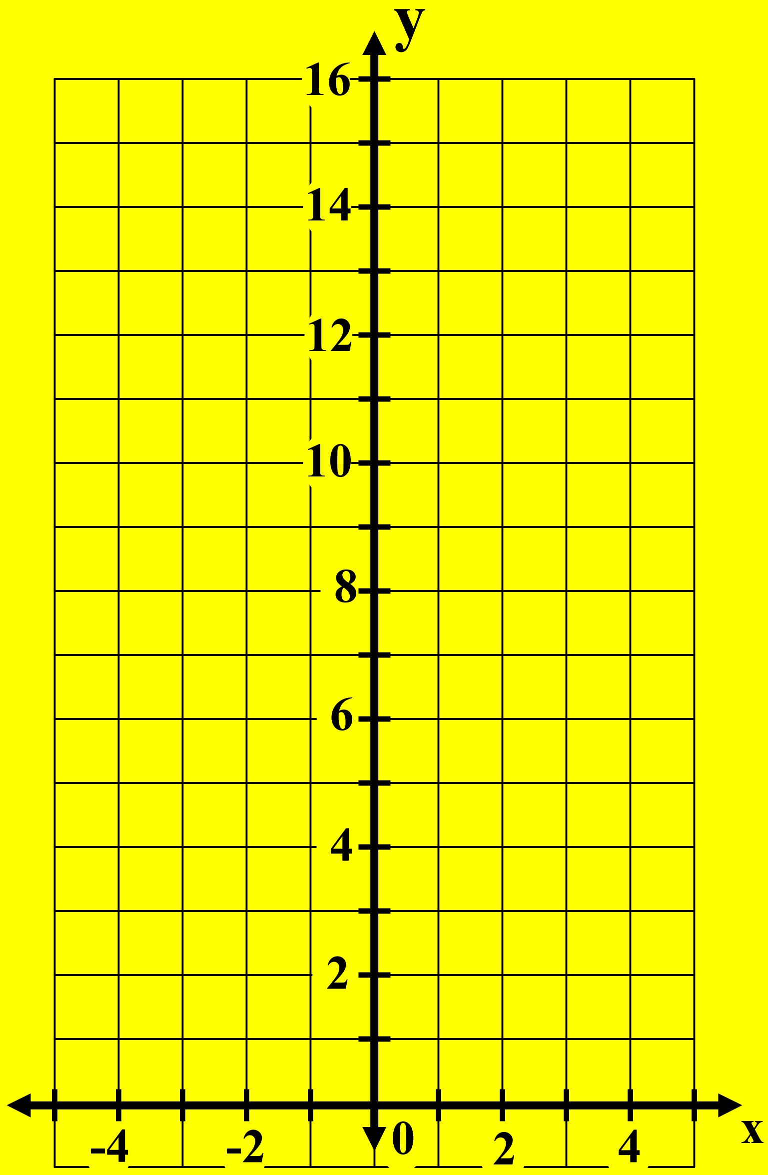
The Shape of a Parabola.

$y = ax^2$

$a = 1 \Rightarrow y = x^2$

x	y
0	0
± 1	1
± 2	4
± 3	9
± 4	16
± 5	25

Once again, we will fill out the table. This time we only have to square the value of x.

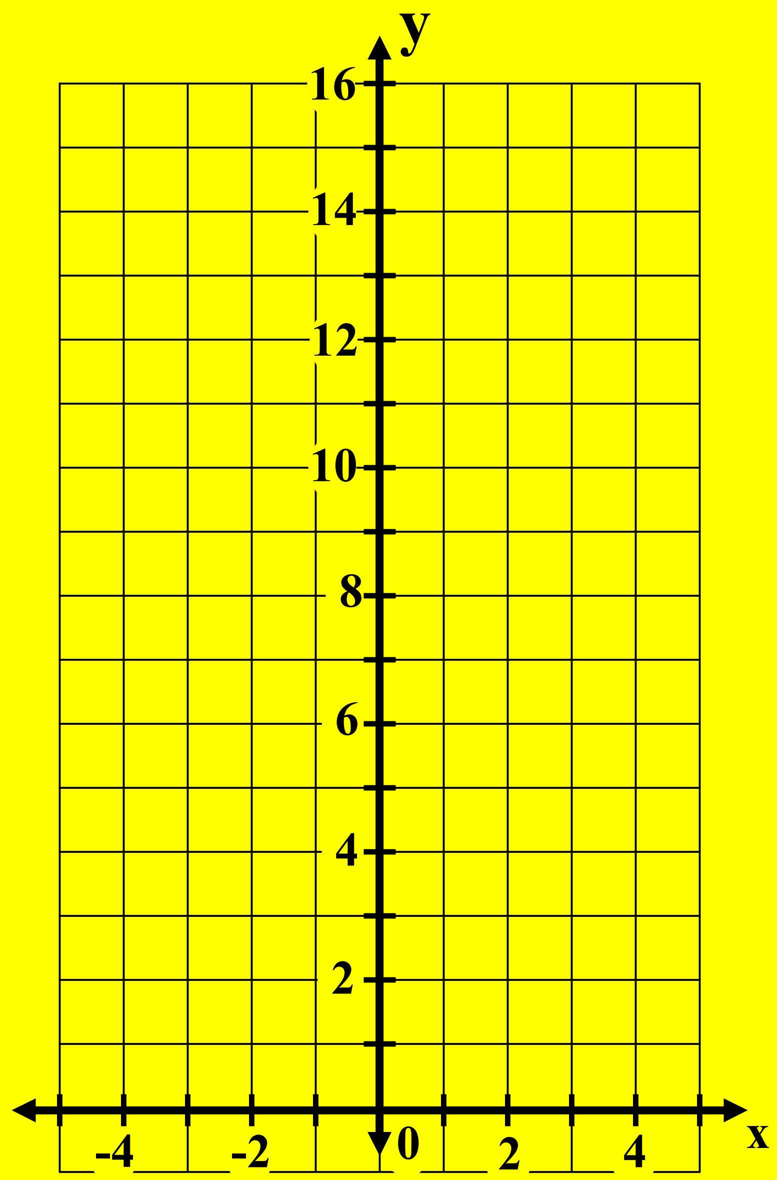


The Shape of a Parabola.

$$y = ax^2$$

$a = 1$ ⇒ $y = x^2$

x	y
0	0
± 1	1
± 2	4
± 3	9
± 4	16
± 5	25



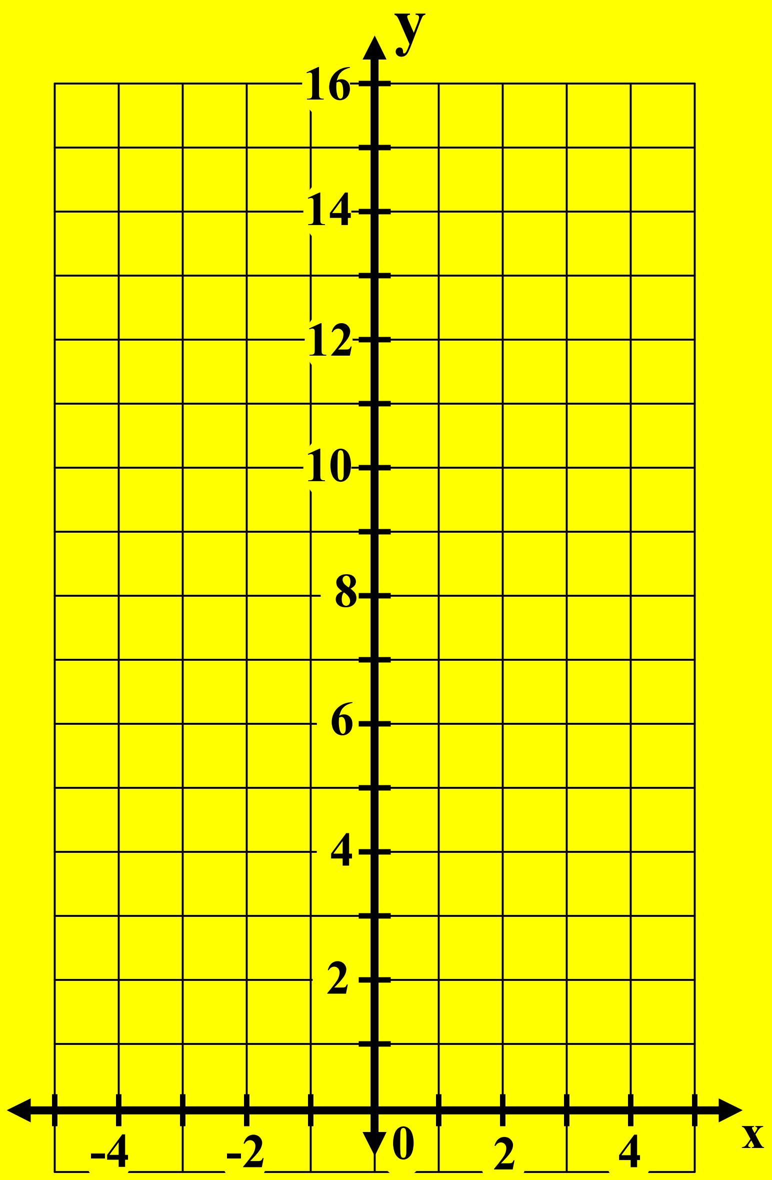
The Shape of a Parabola.

$$y = ax^2$$

$a = 1 \Rightarrow y = x^2$

x	y
0	0
± 1	1
± 2	4
± 3	9
± 4	16
± 5	25

Now, we will plot these points



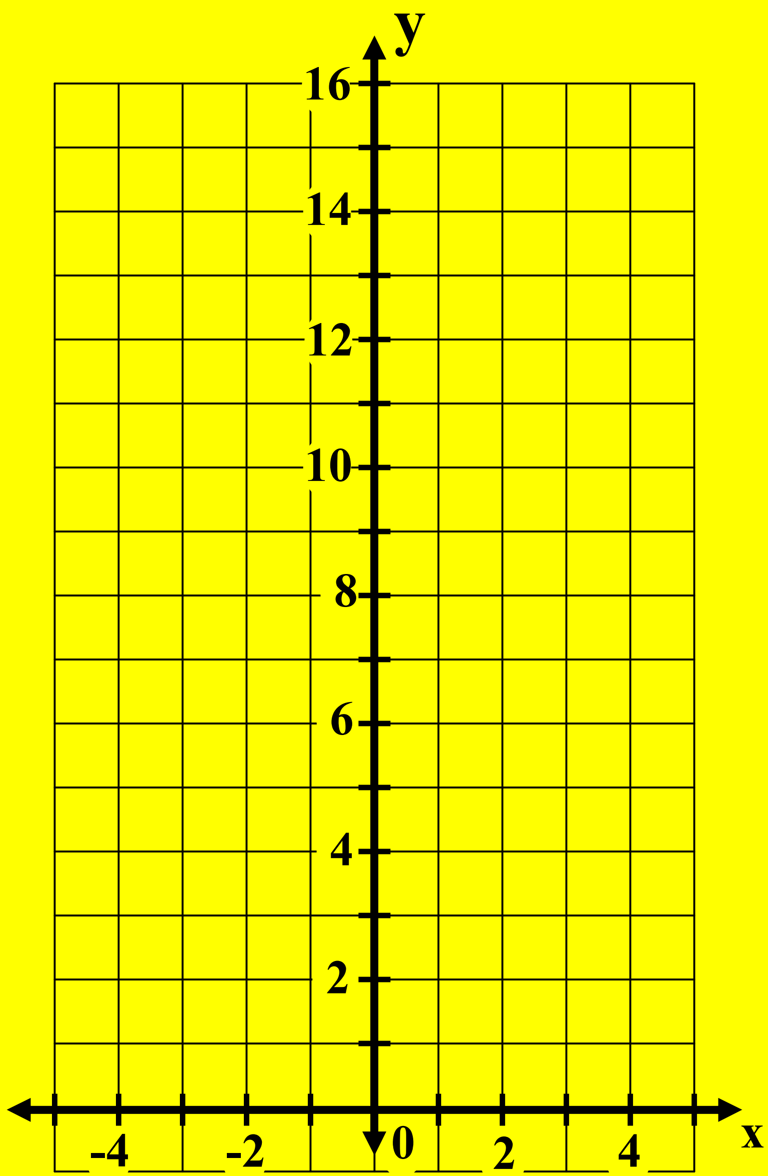
The Shape of a Parabola.

$y = ax^2$

$a = 1$ → $y = x^2$

x	y
0	0
± 1	1
± 2	4
± 3	9
± 4	16
± 5	25

Now, we will plot these points and draw the graph of this function.



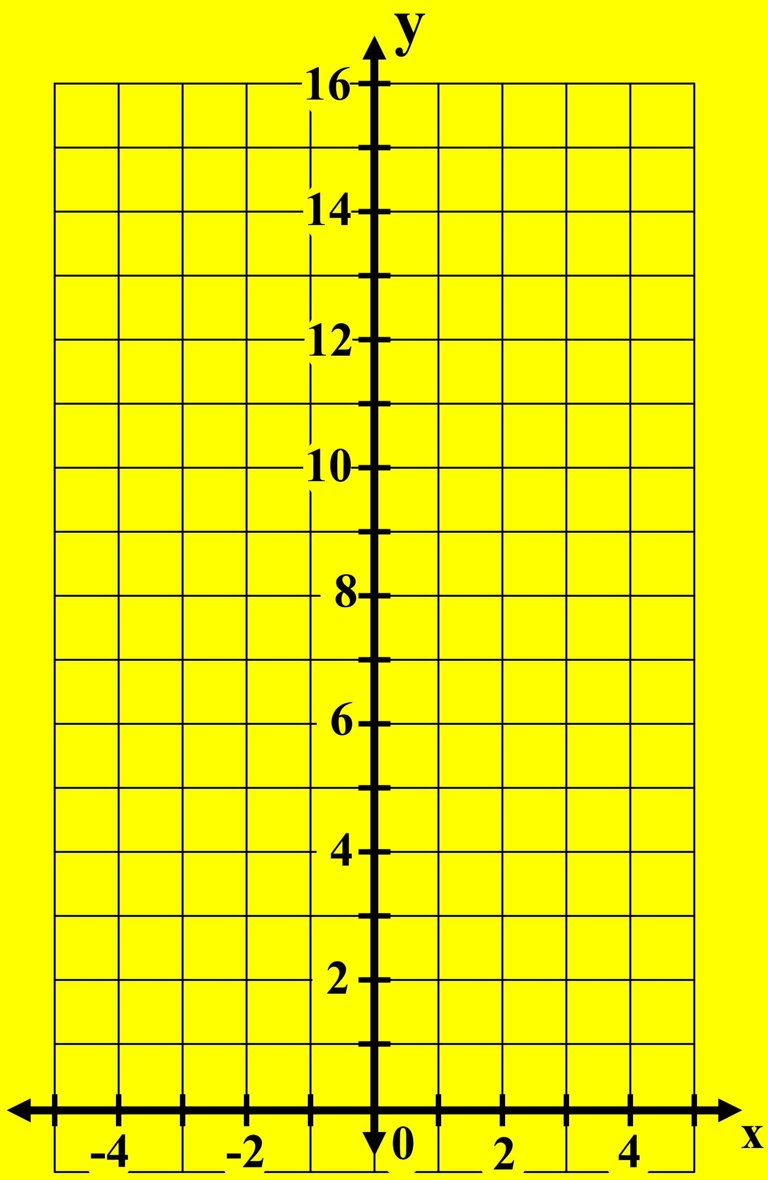
The Shape of a Parabola.

$y = ax^2$

$a = 1 \Rightarrow y = x^2$

x	y
0	0
± 1	1
± 2	4
± 3	9
± 4	16
± 5	25

Now, we will plot these points and draw the graph of this function.



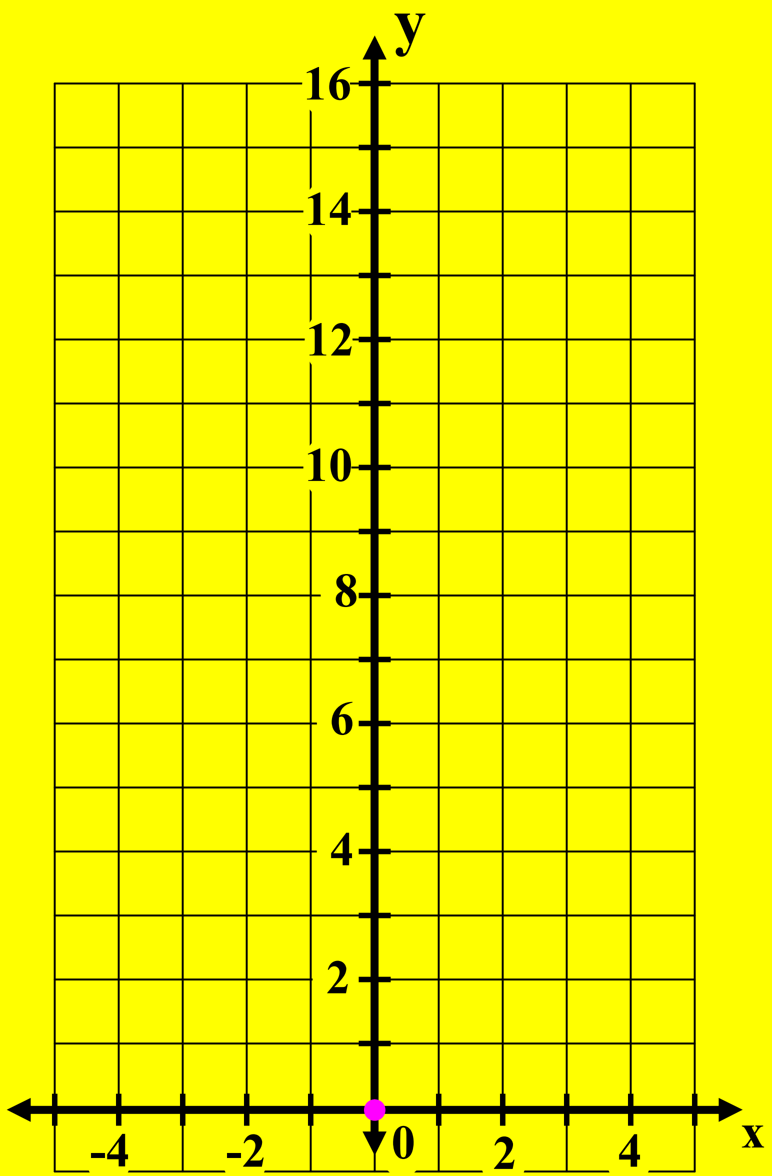
The Shape of a Parabola.

$$y = ax^2$$

$a = 1$ ⇨ $y = x^2$

x	y
0	0
± 1	1
± 2	4
± 3	9
± 4	16
± 5	25

Now, we will plot these points and draw the graph of this function.



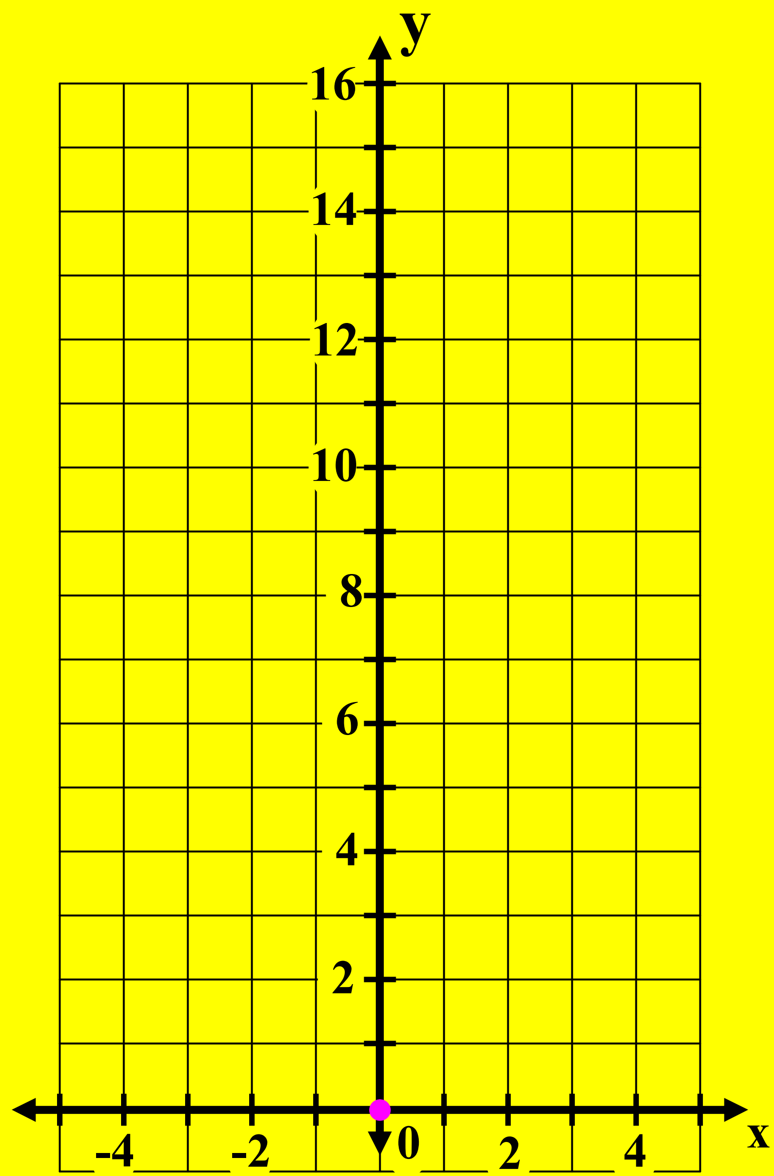
The Shape of a Parabola.

$y = ax^2$

$a = 1 \Rightarrow y = x^2$

x	y
0	0
± 1	1
± 2	4
± 3	9
± 4	16
± 5	25

Now, we will plot these points and draw the graph of this function.



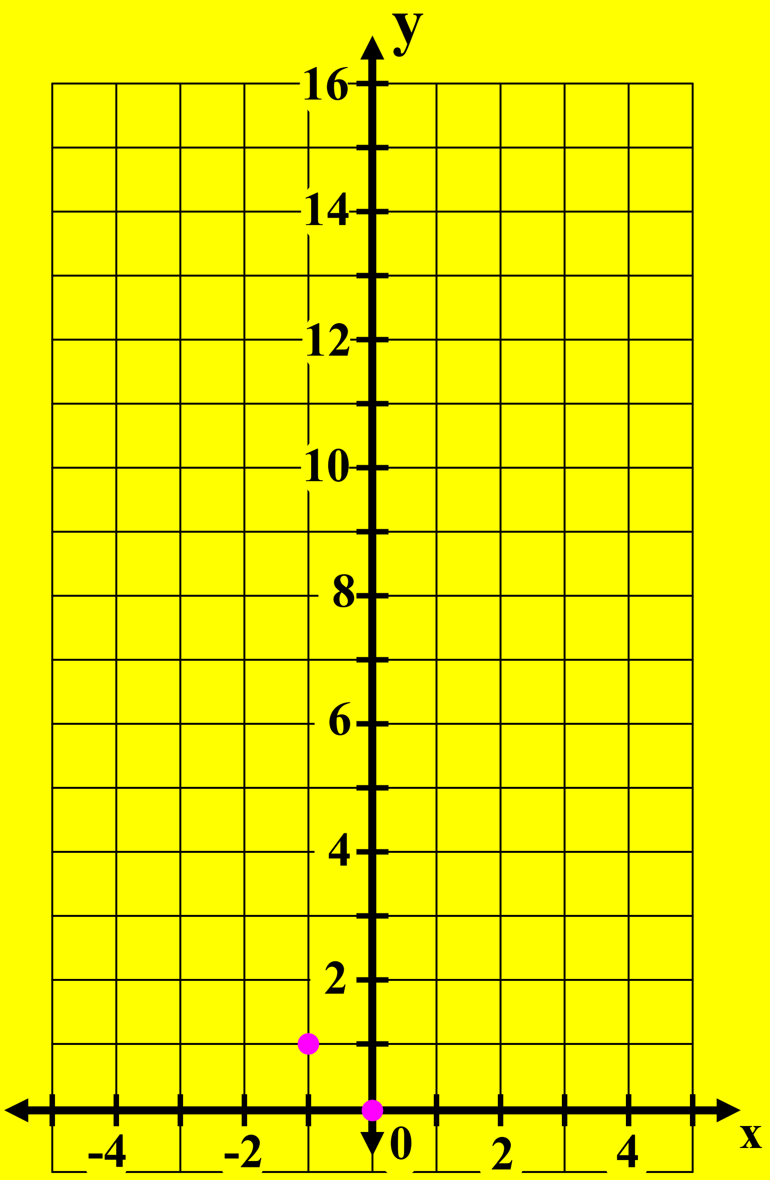
The Shape of a Parabola.

$y = ax^2$

$a = 1 \Rightarrow y = x^2$

x	y
0	0
± 1	1
± 2	4
± 3	9
± 4	16
± 5	25

Now, we will plot these points and draw the graph of this function.



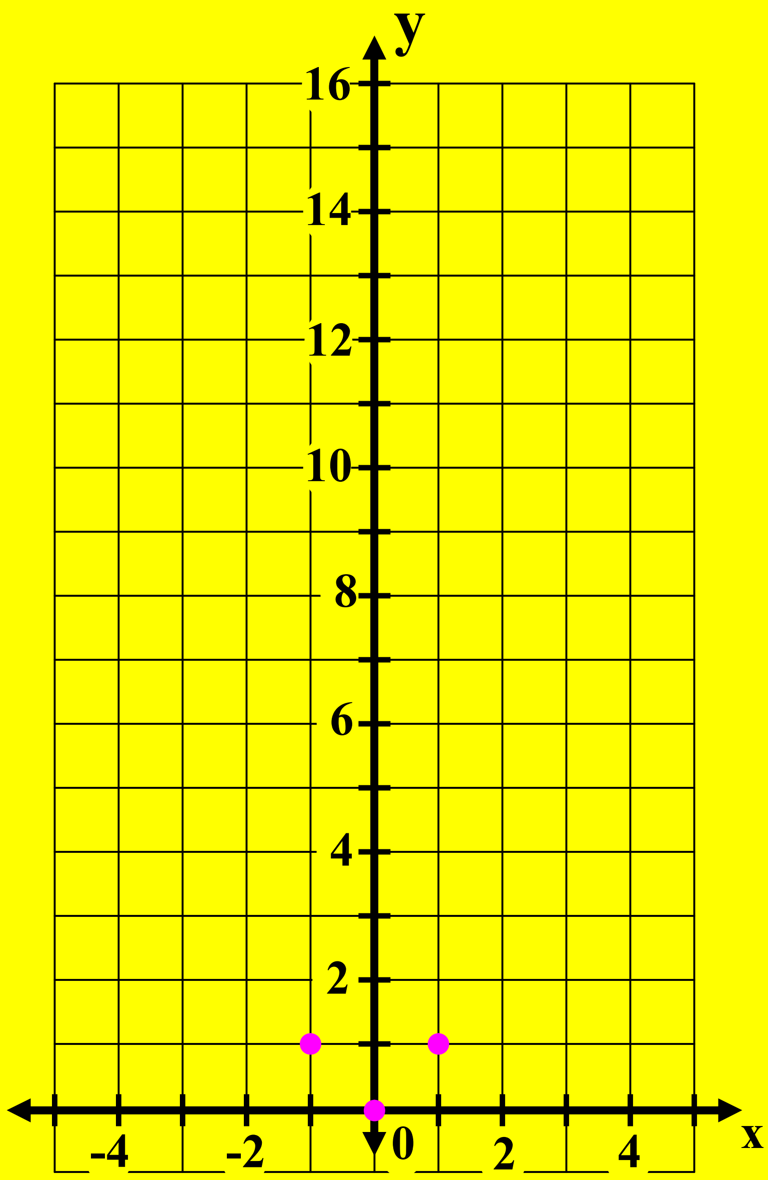
The Shape of a Parabola.

$$y = ax^2$$

$a = 1 \Rightarrow y = x^2$

x	y
0	0
± 1	1
± 2	4
± 3	9
± 4	16
± 5	25

Now, we will plot these points and draw the graph of this function.



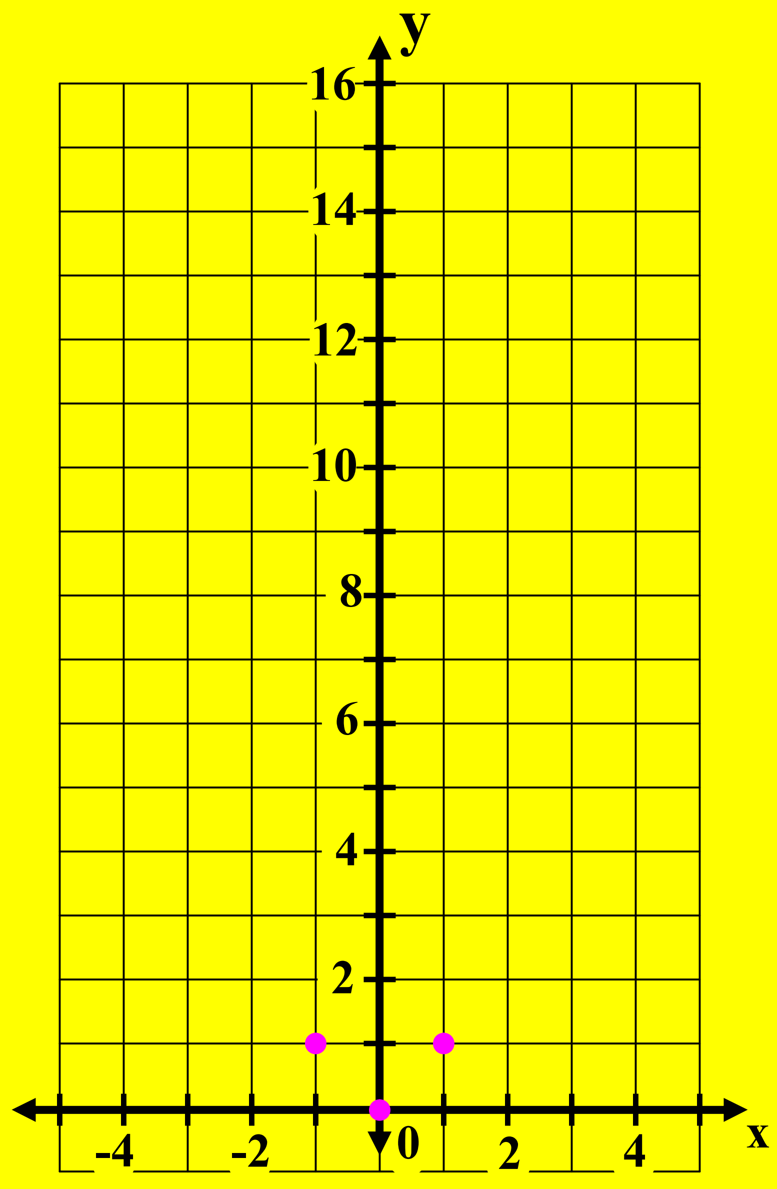
The Shape of a Parabola.

$y = ax^2$

$a = 1 \Rightarrow y = x^2$

x	y
0	0
± 1	1
± 2	4
± 3	9
± 4	16
± 5	25

Now, we will plot these points and draw the graph of this function.

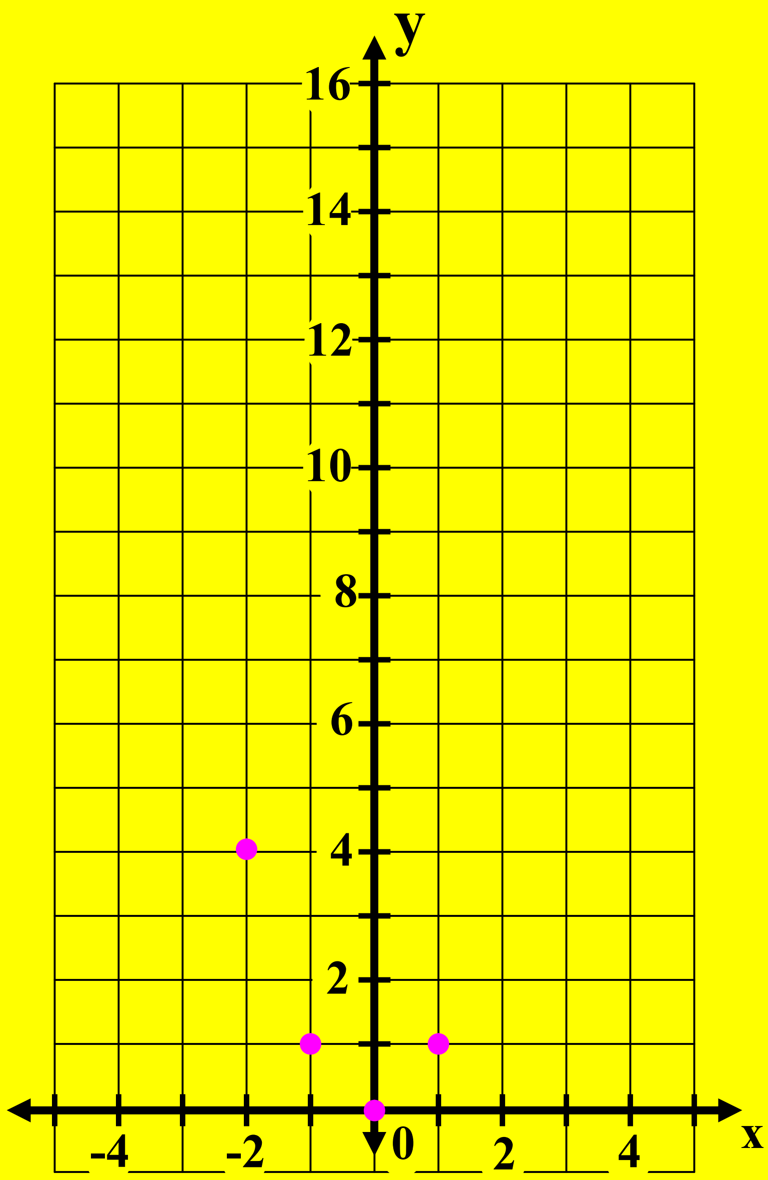


The Shape of a Parabola.

$$y = ax^2$$

$a = 1$ ➡ $y = x^2$

x	y
0	0
± 1	1
± 2	4
± 3	9
± 4	16
± 5	25



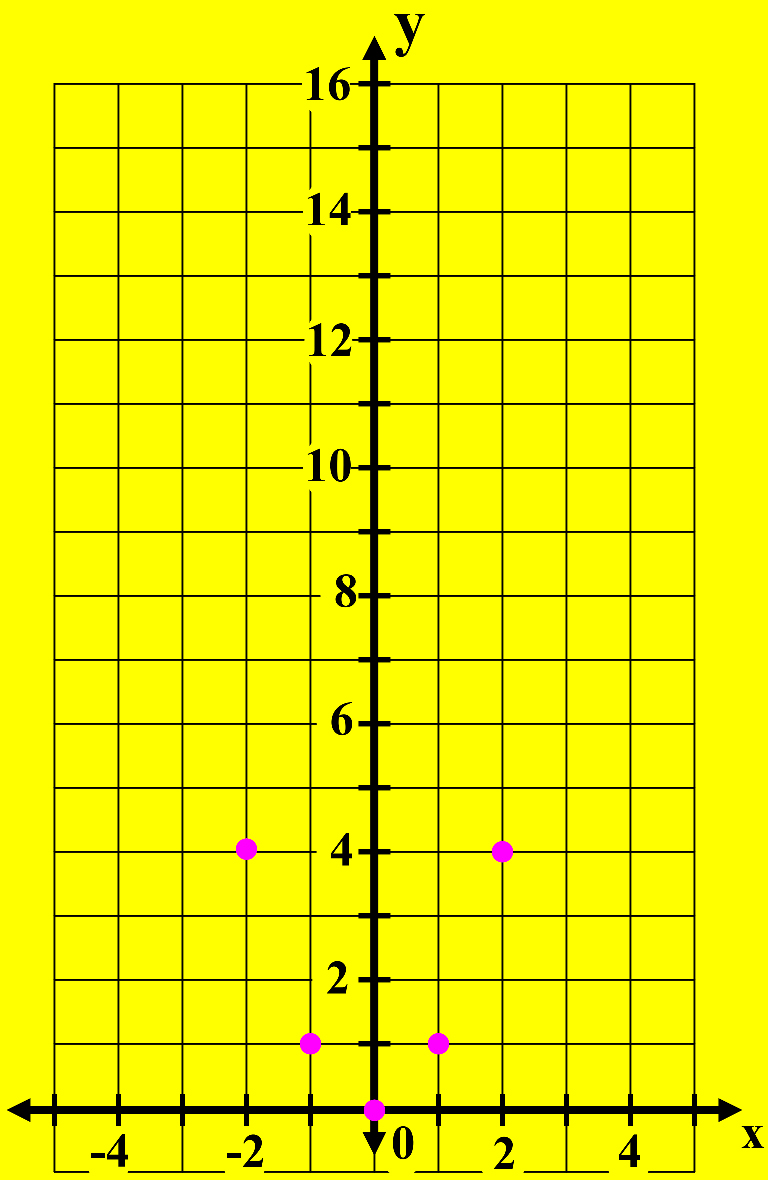
Now, we will plot these points and draw the graph of this function.

The Shape of a Parabola.

$y = ax^2$

$a = 1 \Rightarrow y = x^2$

x	y
0	0
± 1	1
± 2	4
± 3	9
± 4	16
± 5	25



Now, we will plot these points and draw the graph of this function.

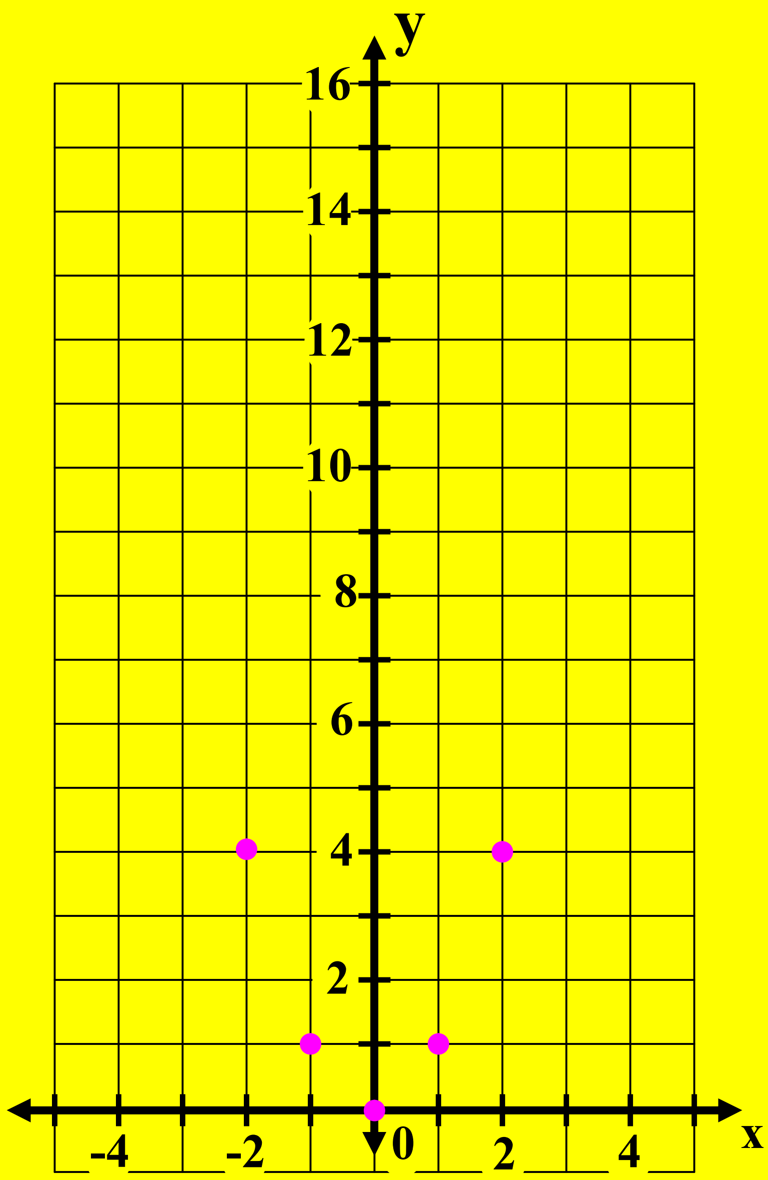
The Shape of a Parabola.

$$y = ax^2$$

$a = 1 \rightarrow y = x^2$

x	y
0	0
± 1	1
± 2	4
± 3	9
± 4	16
± 5	25

Now, we will plot these points and draw the graph of this function.



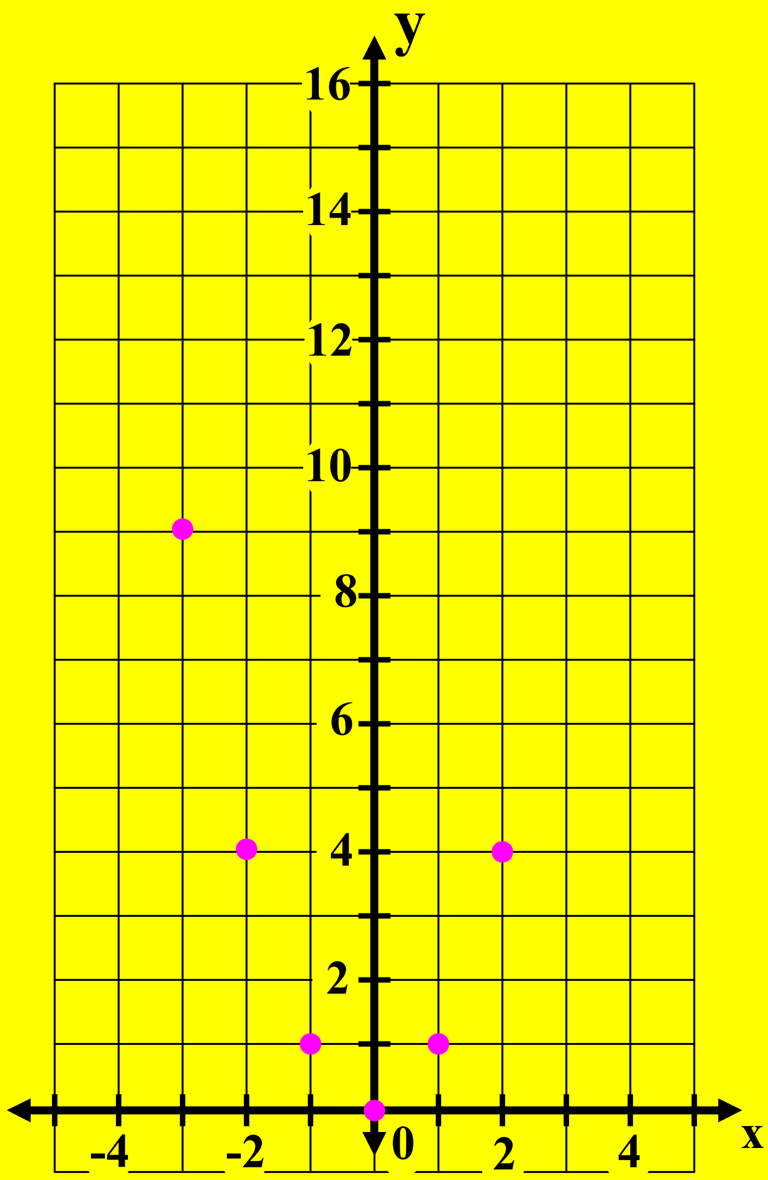
The Shape of a Parabola.

$y = ax^2$

$a = 1 \Rightarrow y = x^2$

x	y
0	0
± 1	1
± 2	4
± 3	9
± 4	16
± 5	25

Now, we will plot these points and draw the graph of this function.

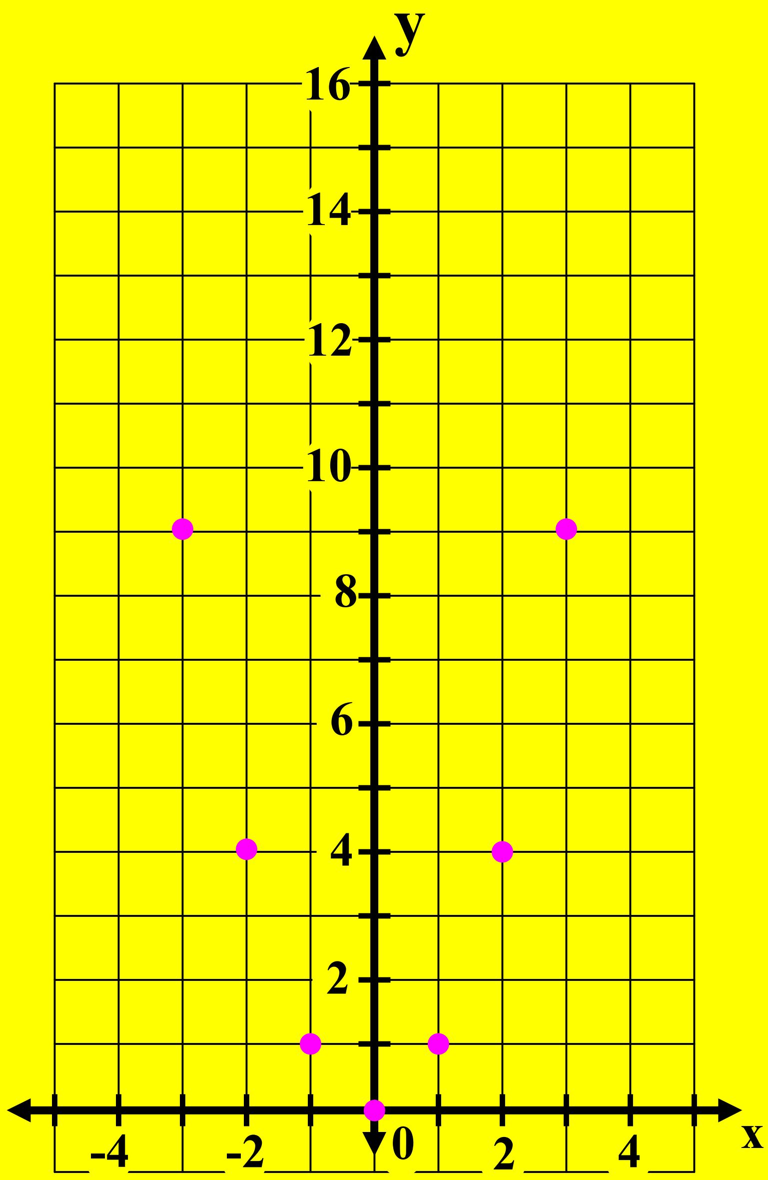


The Shape of a Parabola.

$y = ax^2$

$a = 1 \rightarrow y = x^2$

x	y
0	0
± 1	1
± 2	4
± 3	9
± 4	16
± 5	25



Now, we will plot these points and draw the graph of this function.

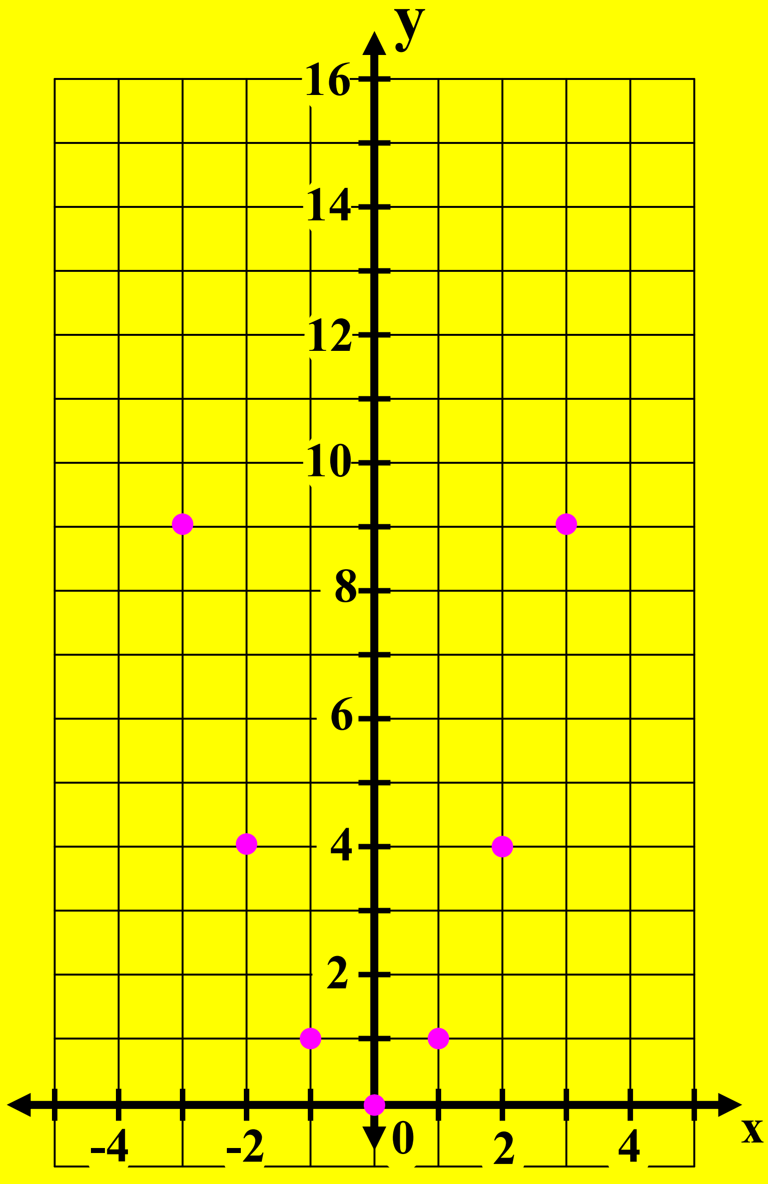
The Shape of a Parabola.

$y = ax^2$

$a = 1$ → $y = x^2$

x	y
0	0
± 1	1
± 2	4
± 3	9
± 4	16
± 5	25

Now, we will plot these points and draw the graph of this function.



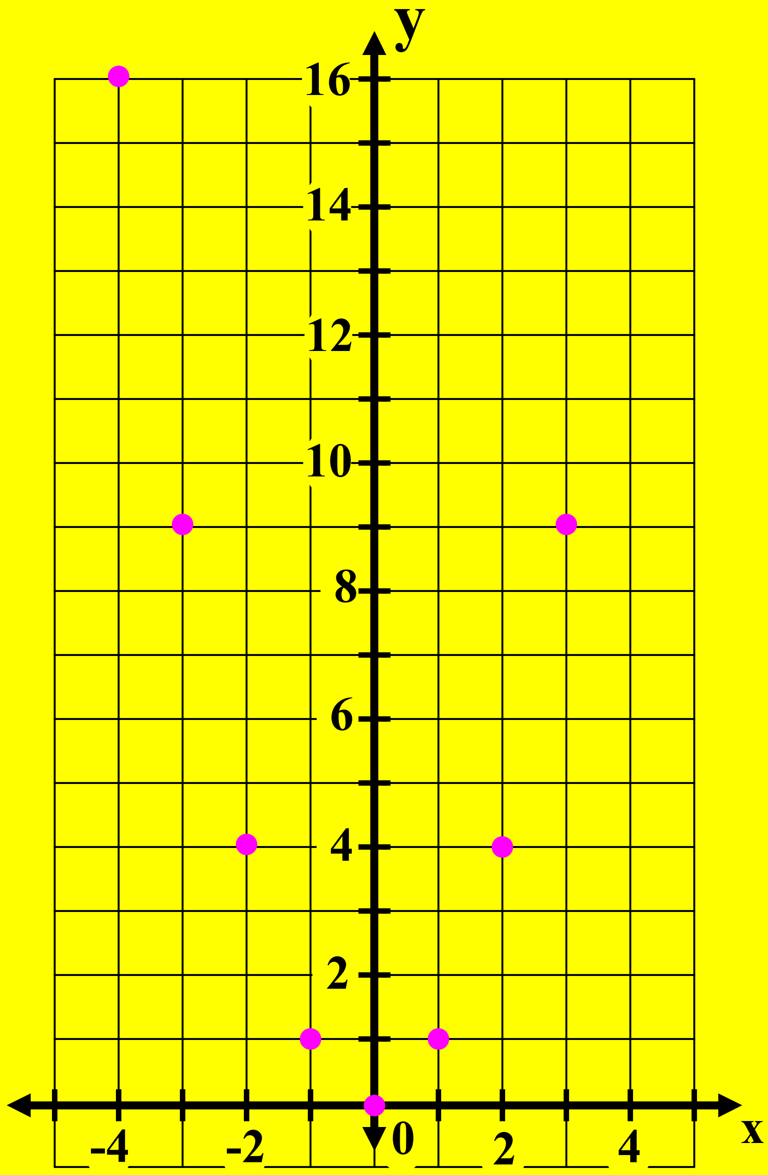
The Shape of a Parabola.

$y = ax^2$

$a = 1 \Rightarrow y = x^2$

x	y
0	0
± 1	1
± 2	4
± 3	9
± 4	16
± 5	25

Now, we will plot these points and draw the graph of this function.



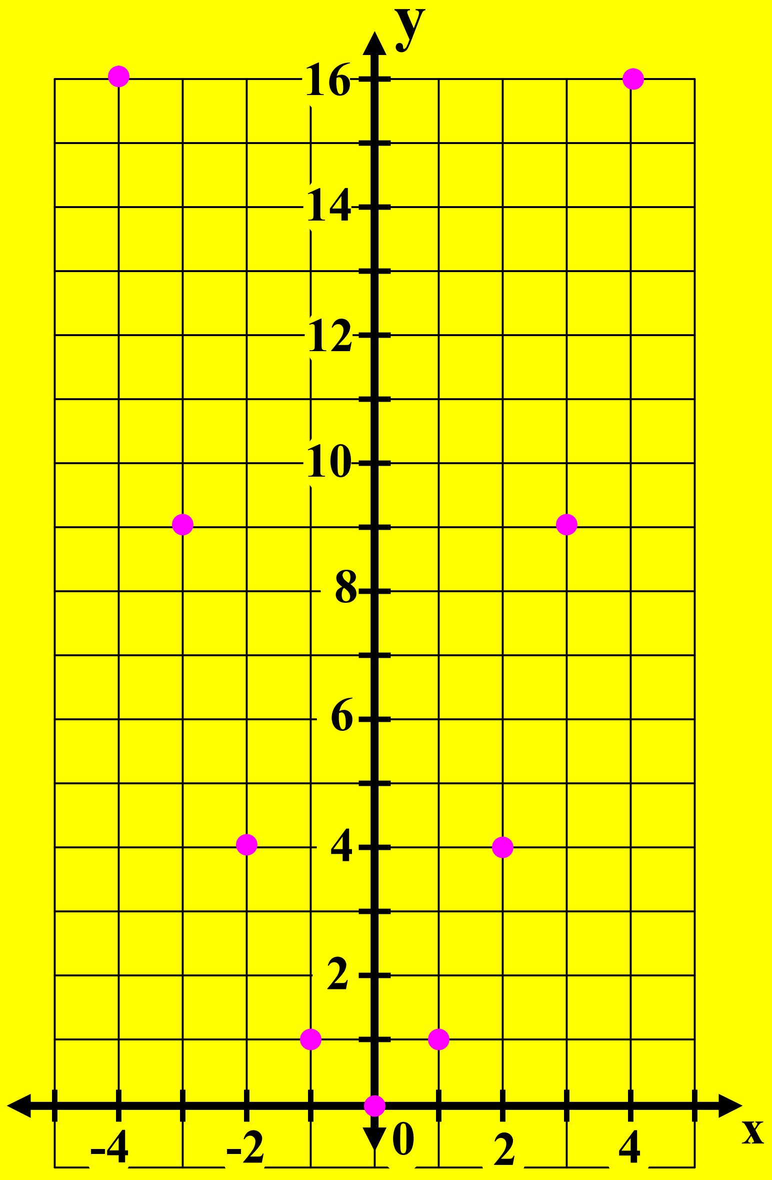
The Shape of a Parabola.

$$y = ax^2$$

$a = 1$ → $y = x^2$

x	y
0	0
± 1	1
± 2	4
± 3	9
± 4	16
± 5	25

Now, we will plot these points and draw the graph of this function.



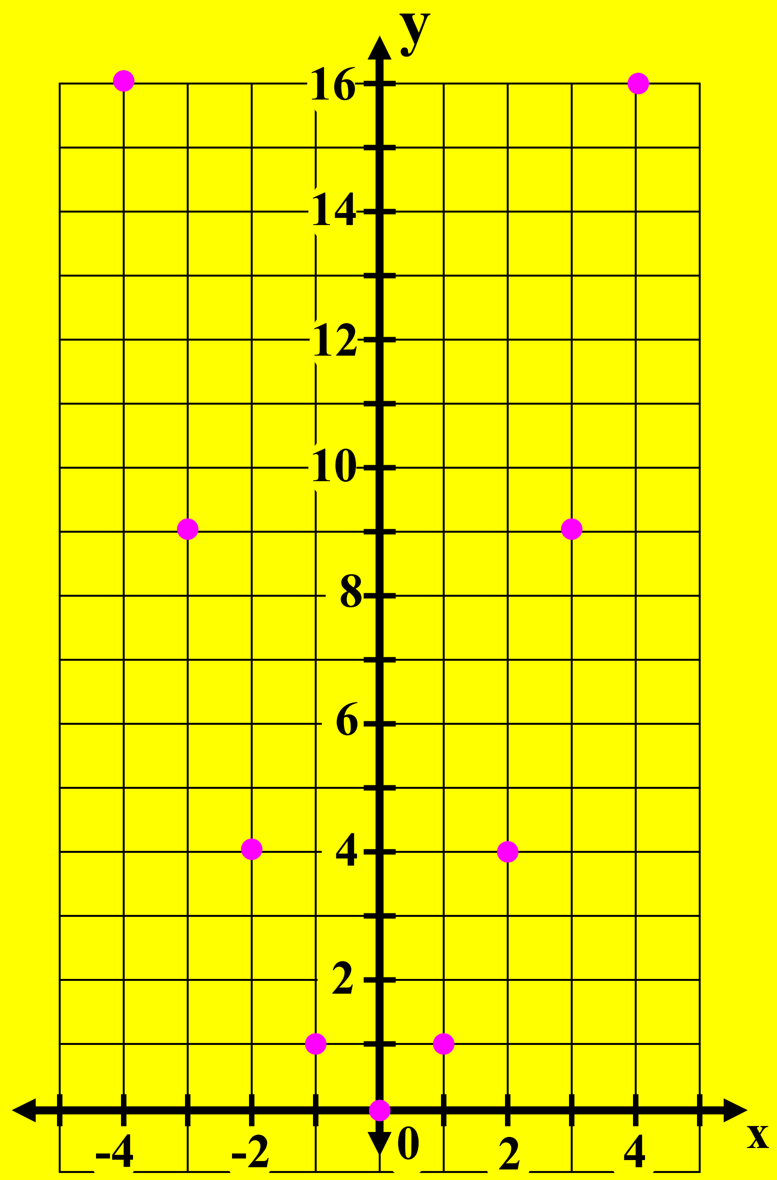
The Shape of a Parabola.

$y = ax^2$

$a = 1 \Rightarrow y = x^2$

x	y
0	0
± 1	1
± 2	4
± 3	9
± 4	16
± 5	25

Now, we will plot these points and draw the graph of this function.



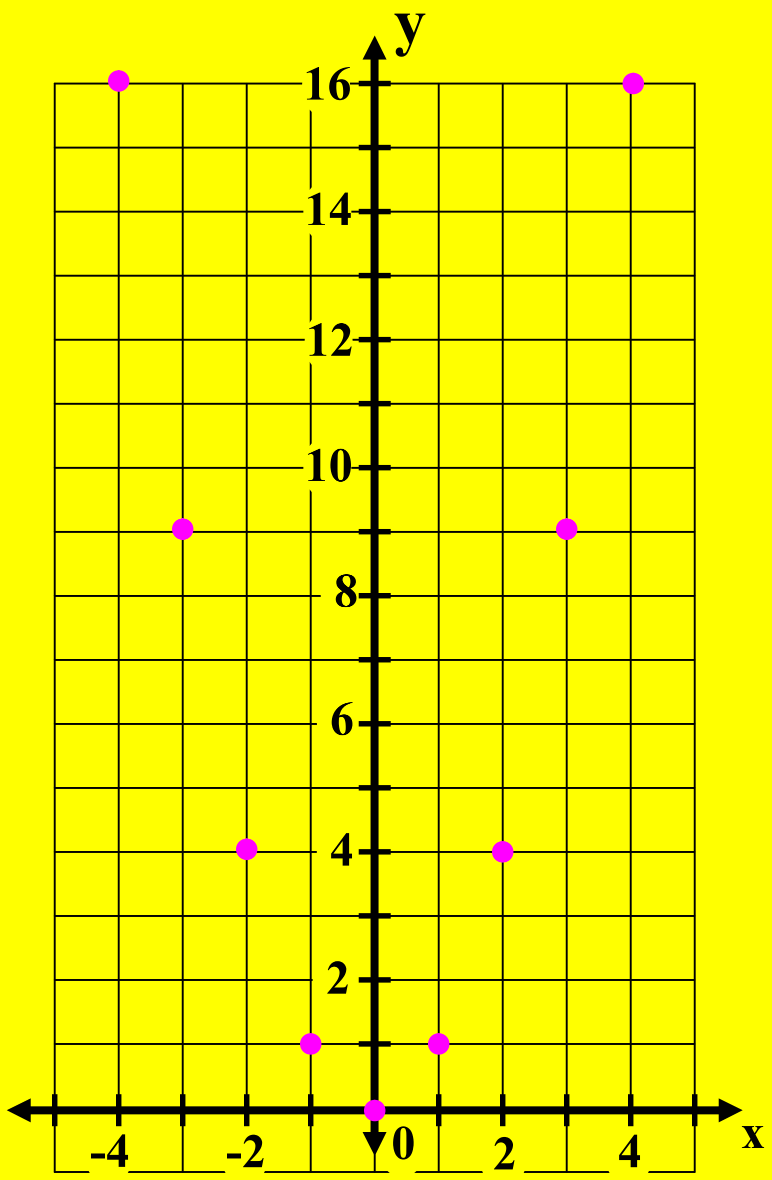
The Shape of a Parabola.

$y = ax^2$

$a = 1 \Rightarrow y = x^2$

x	y
0	0
± 1	1
± 2	4
± 3	9
± 4	16
± 5	25

Now, we will plot these points and draw the graph of this function. These two points are too high to be graphed here.

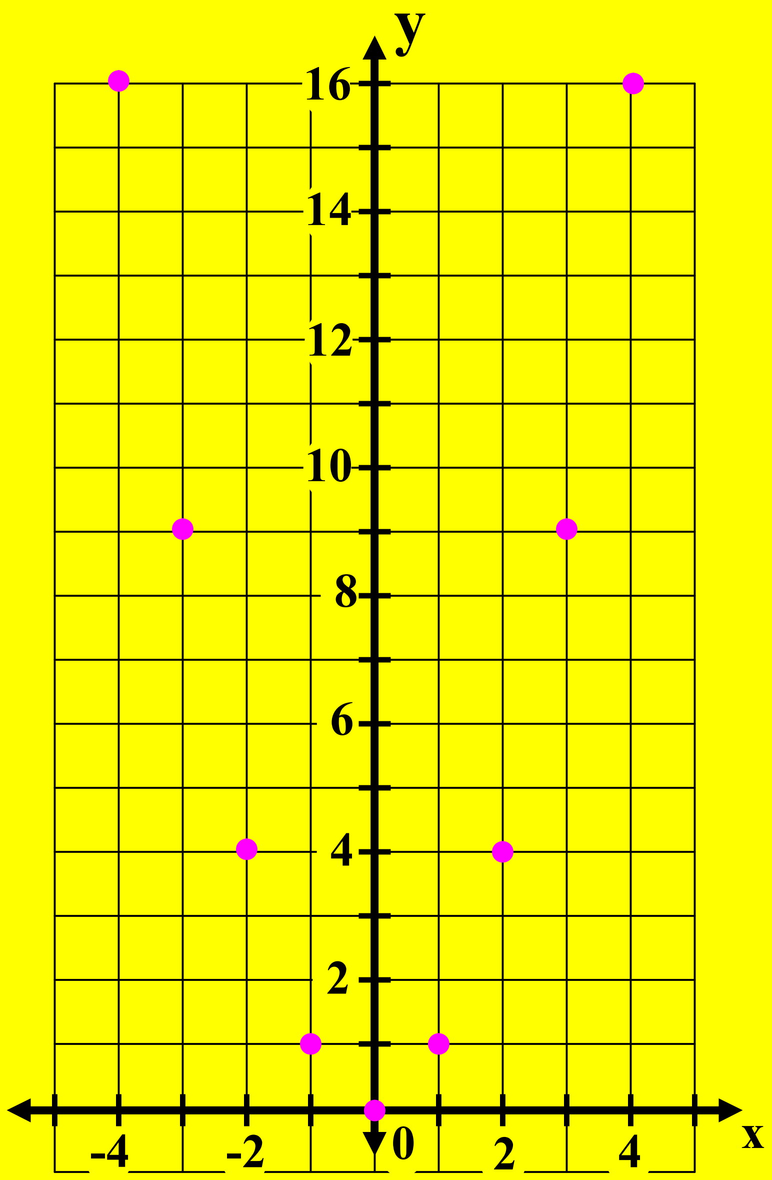


The Shape of a Parabola.

$y = ax^2$

$a = 1 \Rightarrow y = x^2$

x	y
0	0
± 1	1
± 2	4
± 3	9
± 4	16
± 5	25



Now, we will plot these points and draw the graph of this function.

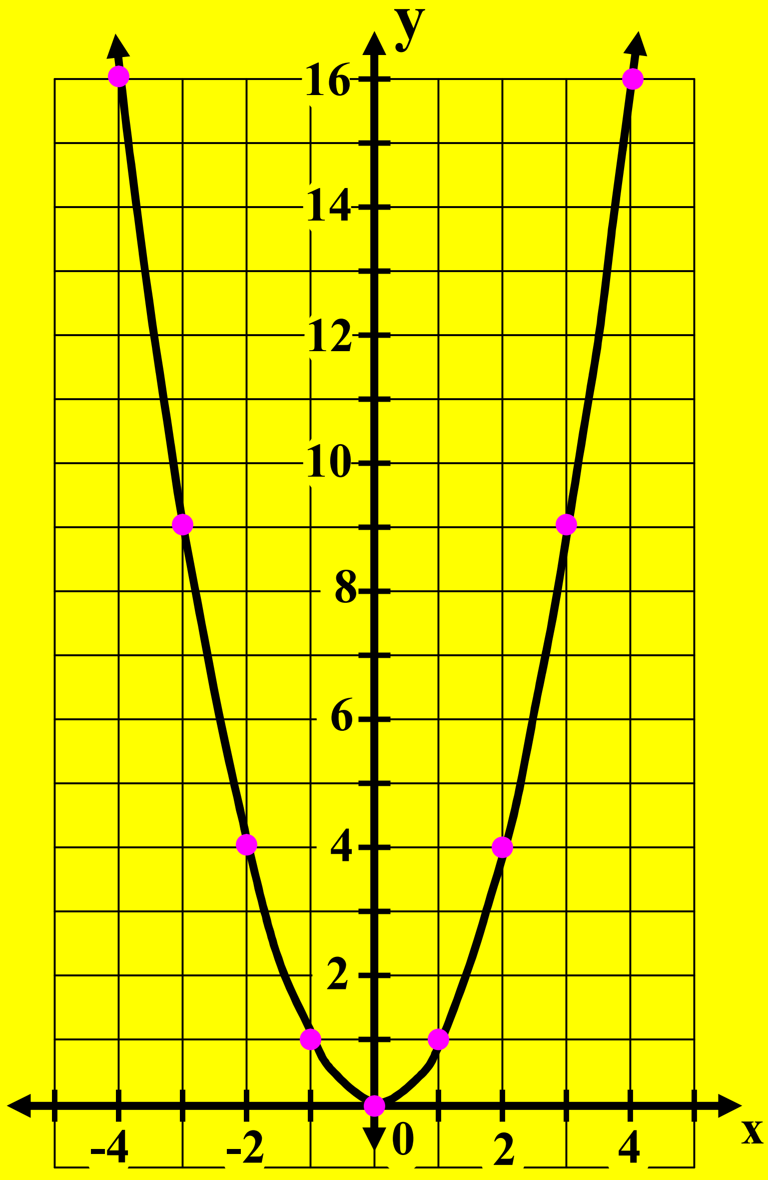
The Shape of a Parabola.

$y = ax^2$

$a = 1$ → $y = x^2$

x	y
0	0
± 1	1
± 2	4
± 3	9
± 4	16
± 5	25

Now, we will plot these points and draw the graph of this function.

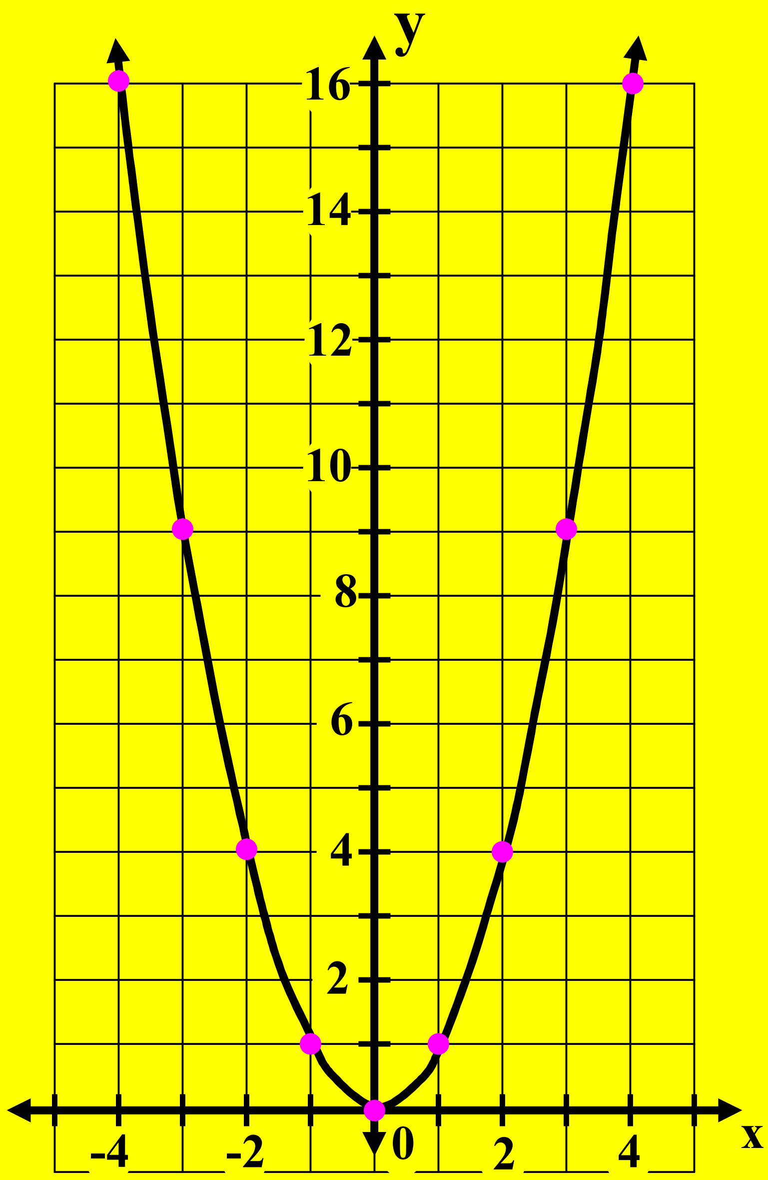


The Shape of a Parabola.

$y = ax^2$

$a = 1$ → $y = x^2$

x	y
0	0
± 1	1
± 2	4
± 3	9
± 4	16
± 5	25



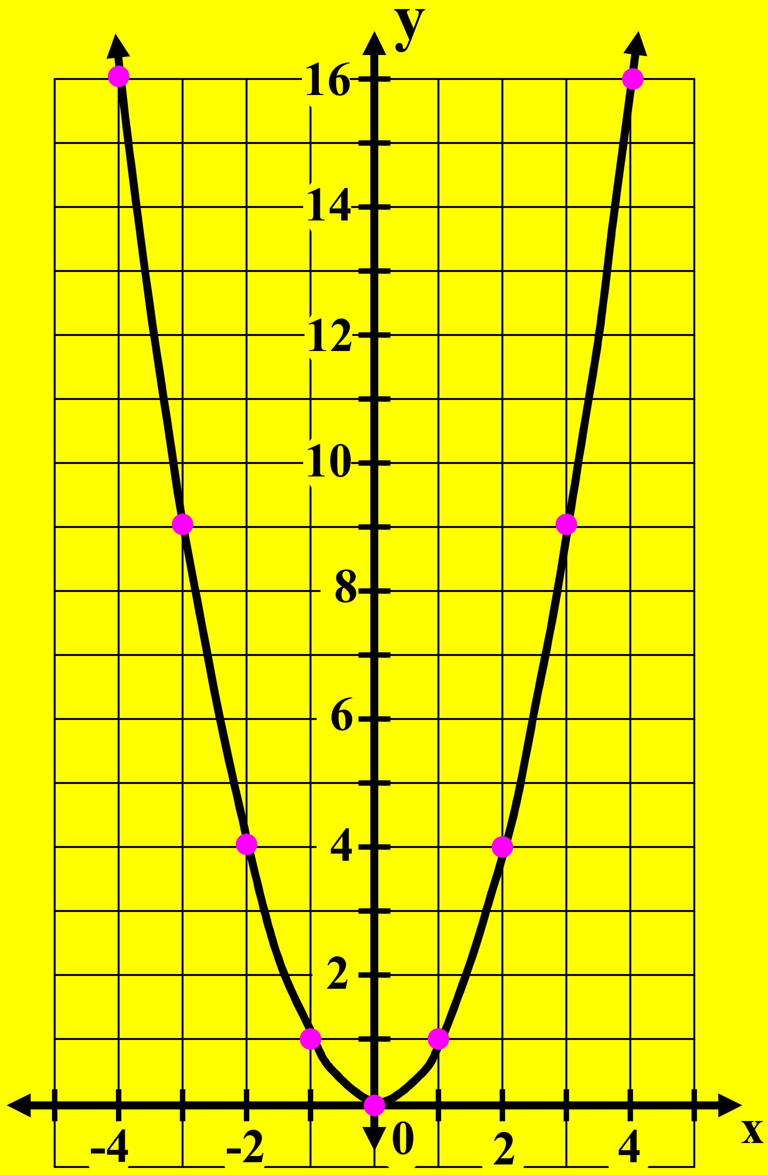
The Shape of a Parabola.

$y = ax^2$

$a = 1 \rightarrow y = x^2$

x	y
0	0
± 1	1
± 2	4
± 3	9
± 4	16
± 5	25

We will graph one more function before we compare them.

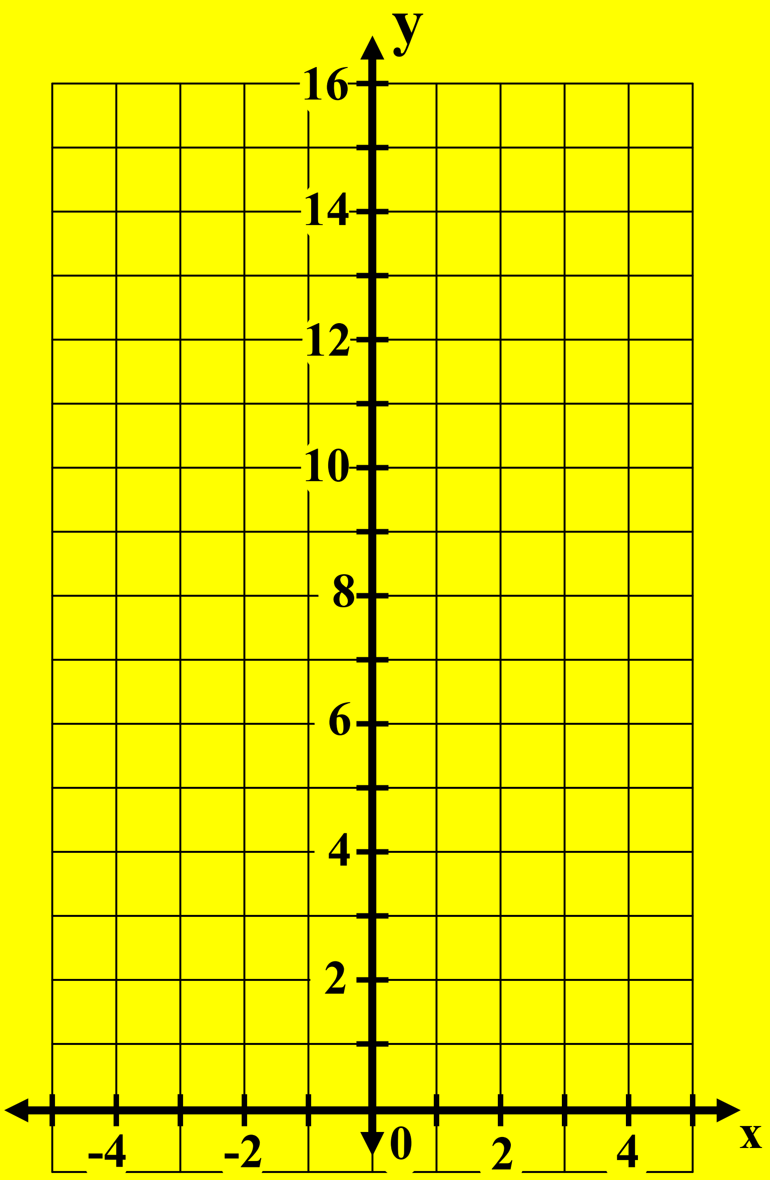


The Shape of a Parabola.

$$y = ax^2$$

$$a = \frac{3}{2} \implies y = \frac{3}{2}x^2$$

x	y
0	
± 1	
± 2	
± 3	
± 4	
± 5	



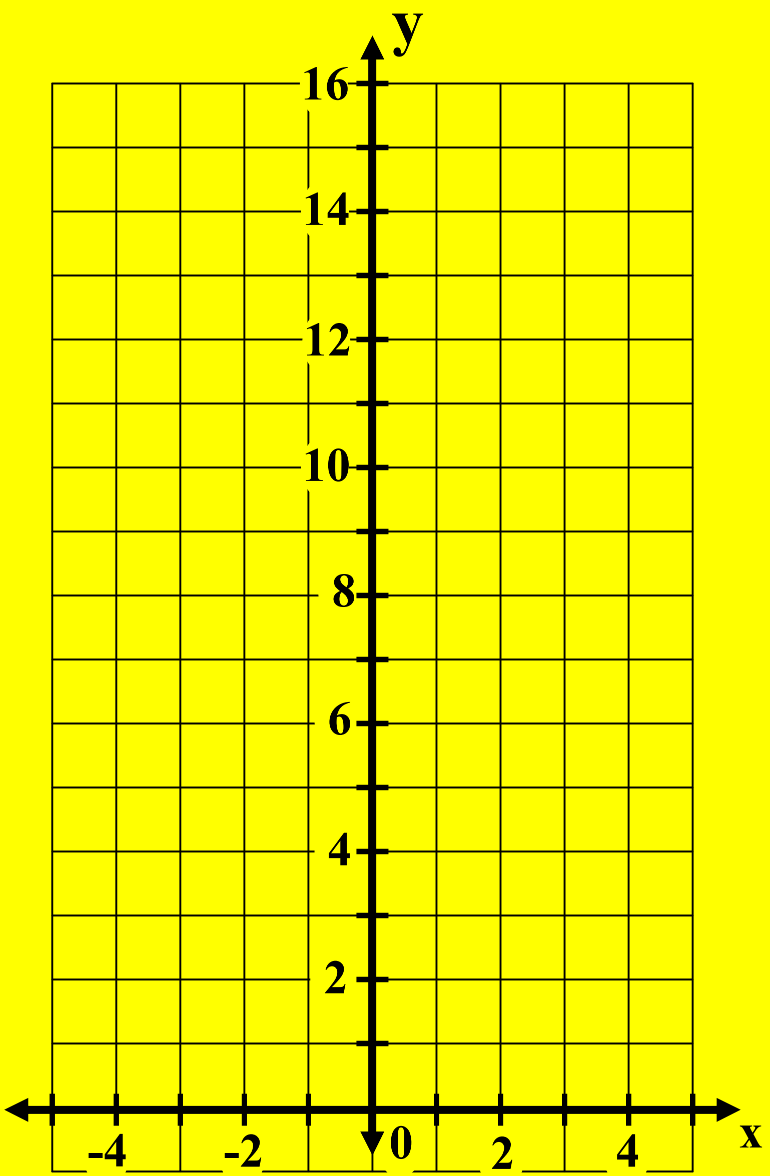
The Shape of a Parabola.

$$y = ax^2$$

$a = \frac{3}{2}$ ⇒ $y = \frac{3}{2}x^2$

x	y
0	
± 1	
± 2	
± 3	
± 4	
± 5	

(1) Fill out the table.



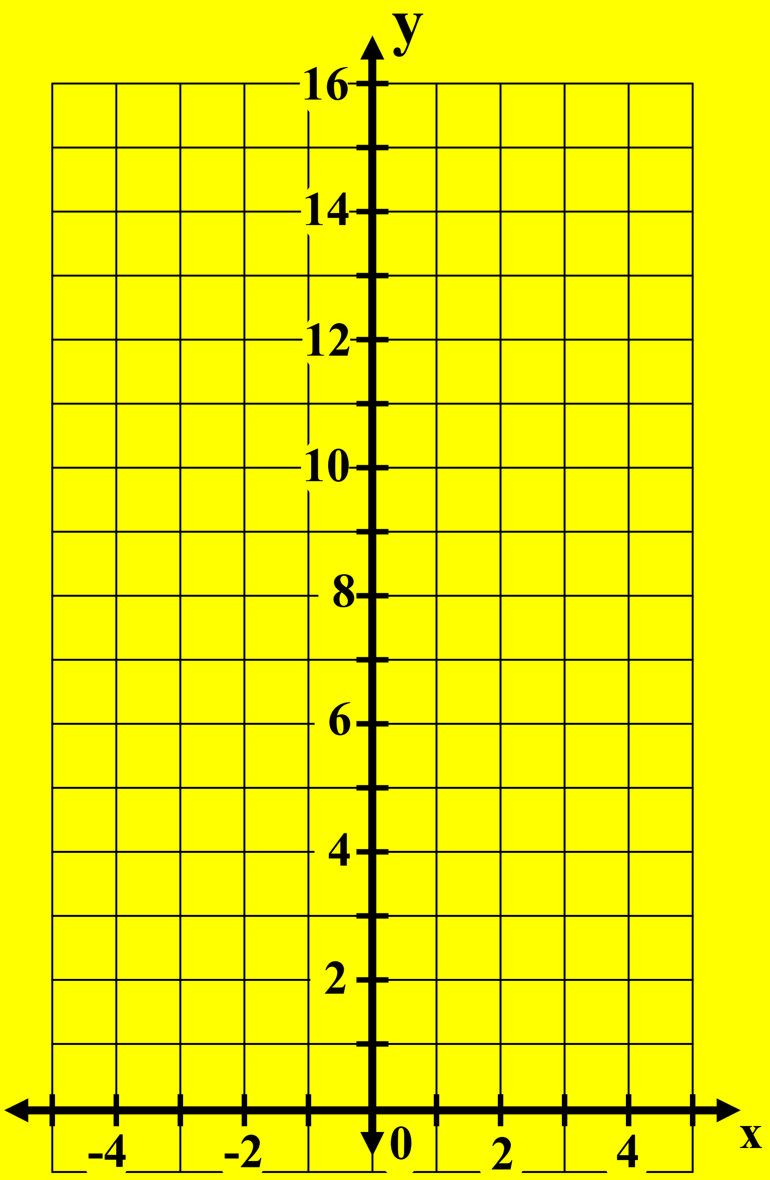
The Shape of a Parabola.

$$y = ax^2$$

$$a = \frac{3}{2} \Rightarrow y = \frac{3}{2}x^2$$

x	y
0	
± 1	
± 2	
± 3	
± 4	
± 5	

(1) Fill out the table.



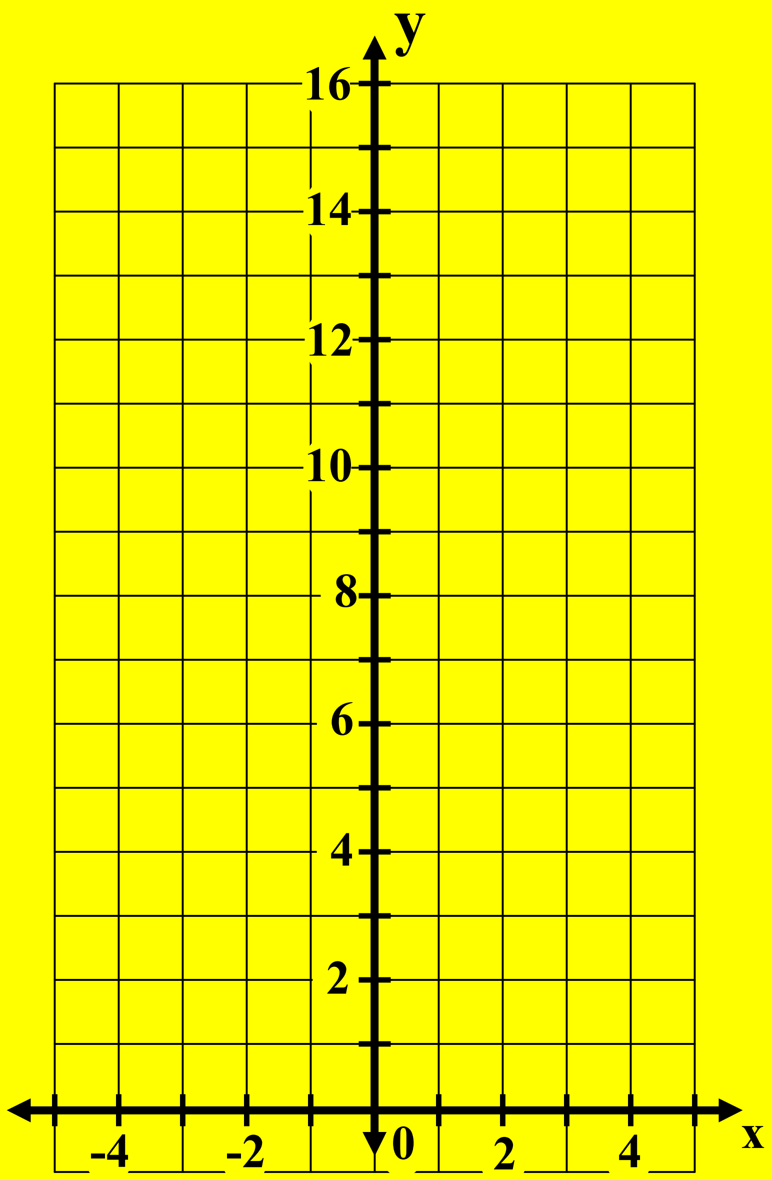
The Shape of a Parabola.

$y = ax^2$

$a = \frac{3}{2}$ ⇨ $y = \frac{3}{2}x^2$

x	y
0	0
± 1	
± 2	
± 3	
± 4	
± 5	

(1) Fill out the table.



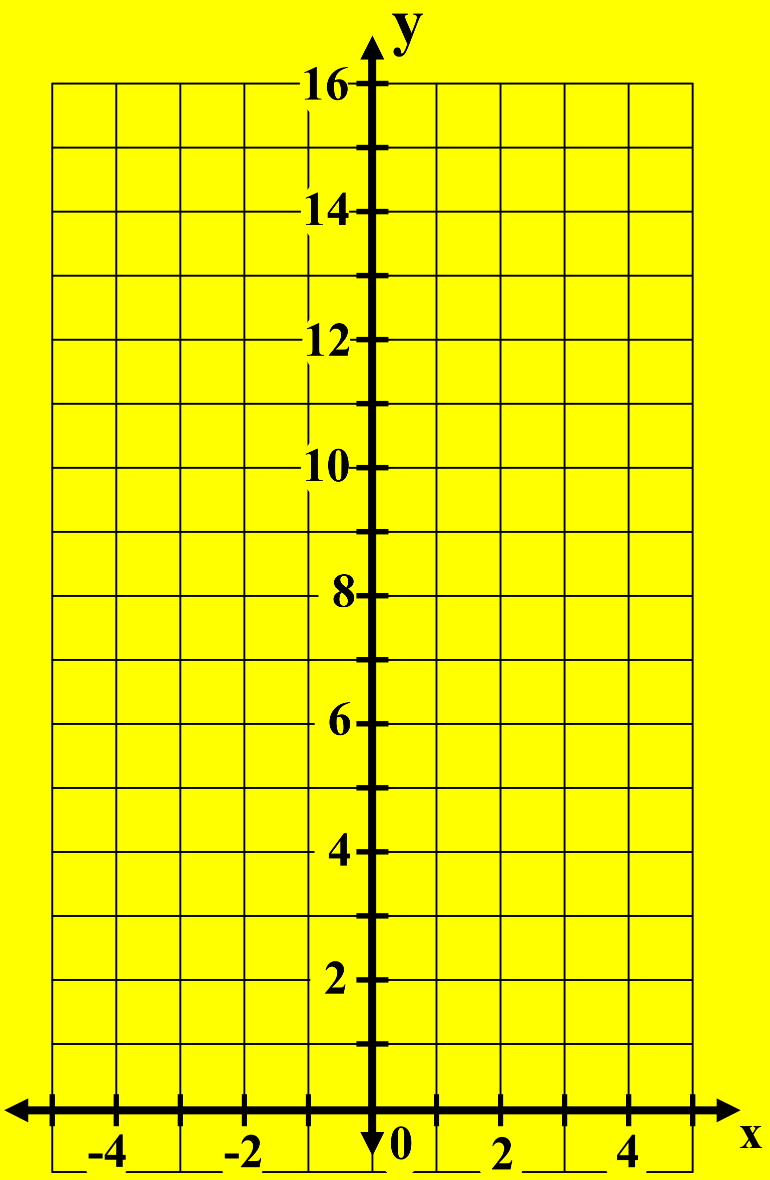
The Shape of a Parabola.

$$y = ax^2$$

$$a = \frac{3}{2} \quad \Rightarrow \quad y = \frac{3}{2}x^2$$

x	y
0	0
± 1	
± 2	
± 3	
± 4	
± 5	

(1) Fill out the table.



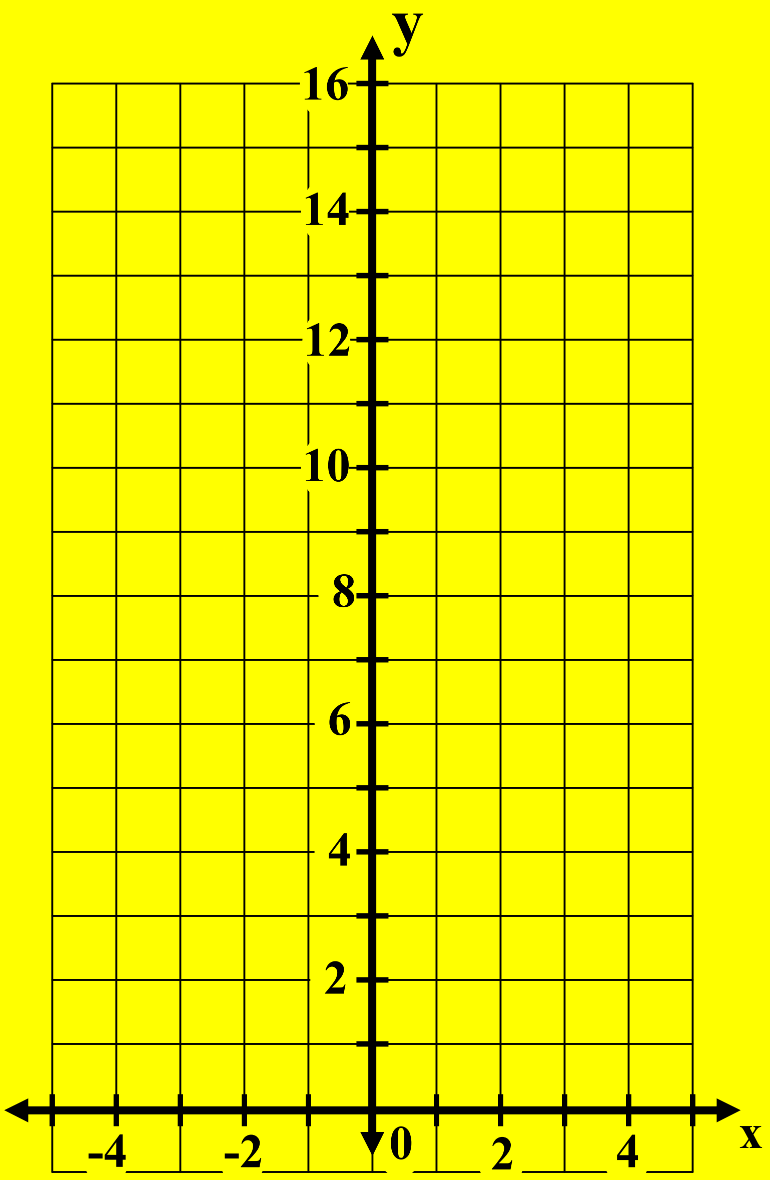
The Shape of a Parabola.

$$y = ax^2$$

$a = \frac{3}{2}$ ⇨ $y = \frac{3}{2}x^2$

x	y
0	0
± 1	$\frac{3}{2}$
± 2	
± 3	
± 4	
± 5	

(1) Fill out the table.



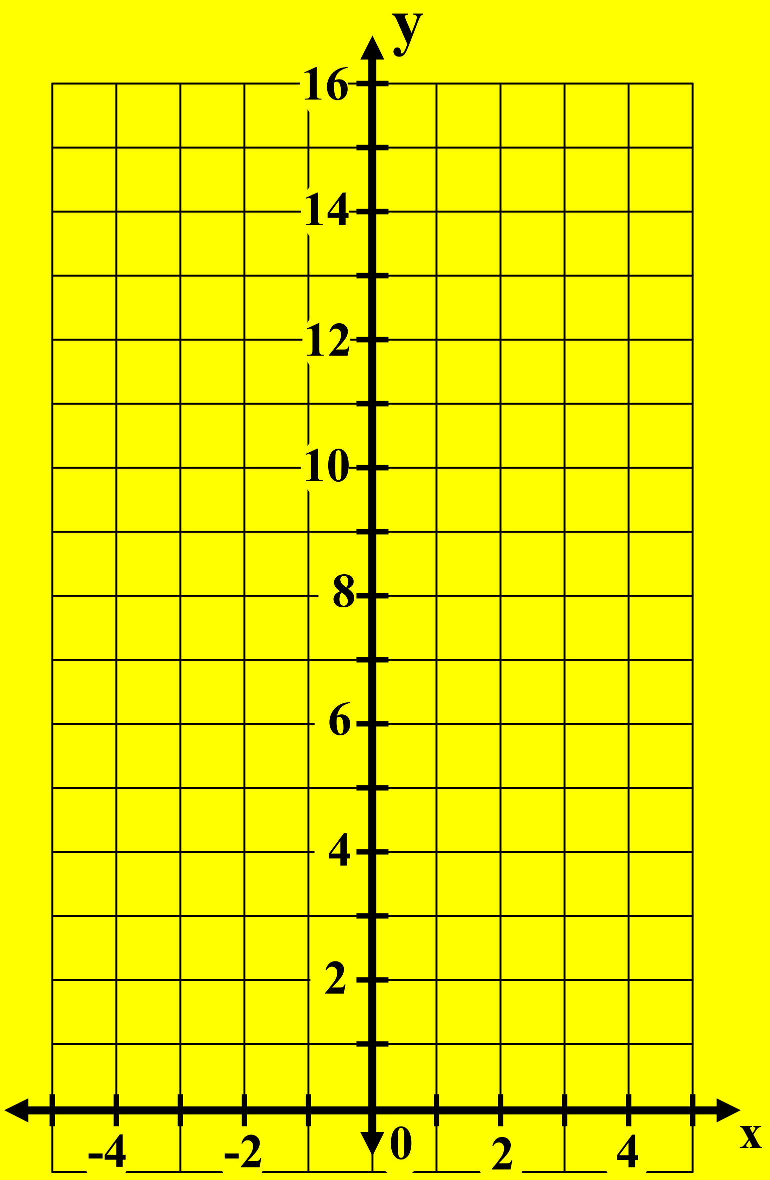
The Shape of a Parabola.

$$y = ax^2$$

$a = \frac{3}{2}$ ⇒ $y = \frac{3}{2}x^2$

x	y
0	0
± 1	$\frac{3}{2}$
± 2	
± 3	
± 4	
± 5	

(1) Fill out the table.

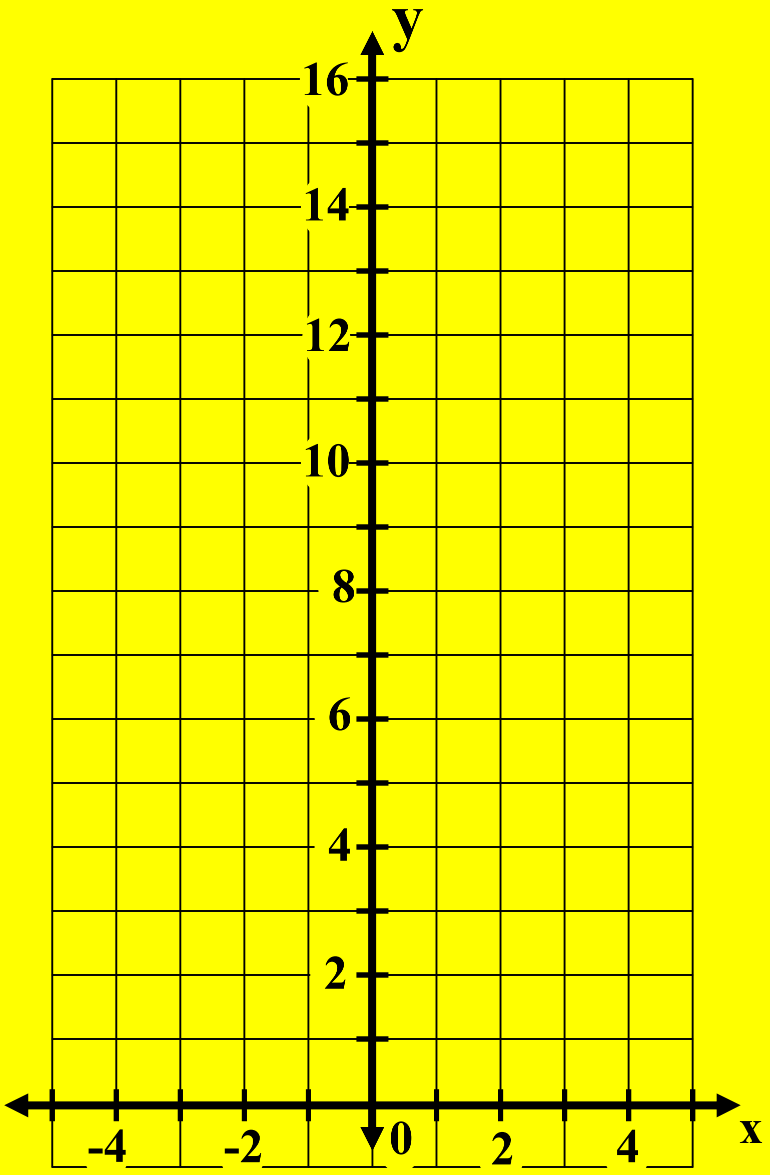


The Shape of a Parabola.

$$y = ax^2$$

$$a = \frac{3}{2} \Rightarrow y = \frac{3}{2}x^2$$

x	y
0	0
± 1	$\frac{3}{2}$
± 2	6
± 3	
± 4	
± 5	



(1) Fill out the table.

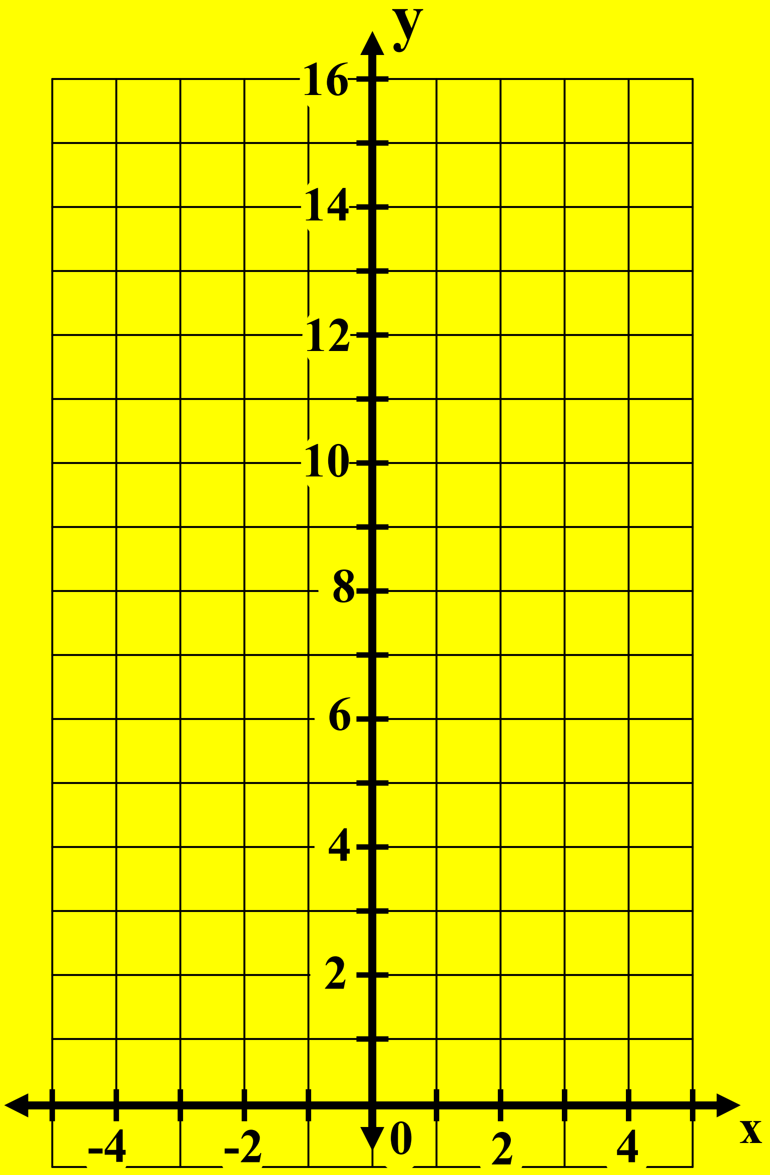
The Shape of a Parabola.

$$y = ax^2$$

$$a = \frac{3}{2} \Rightarrow y = \frac{3}{2}x^2$$

x	y
0	0
± 1	$\frac{3}{2}$
± 2	6
± 3	
± 4	
± 5	

(1) Fill out the table.



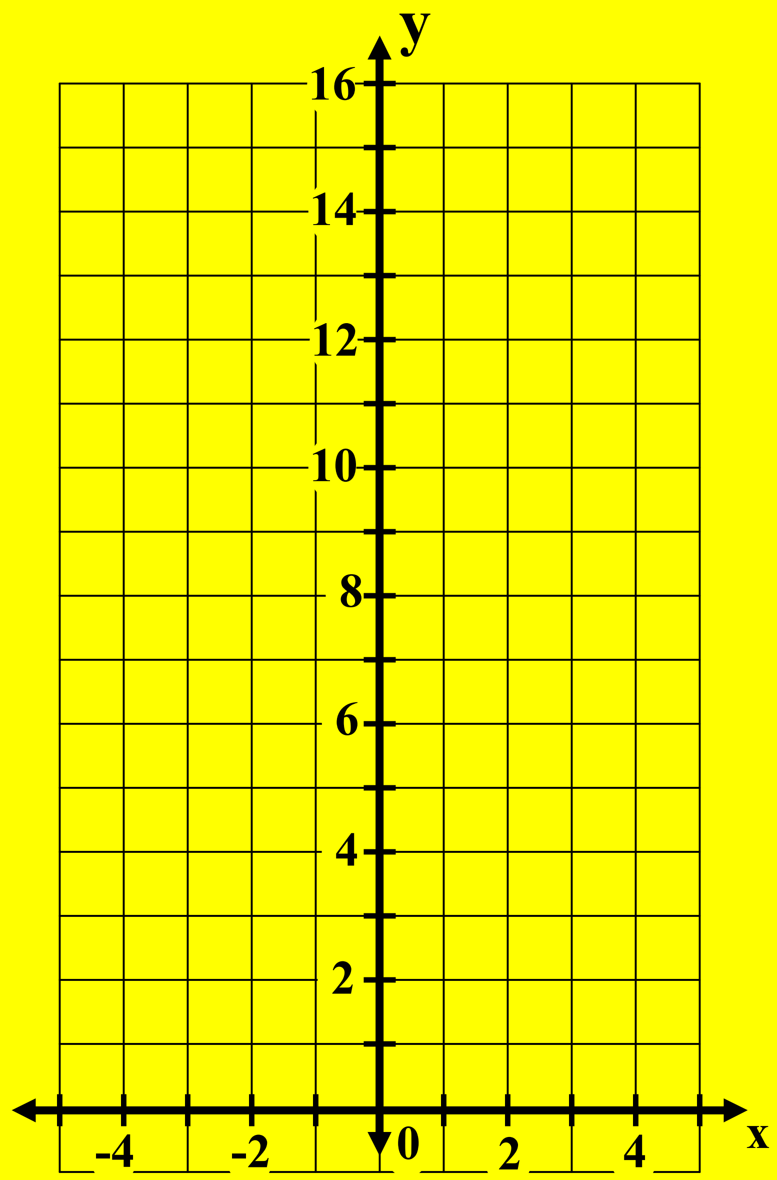
The Shape of a Parabola.

$$y = ax^2$$

$$a = \frac{3}{2} \Rightarrow y = \frac{3}{2}x^2$$

x	y
0	0
± 1	$\frac{3}{2}$
± 2	6
± 3	$\frac{27}{2}$
± 4	
± 5	

(1) Fill out the table.



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0	0
± 1	$\frac{3}{2}$
± 2	6
± 3	$\frac{27}{2}$
± 4	
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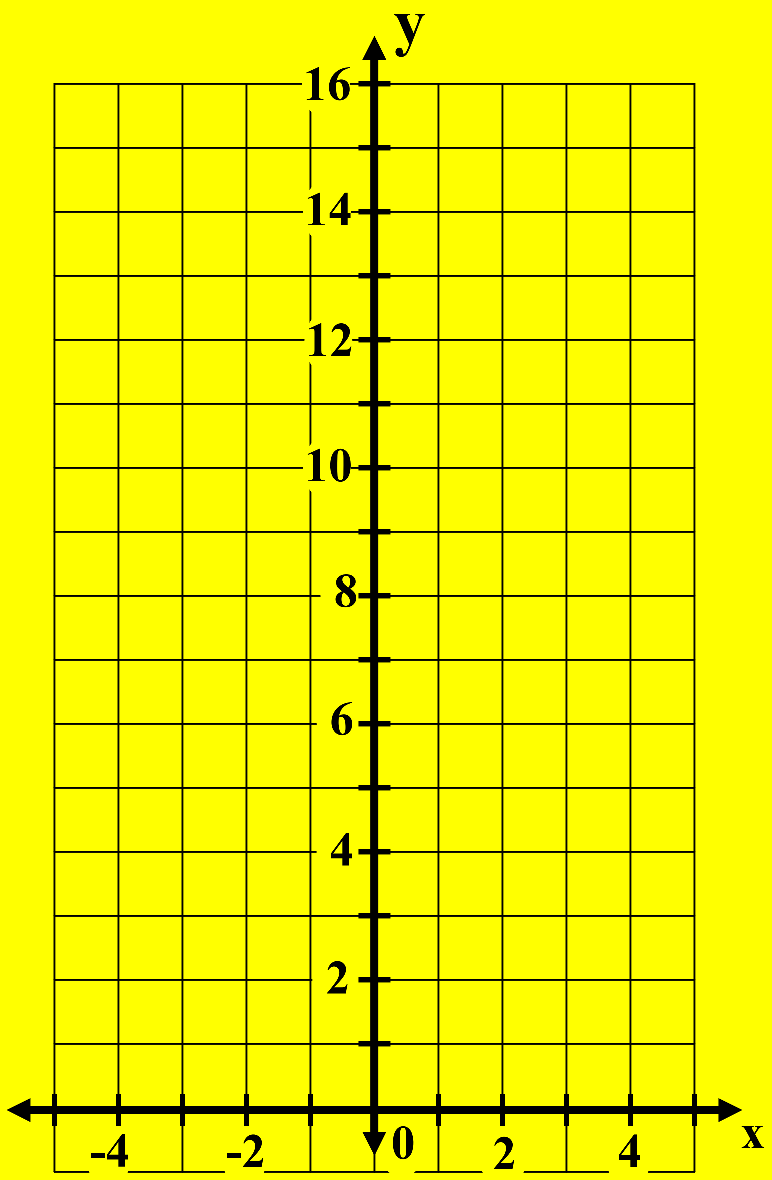


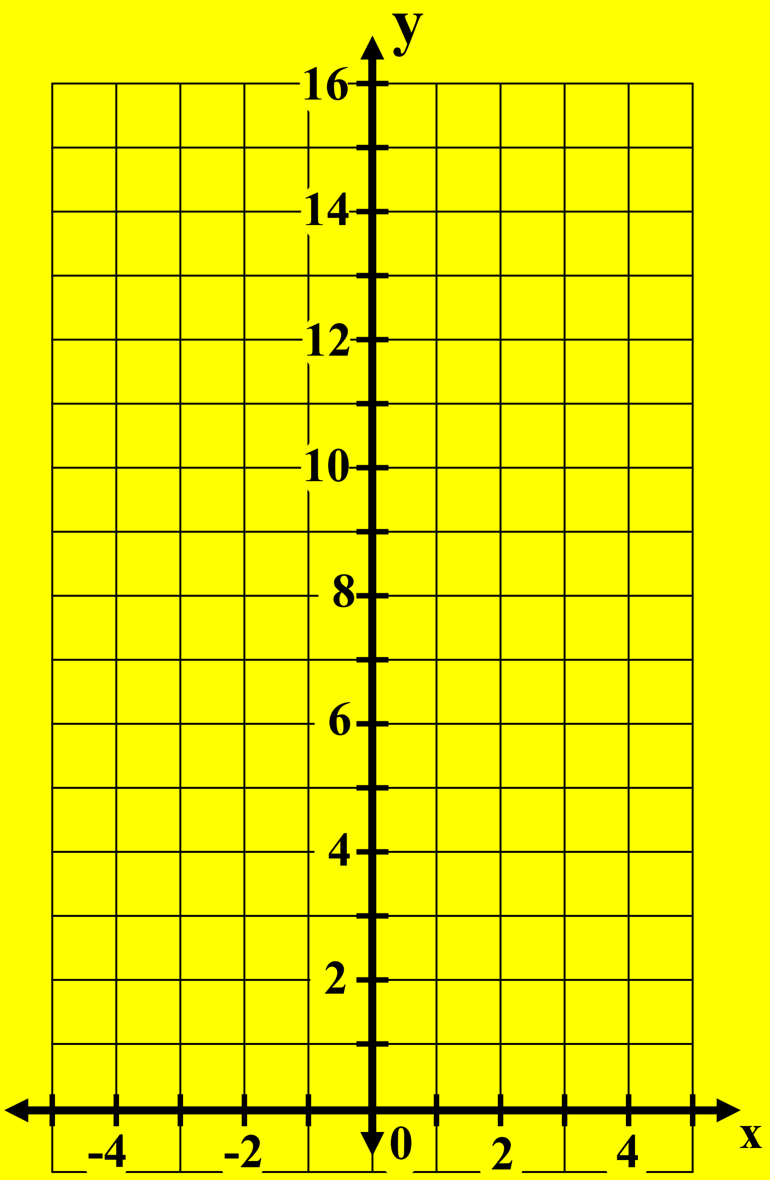
The Shape of a Parabola.

$$y = ax^2$$

$a = \frac{3}{2}$ ⇒ $y = \frac{3}{2}x^2$

x	y
0	0
± 1	$\frac{3}{2}$
± 2	6
± 3	$\frac{27}{2}$
± 4	24
± 5	

(1) Fill out the table.



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x	y
0	0
± 1	$\frac{3}{2}$
± 2	6
± 3	$\frac{27}{2}$
± 4	24
± 5	

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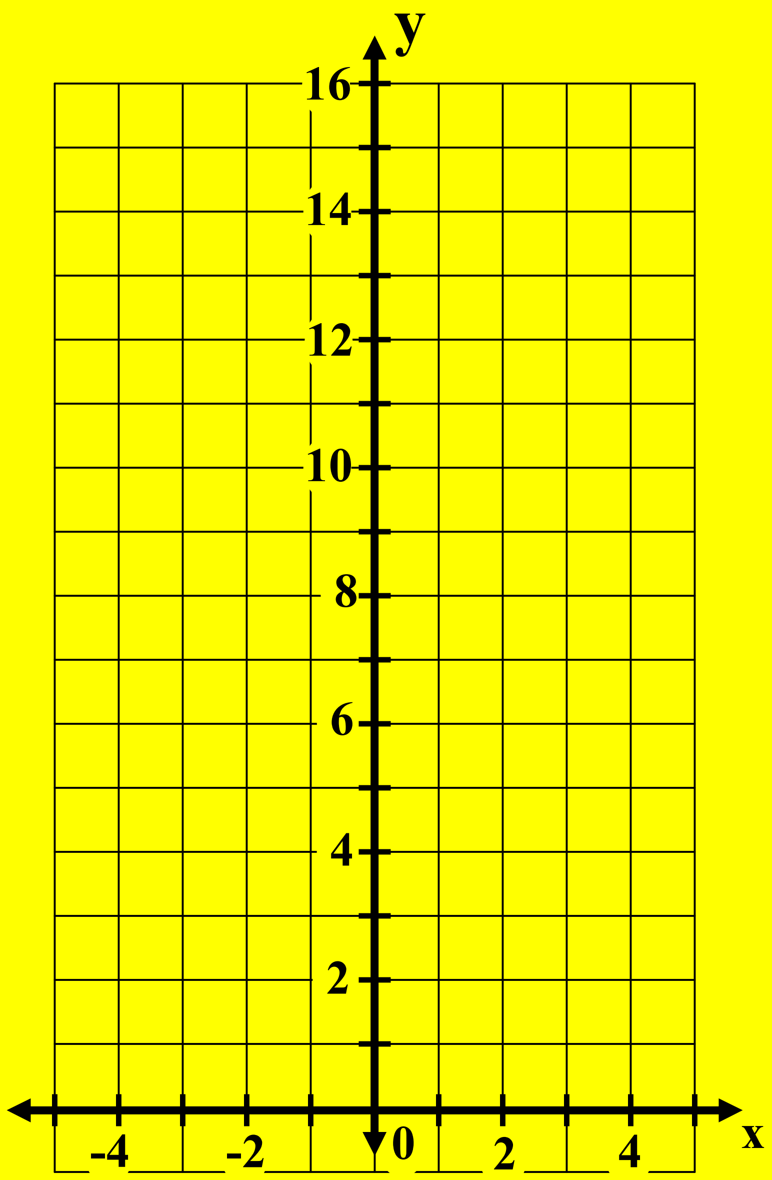


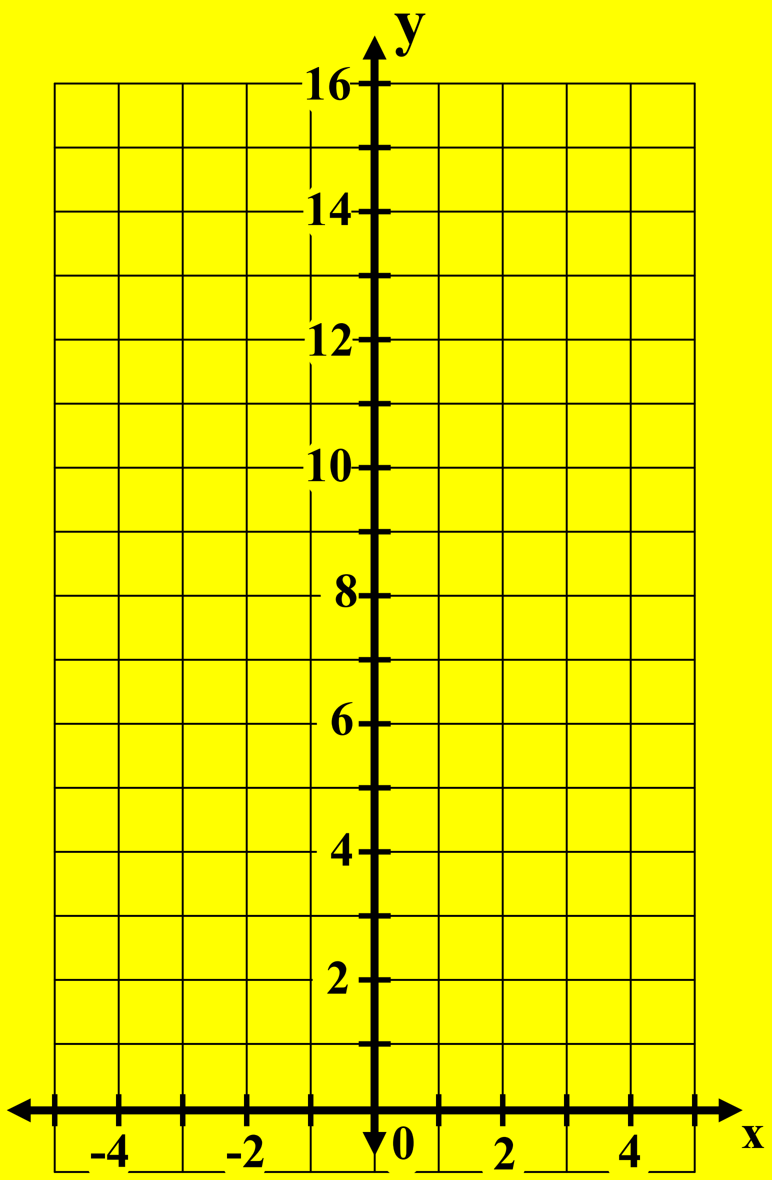
The Shape of a Parabola.

$$y = ax^2$$

$a = \frac{3}{2}$ ➡ $y = \frac{3}{2}x^2$

x	y
0	0
± 1	$\frac{3}{2}$
± 2	6
± 3	$\frac{27}{2}$
± 4	24
± 5	$\frac{75}{2}$

(1) Fill out the table.



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$$y = ax^2$$

$$a = \frac{3}{2} \quad \Rightarrow \quad y = \frac{3}{2}x^2$$

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± 1	$\frac{3}{2}$
± 2	6
± 3	$\frac{27}{2}$
± 4	24
± 5	$\frac{75}{2}$

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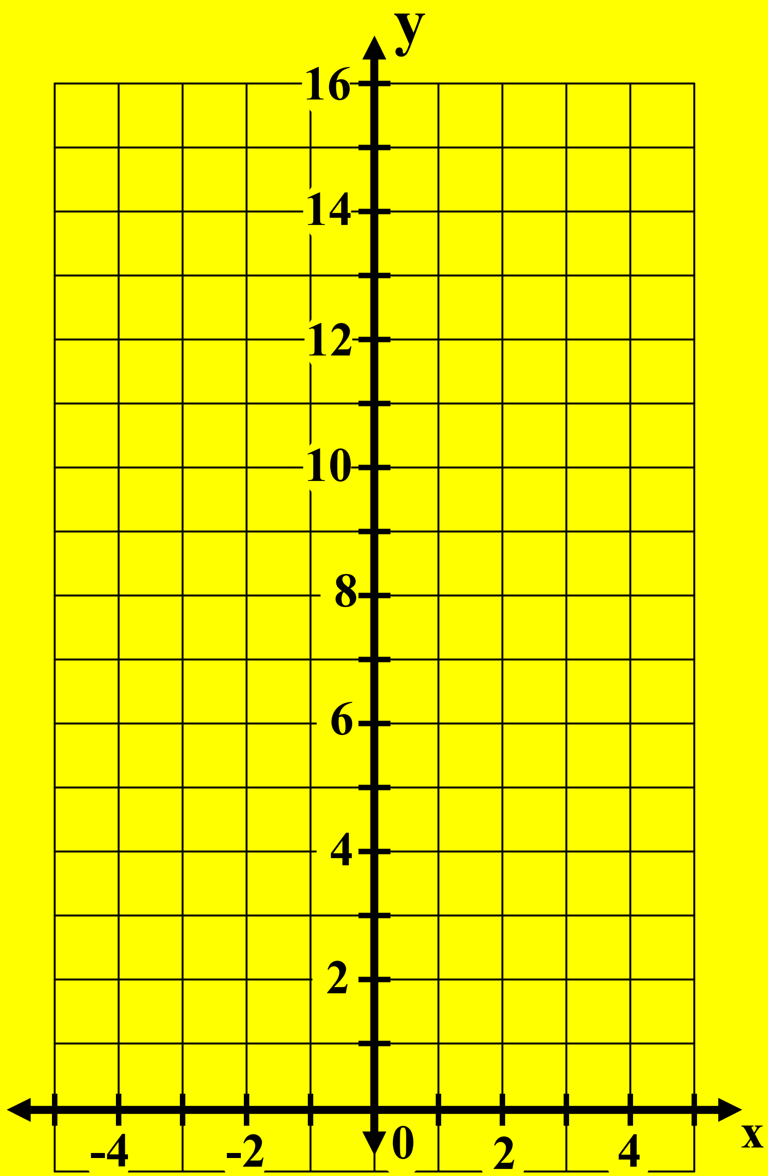


The Shape of a Parabola.

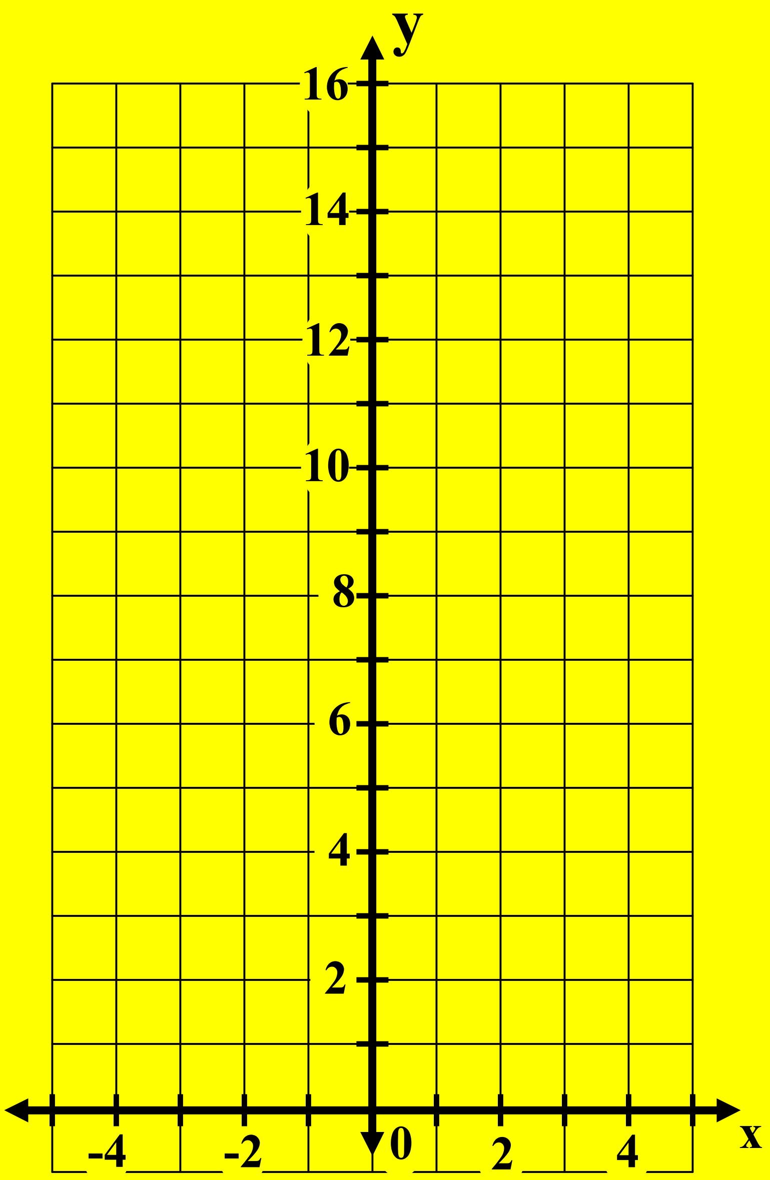
$$y = ax^2$$

$a = \frac{3}{2}$ ⇨ $y = \frac{3}{2}x^2$

x	y
0	0
± 1	$\frac{3}{2}$
± 2	6
± 3	$\frac{27}{2}$
± 4	24
± 5	$\frac{75}{2}$

(1) Fill out the table.

(2) Graph the points.



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± 4	24
± 5	$\frac{75}{2}$

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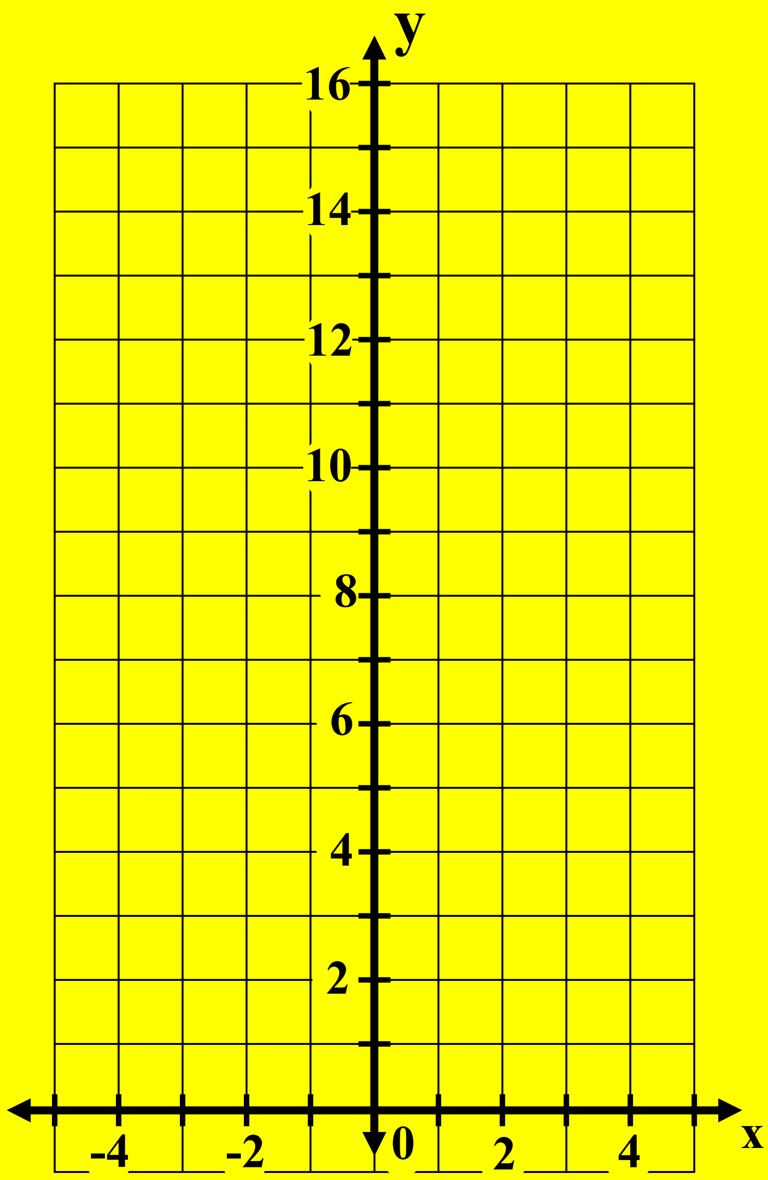

The Shape of a Parabola.

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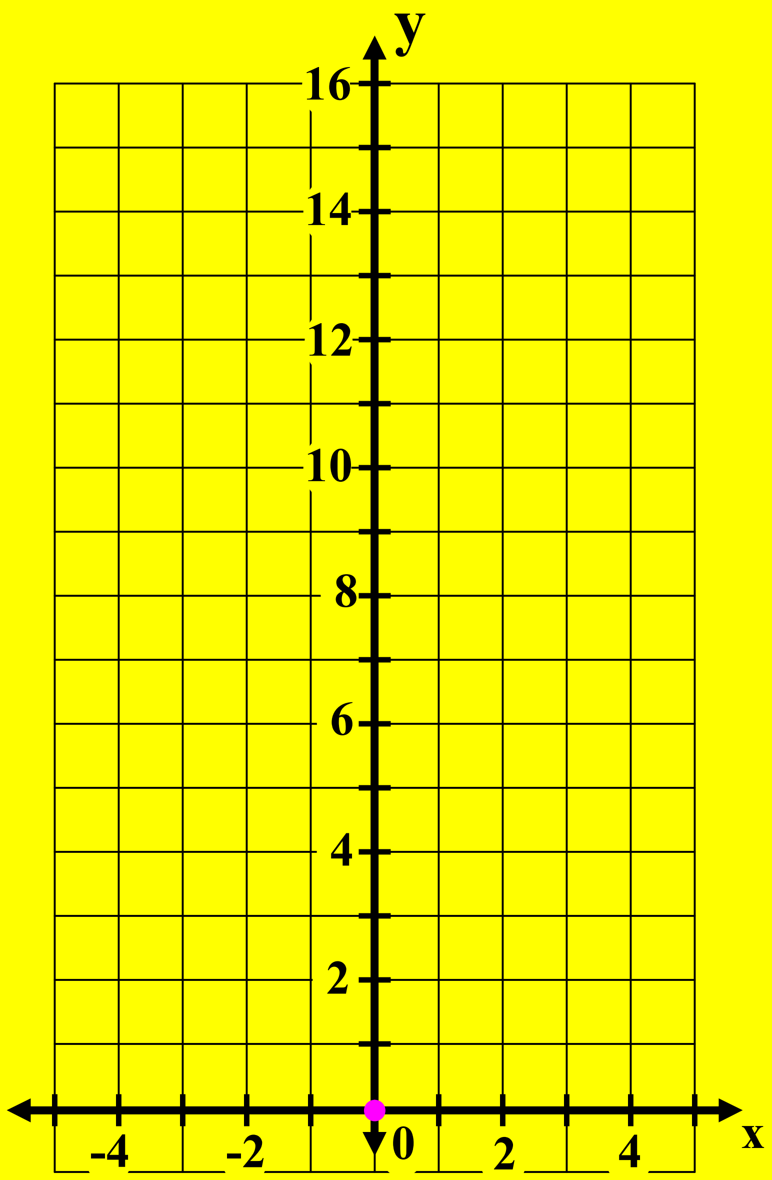

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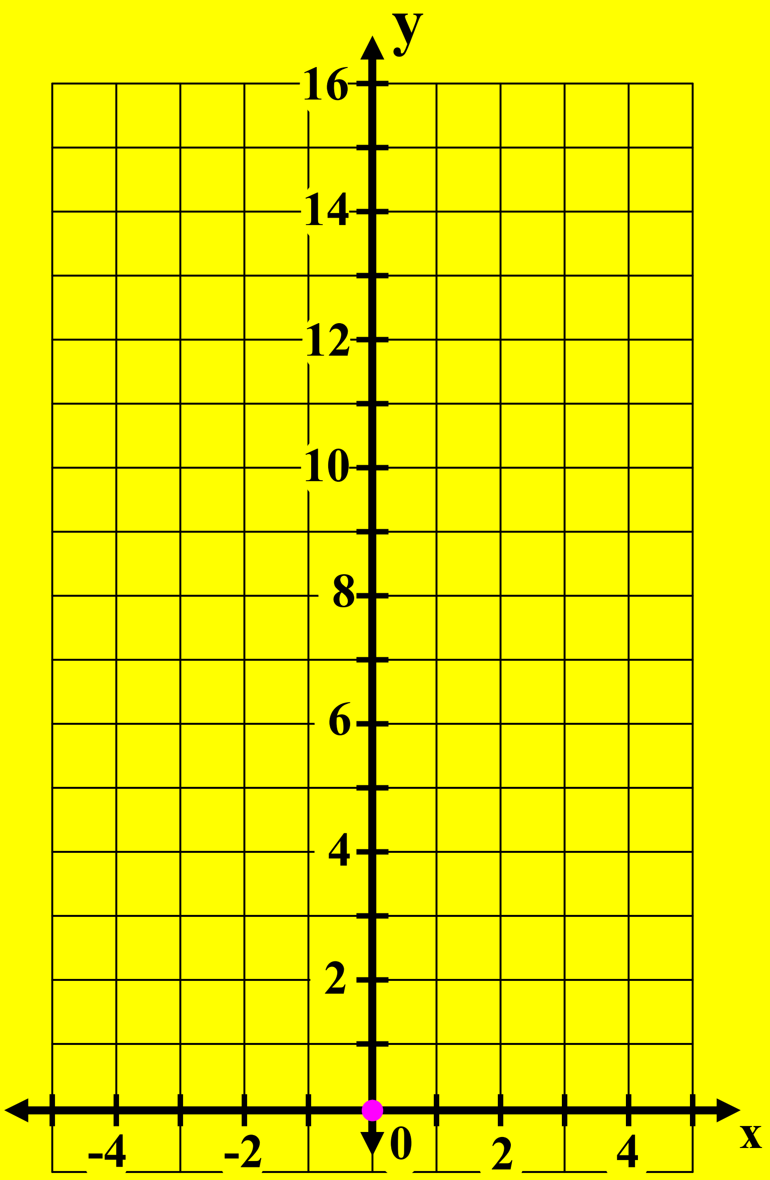

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± 3	$\frac{27}{2}$
± 4	24
± 5	$\frac{75}{2}$

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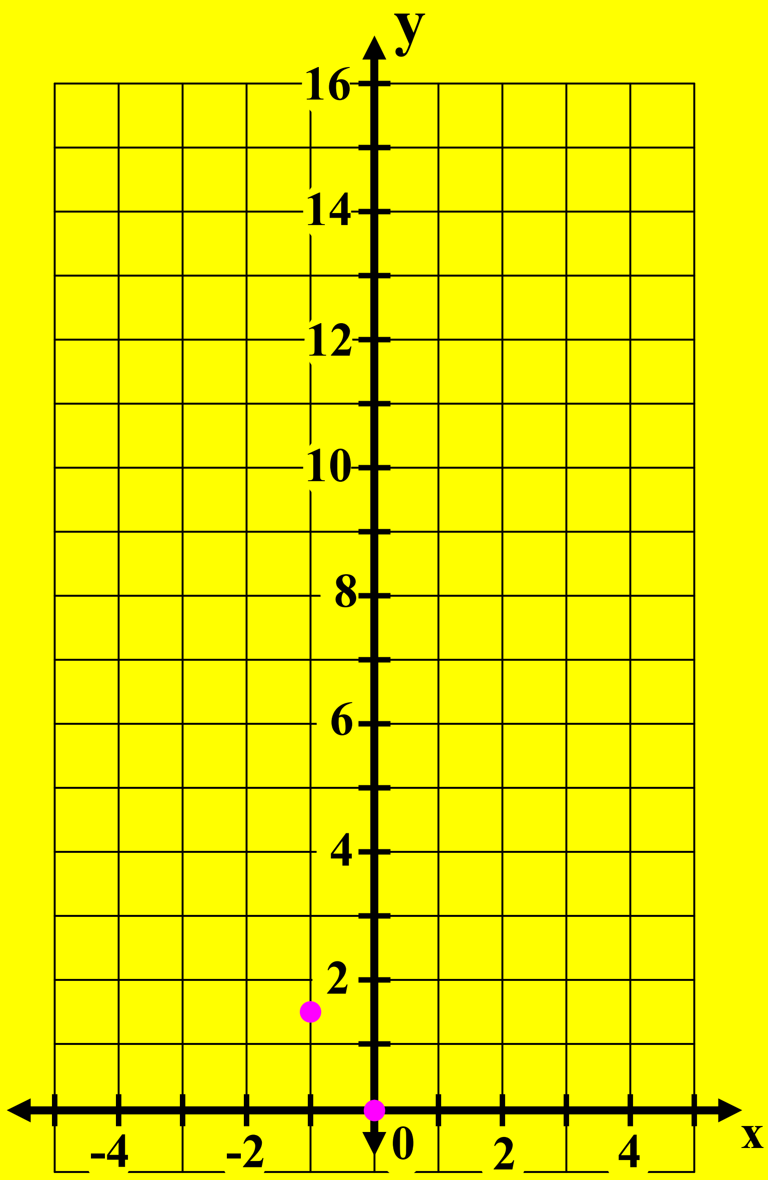


The Shape of a Parabola.

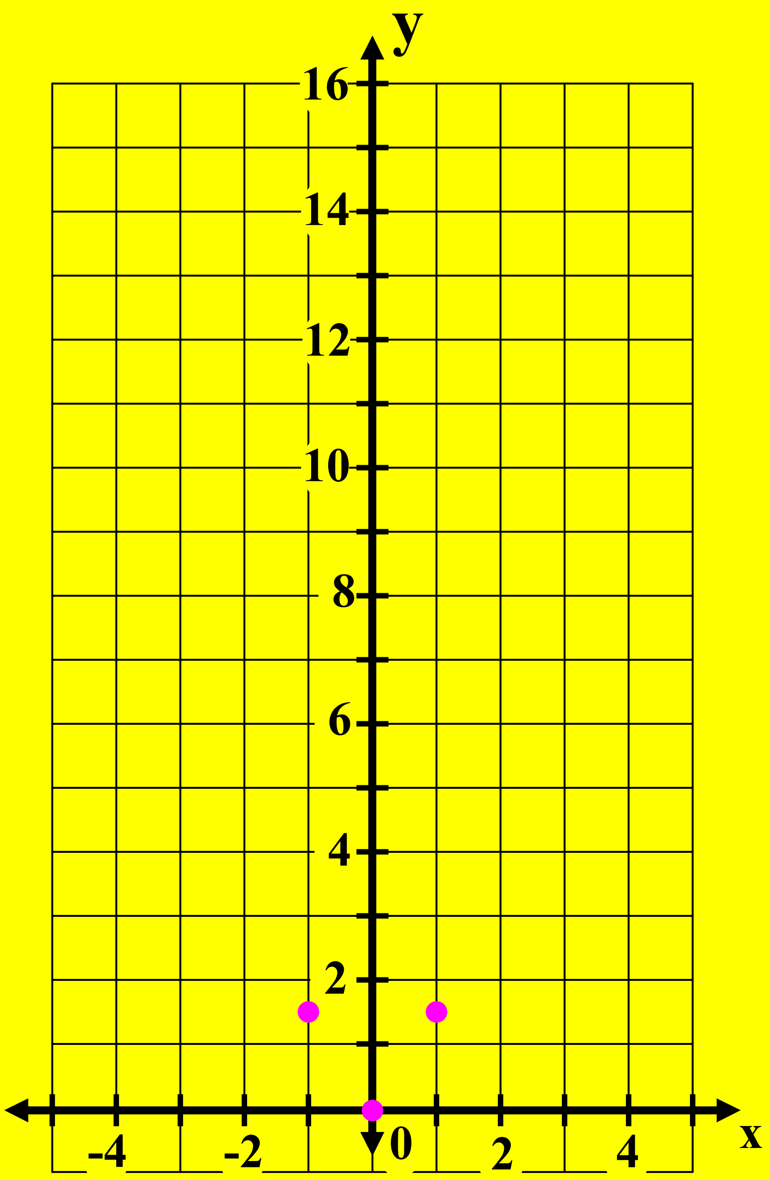
$$y = ax^2$$

$$a = \frac{3}{2} \Rightarrow y = \frac{3}{2}x^2$$

x	y
0	0
± 1	$\frac{3}{2}$
± 2	6
± 3	$\frac{27}{2}$
± 4	24
± 5	$\frac{75}{2}$

(1) Fill out the table.

(2) Graph the points.



The Shape of a Parabola.

$$y = ax^2$$

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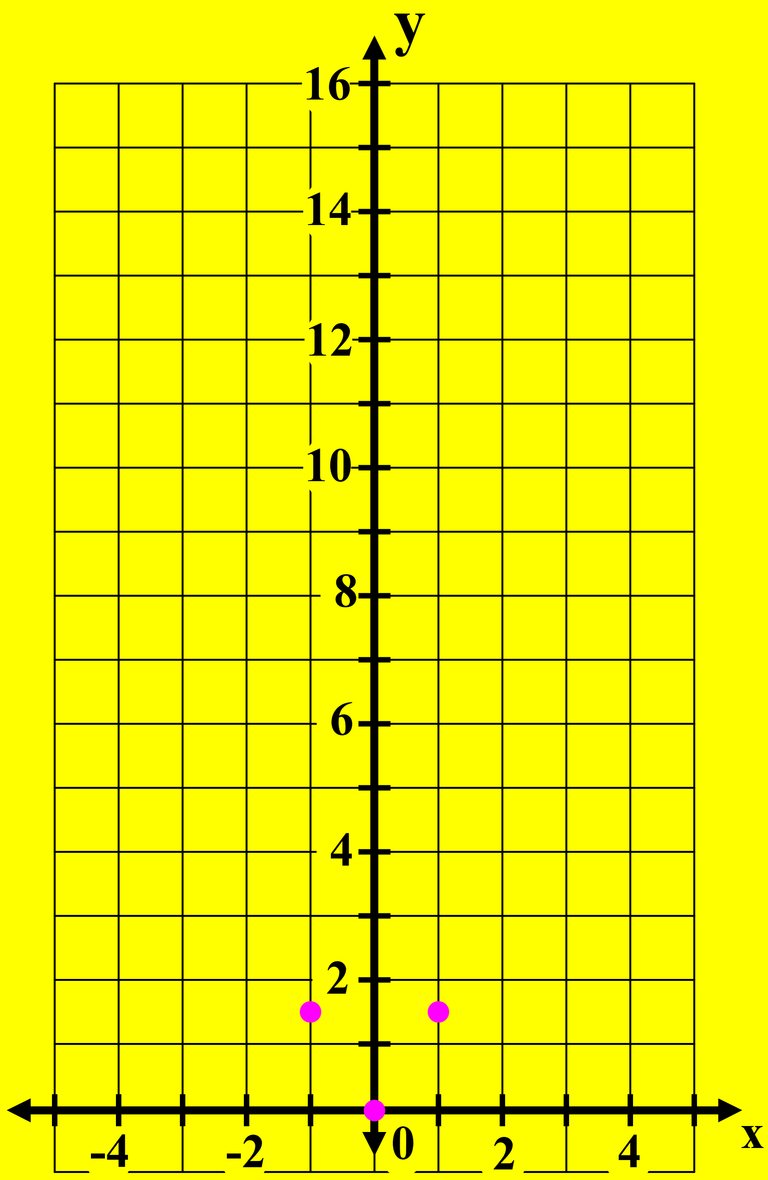
± 1	$\frac{3}{2}$
± 2	6
± 3	$\frac{27}{2}$
± 4	24
± 5	$\frac{75}{2}$

(1) Fill out the table.

(2) Graph the points.



The Shape of a Parabola.

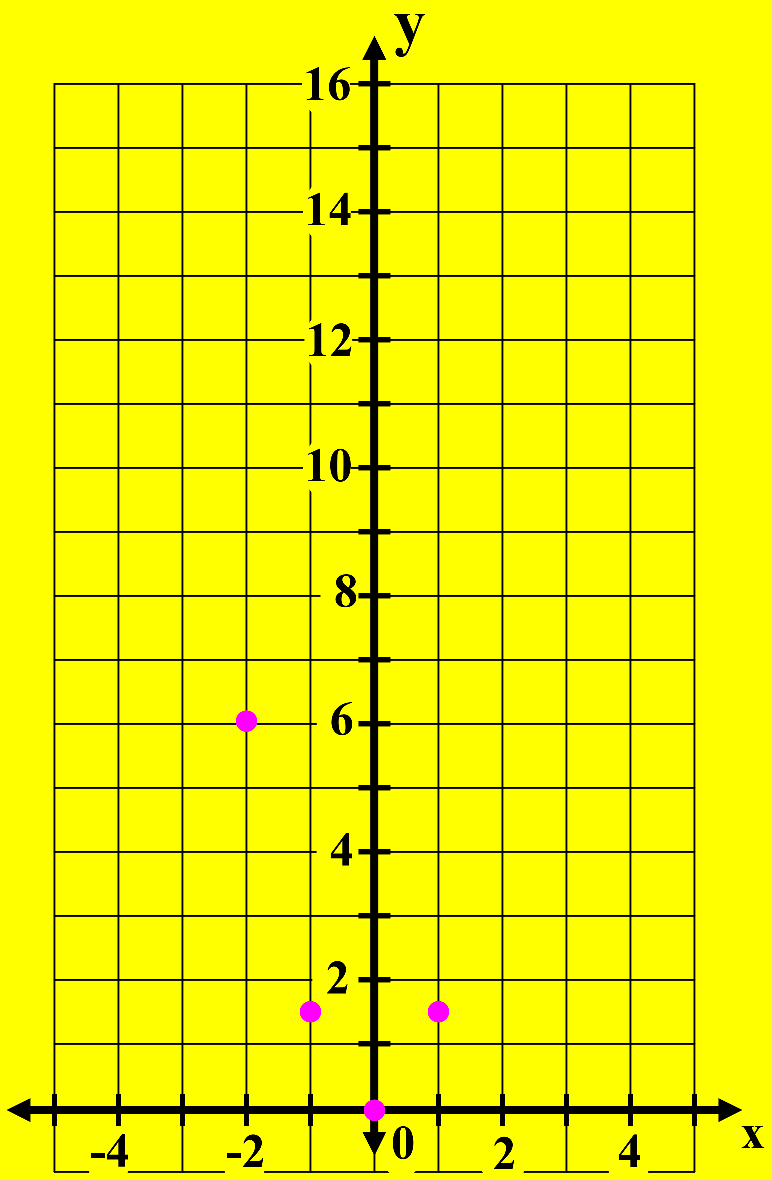
$$y = ax^2$$

$a = \frac{3}{2}$ → $y = \frac{3}{2}x^2$

x	y
0	0
± 1	$\frac{3}{2}$
± 2	6
± 3	$\frac{27}{2}$
± 4	24
± 5	$\frac{75}{2}$

(1) Fill out the table.

(2) Graph the points.



The Shape of a Parabola.

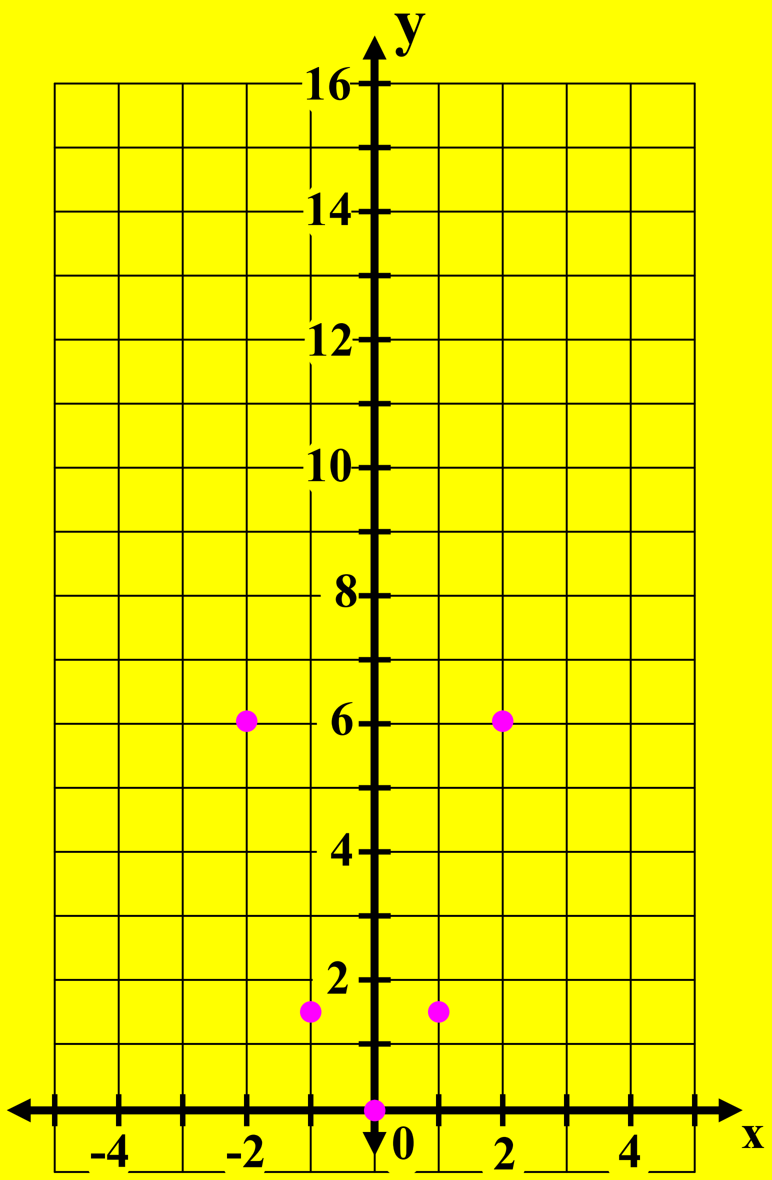
$$y = ax^2$$

$a = \frac{3}{2}$ → $y = \frac{3}{2}x^2$

x	y
0	0
± 1	$\frac{3}{2}$
± 2	6
± 3	$\frac{27}{2}$
± 4	24
± 5	$\frac{75}{2}$

(1) Fill out the table.

(2) Graph the points.



The Shape of a Parabola.

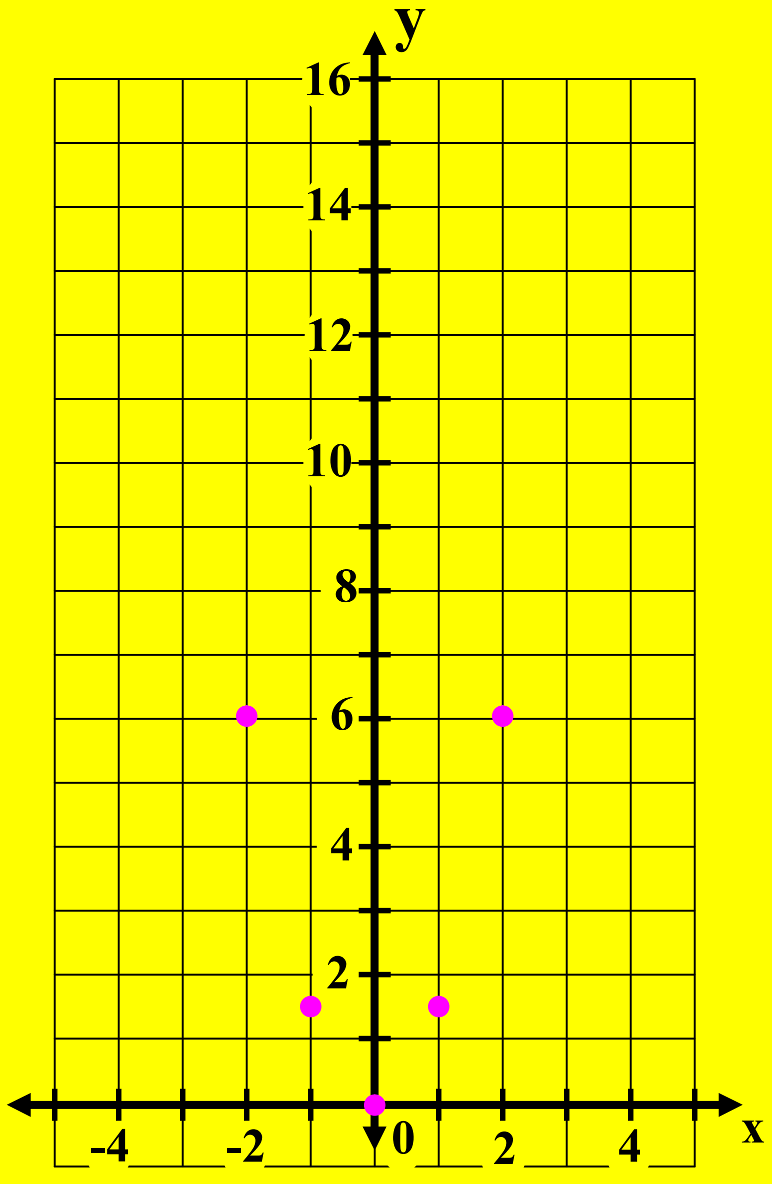
$$y = ax^2$$

$$a = \frac{3}{2} \Rightarrow y = \frac{3}{2}x^2$$

x	y
0	0
± 1	$\frac{3}{2}$
± 2	6
± 3	$\frac{27}{2}$
± 4	24
± 5	$\frac{75}{2}$

(1) Fill out the table.

(2) Graph the points.



The Shape of a Parabola.

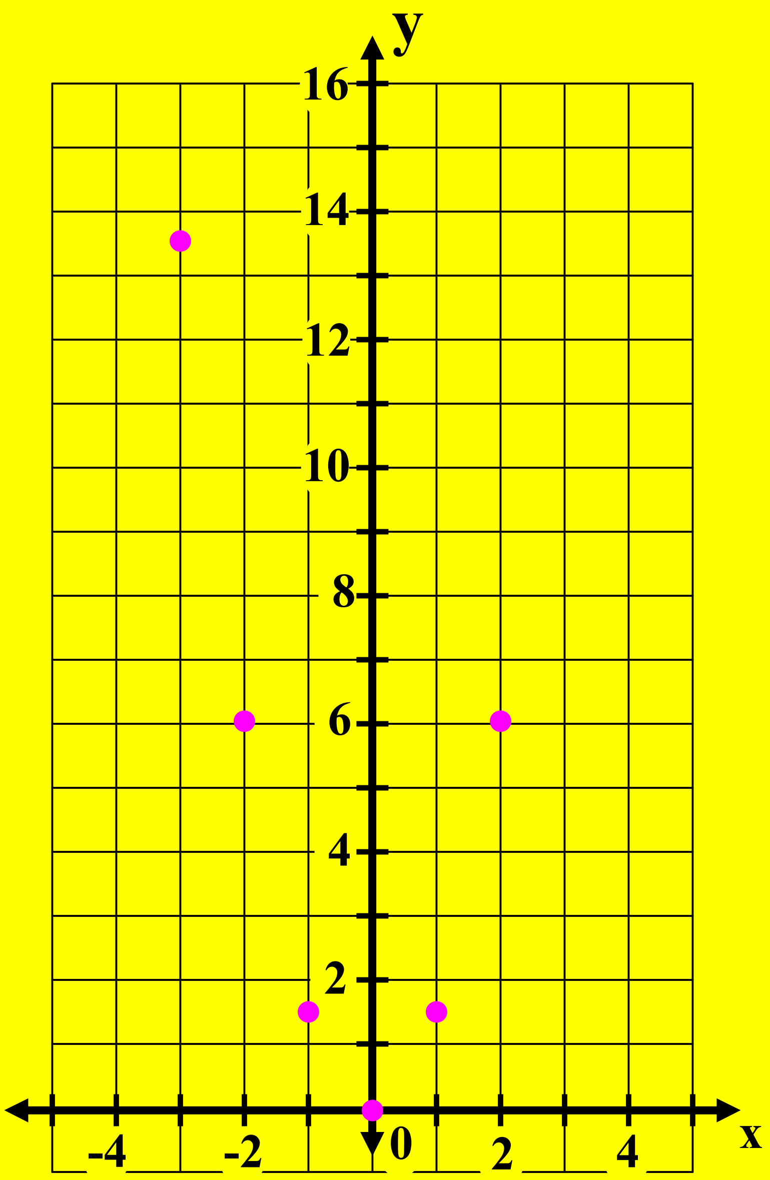
$$y = ax^2$$

$$a = \frac{3}{2} \Rightarrow y = \frac{3}{2}x^2$$

x	y
0	0
± 1	$\frac{3}{2}$
± 2	6
± 3	$\frac{27}{2}$
± 4	24
± 5	$\frac{75}{2}$

(1) Fill out the table.

(2) Graph the points.



The Shape of a Parabola.

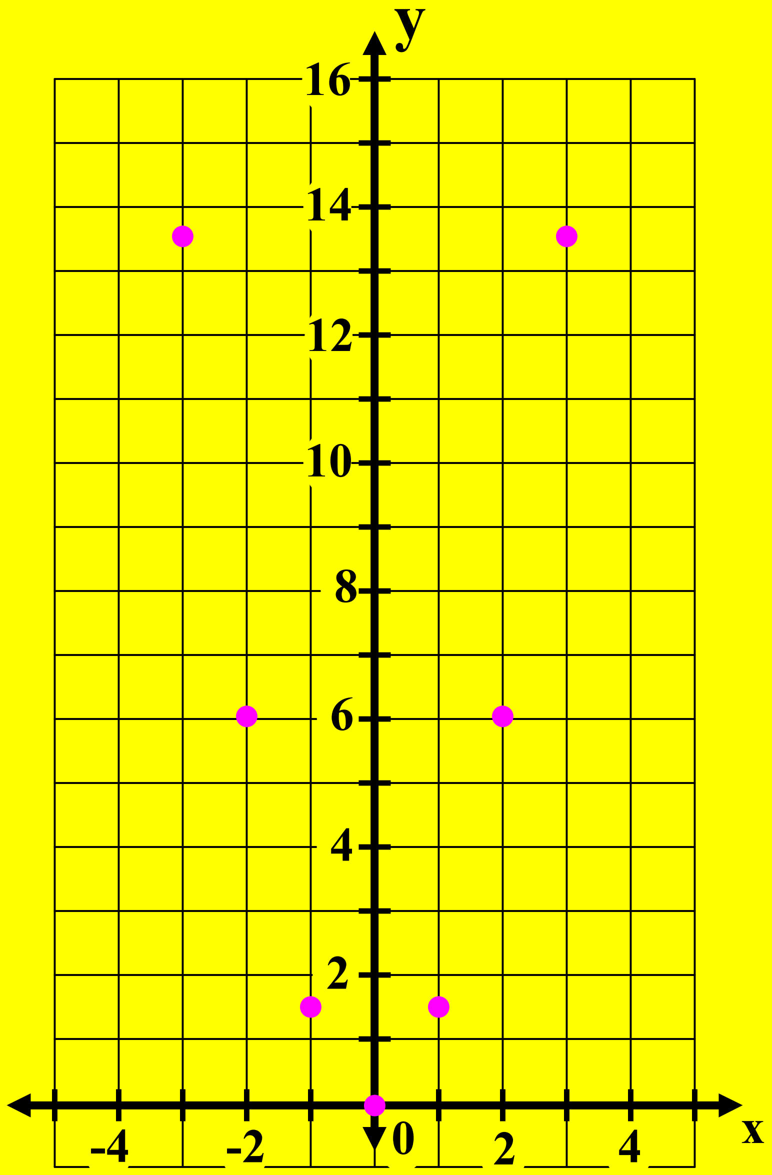
$$y = ax^2$$

$$a = \frac{3}{2} \quad \Rightarrow \quad y = \frac{3}{2}x^2$$

x	y
0	0
± 1	$\frac{3}{2}$
± 2	6
± 3	$\frac{27}{2}$
± 4	24
± 5	$\frac{75}{2}$

(1) Fill out the table.

(2) Graph the points.



The Shape of a Parabola.

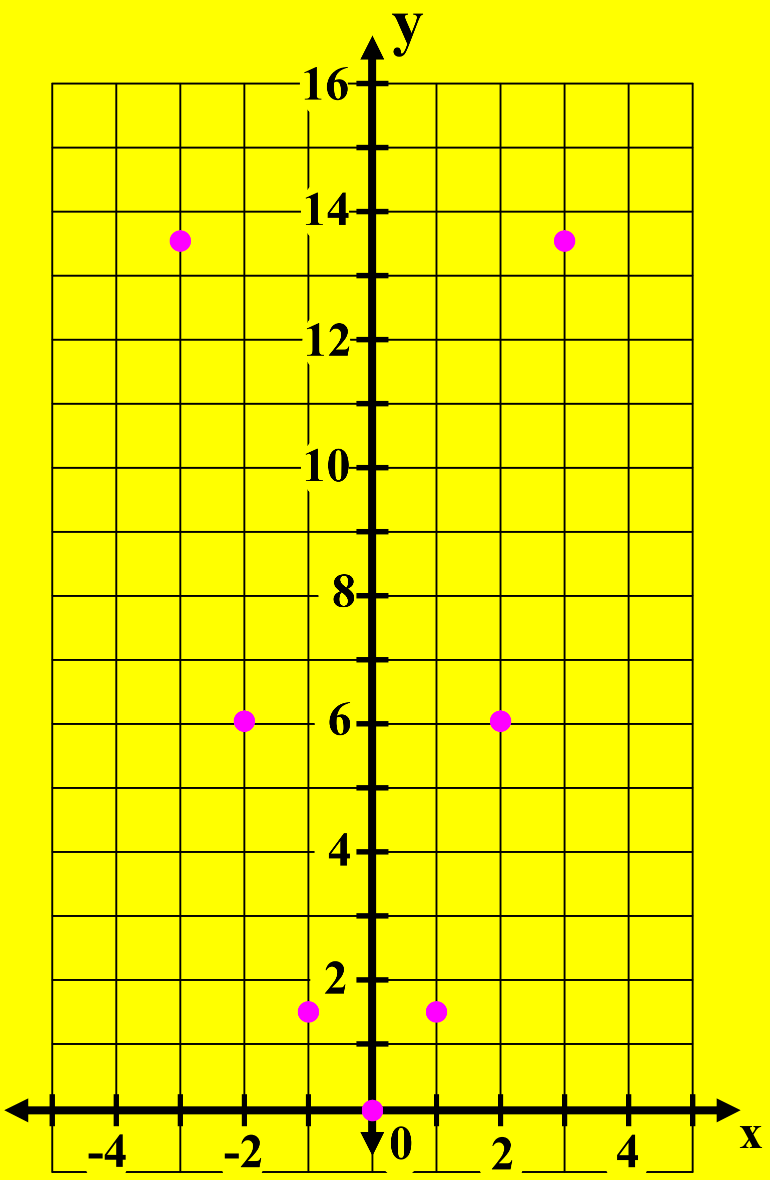
$$y = ax^2$$

$a = \frac{3}{2}$ ⇨ $y = \frac{3}{2}x^2$

x	y
0	0
± 1	$\frac{3}{2}$
± 2	6
± 3	$\frac{27}{2}$
± 4	24
± 5	$\frac{75}{2}$

(1) Fill out the table.

(2) Graph the points.



The Shape of a Parabola.

$$y = ax^2$$

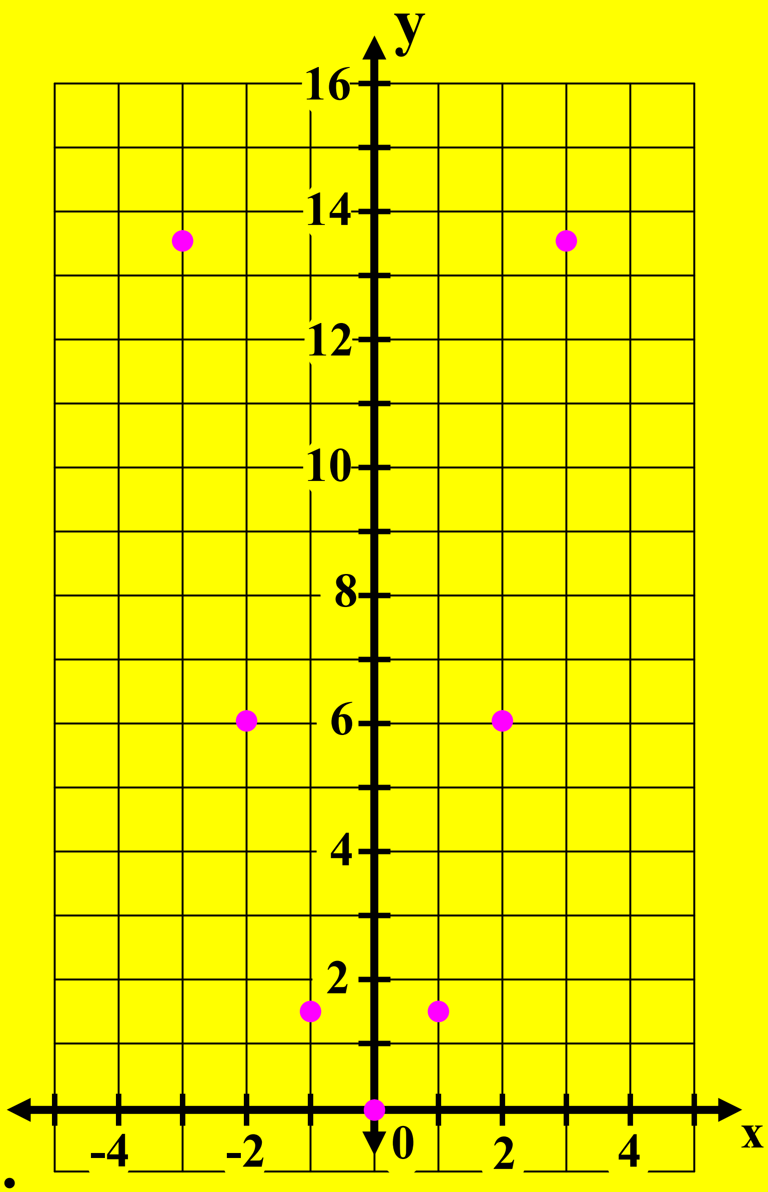
$$a = \frac{3}{2} \Rightarrow y = \frac{3}{2}x^2$$

x	y
0	0
± 1	$\frac{3}{2}$
± 2	6
± 3	$\frac{27}{2}$
± 4	24
± 5	$\frac{75}{2}$

(1) Fill out the table.

(2) Graph the points.

These points are beyond the graph.



The Shape of a Parabola.

$$y = ax^2$$

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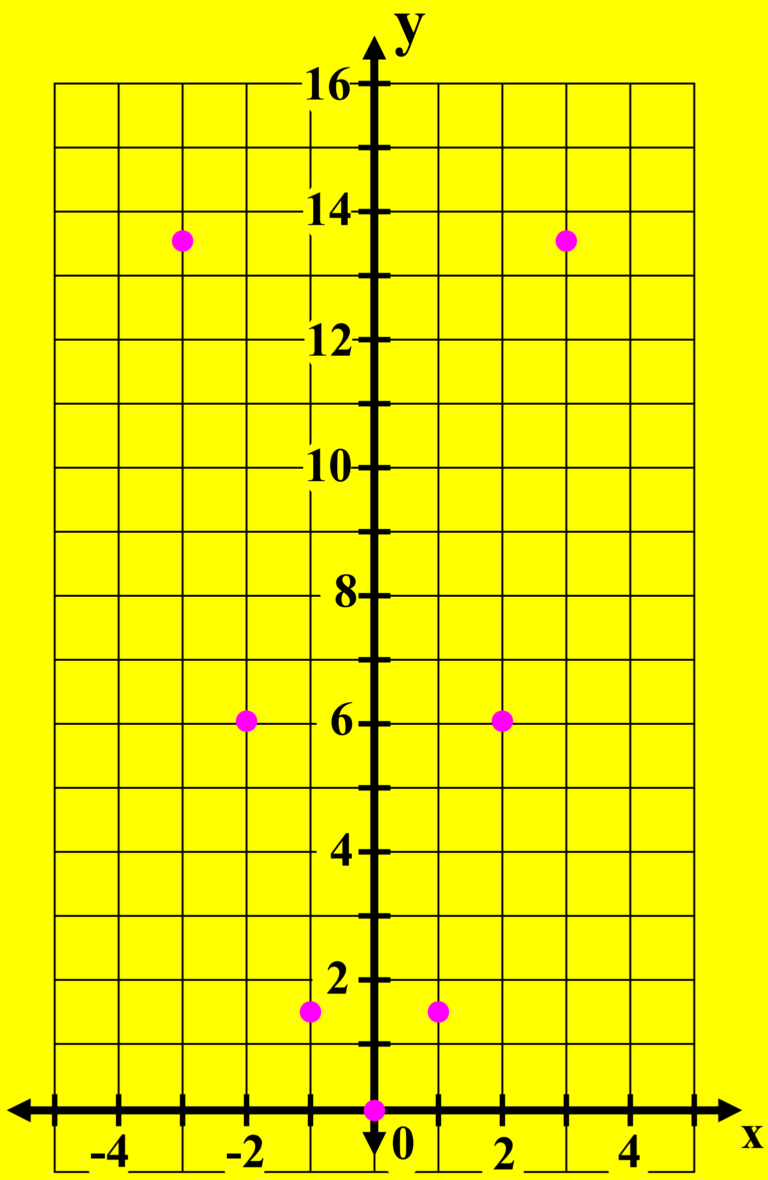
± 2	6
± 3	$\frac{27}{2}$
± 4	24
± 5	$\frac{75}{2}$

(1) Fill out the table.

(2) Graph the points.



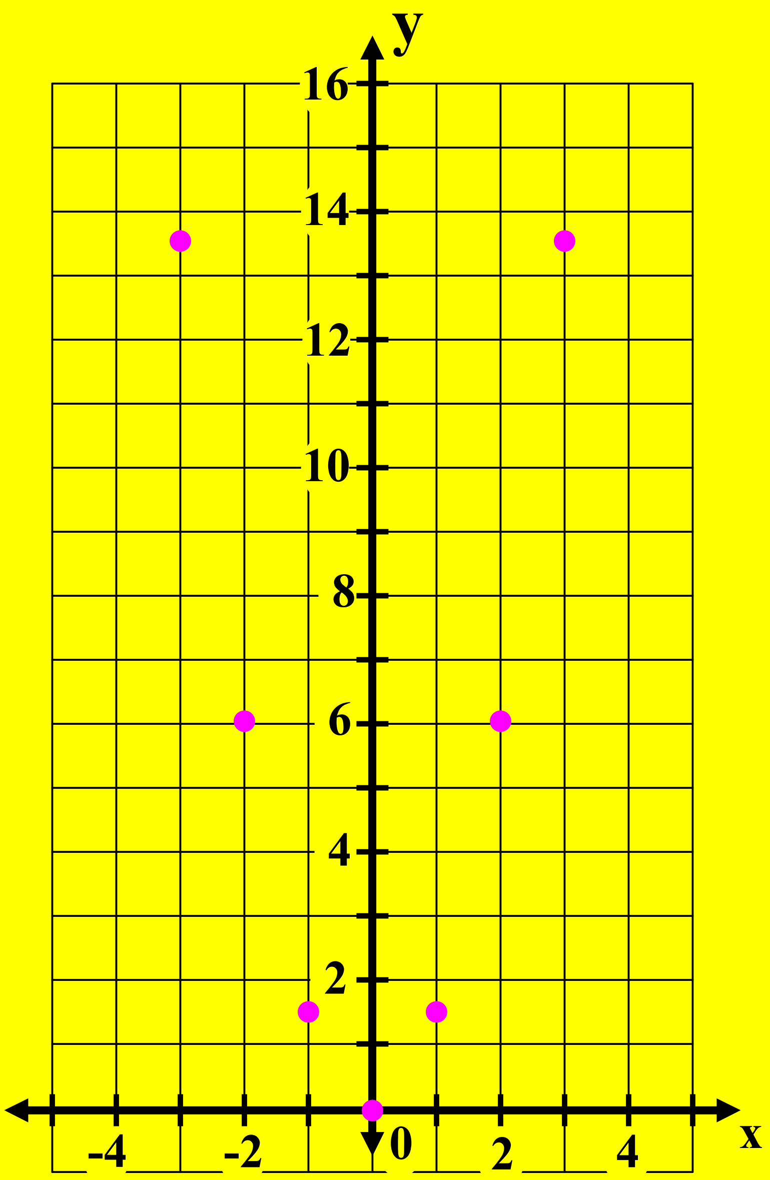
The Shape of a Parabola.

$$y = ax^2$$

$$a = \frac{3}{2} \Rightarrow y = \frac{3}{2}x^2$$

x	y
0	0
± 1	$\frac{3}{2}$
± 2	6
± 3	$\frac{27}{2}$
± 4	24
± 5	$\frac{75}{2}$

(1) Fill out the table.
(2) Graph the points.
(3) Complete the graph.



The Shape of a Parabola.

$$y = ax^2$$

$a = \frac{3}{2}$ ⇨ $y = \frac{3}{2}x^2$

x	y
0	0
± 1	$\frac{3}{2}$
± 2	6
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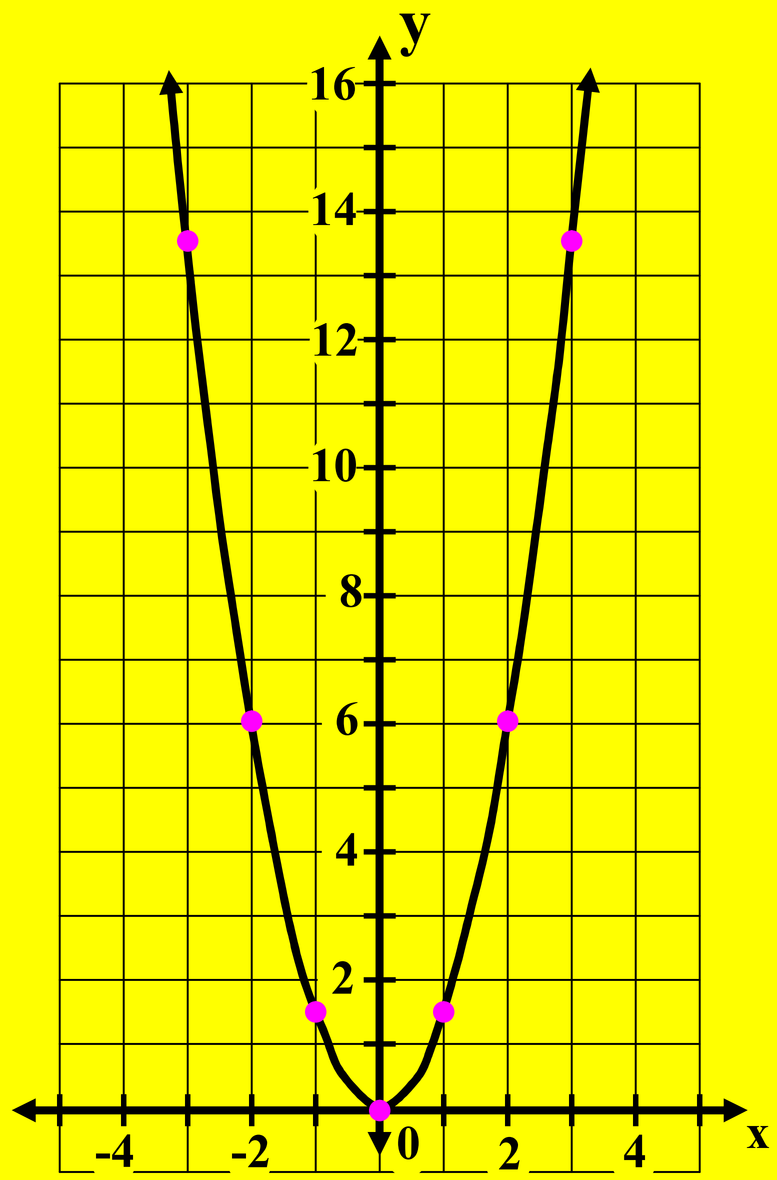
(1) Fill out the table.
(2) Graph the points.
(3) Complete the graph.



The Shape of a Parabola.

$$y = ax^2$$

$a = \frac{3}{2}$ ➡ $y = \frac{3}{2}x^2$

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± 1	$\frac{3}{2}$
± 2	6
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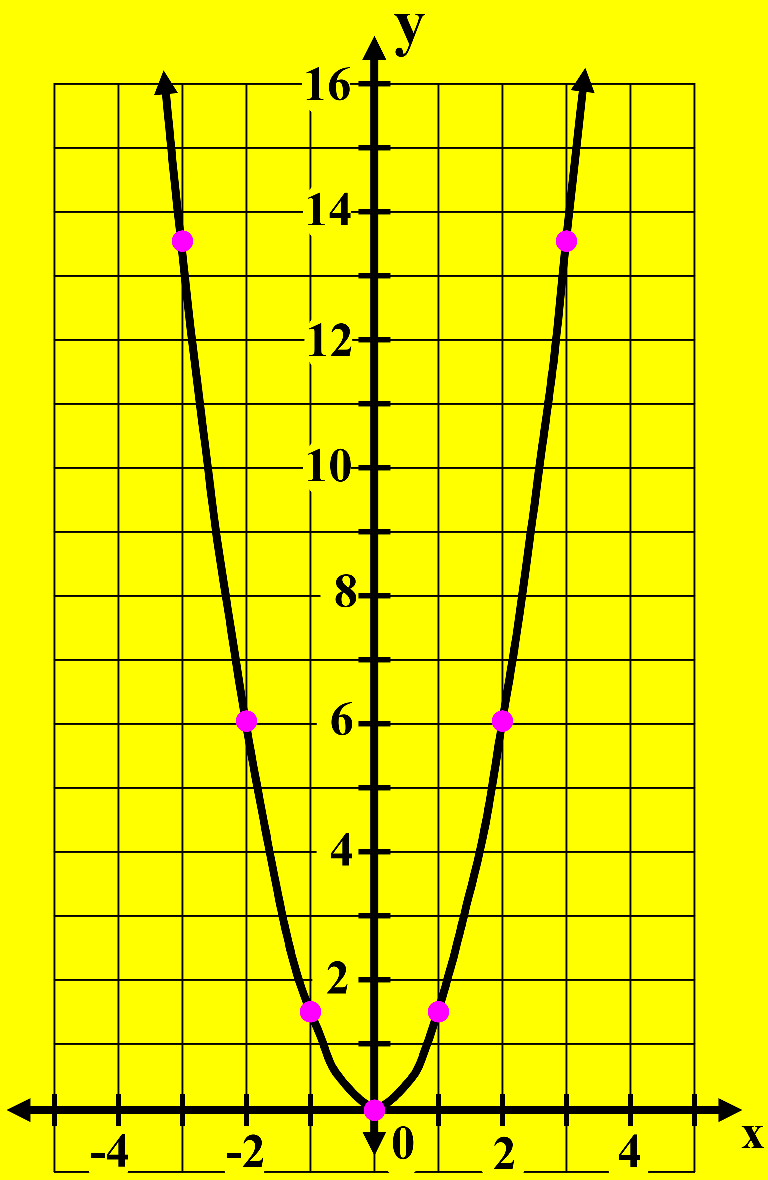

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± 1	$\frac{3}{2}$
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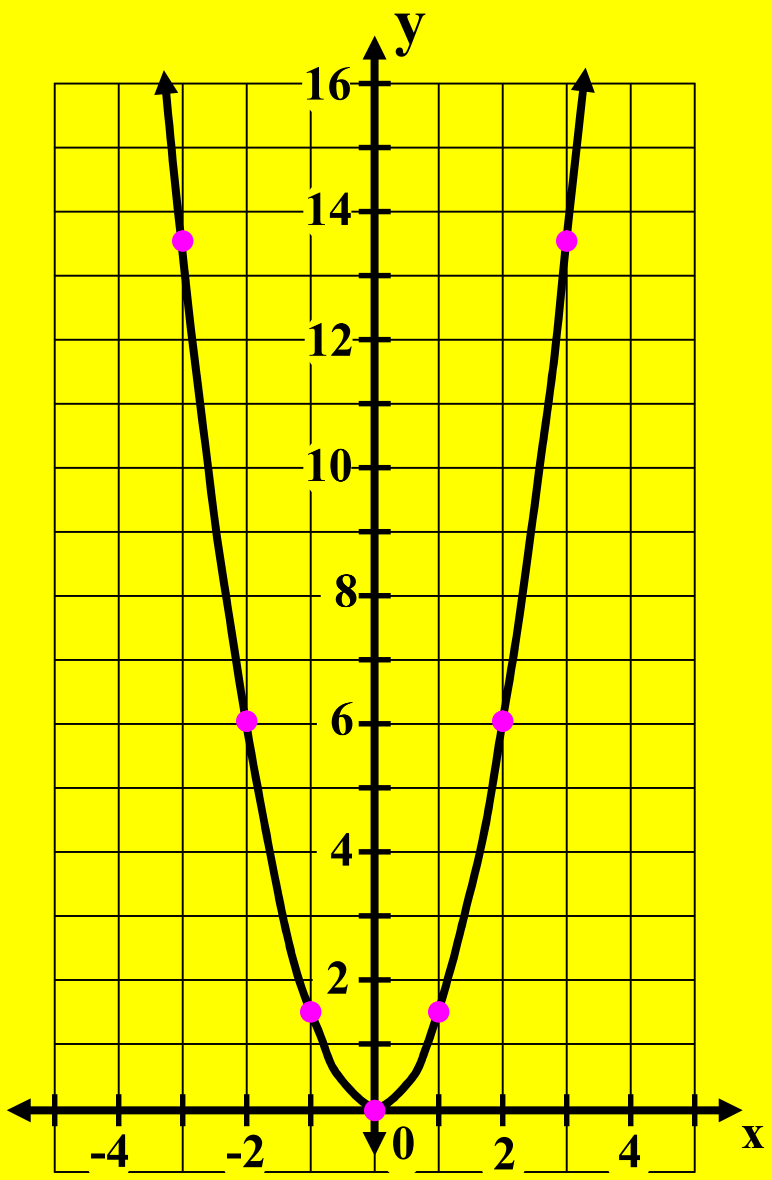
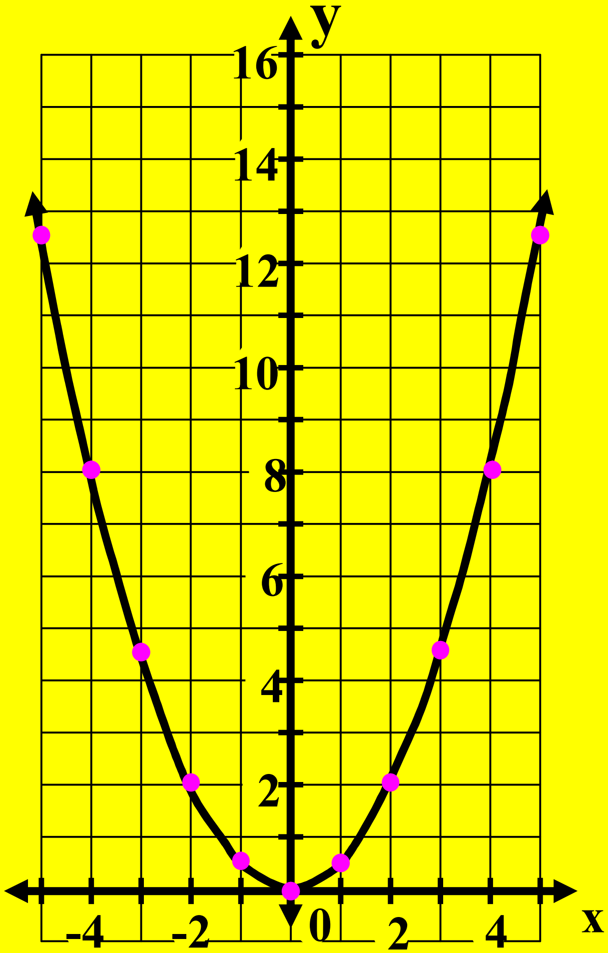
± 4	24
± 5	$\frac{75}{2}$



Now, we will compare the three graphs we have completed.

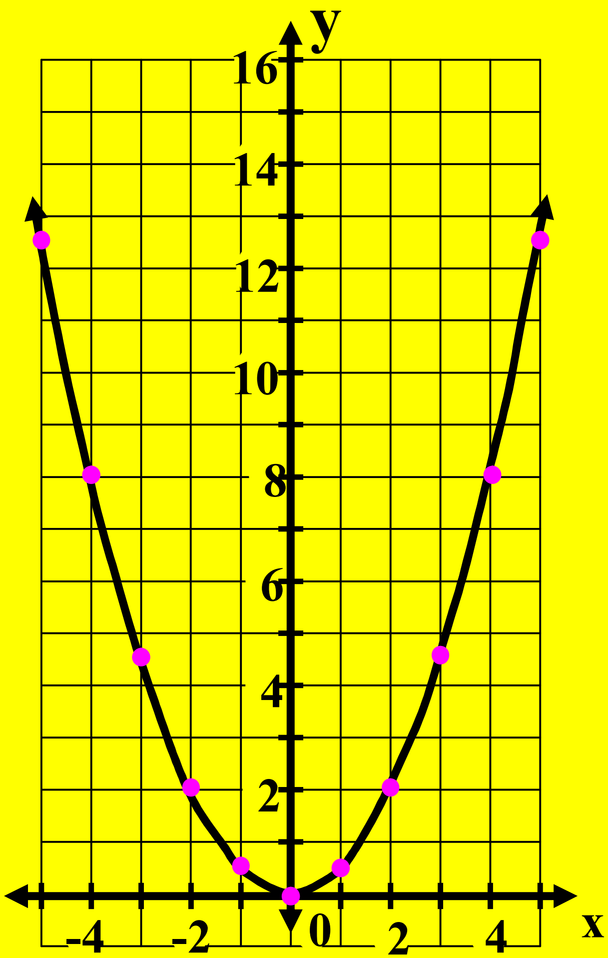
The Shape of a Parabola.



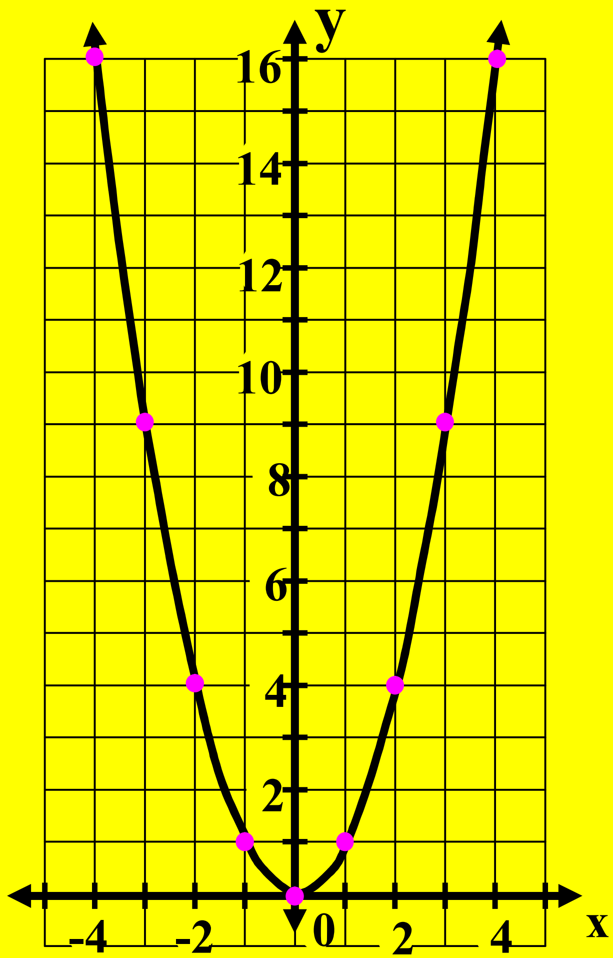
$$y = \frac{1}{2}x^2$$

Now, we will compare the three graphs we have completed.

The Shape of a Parabola.



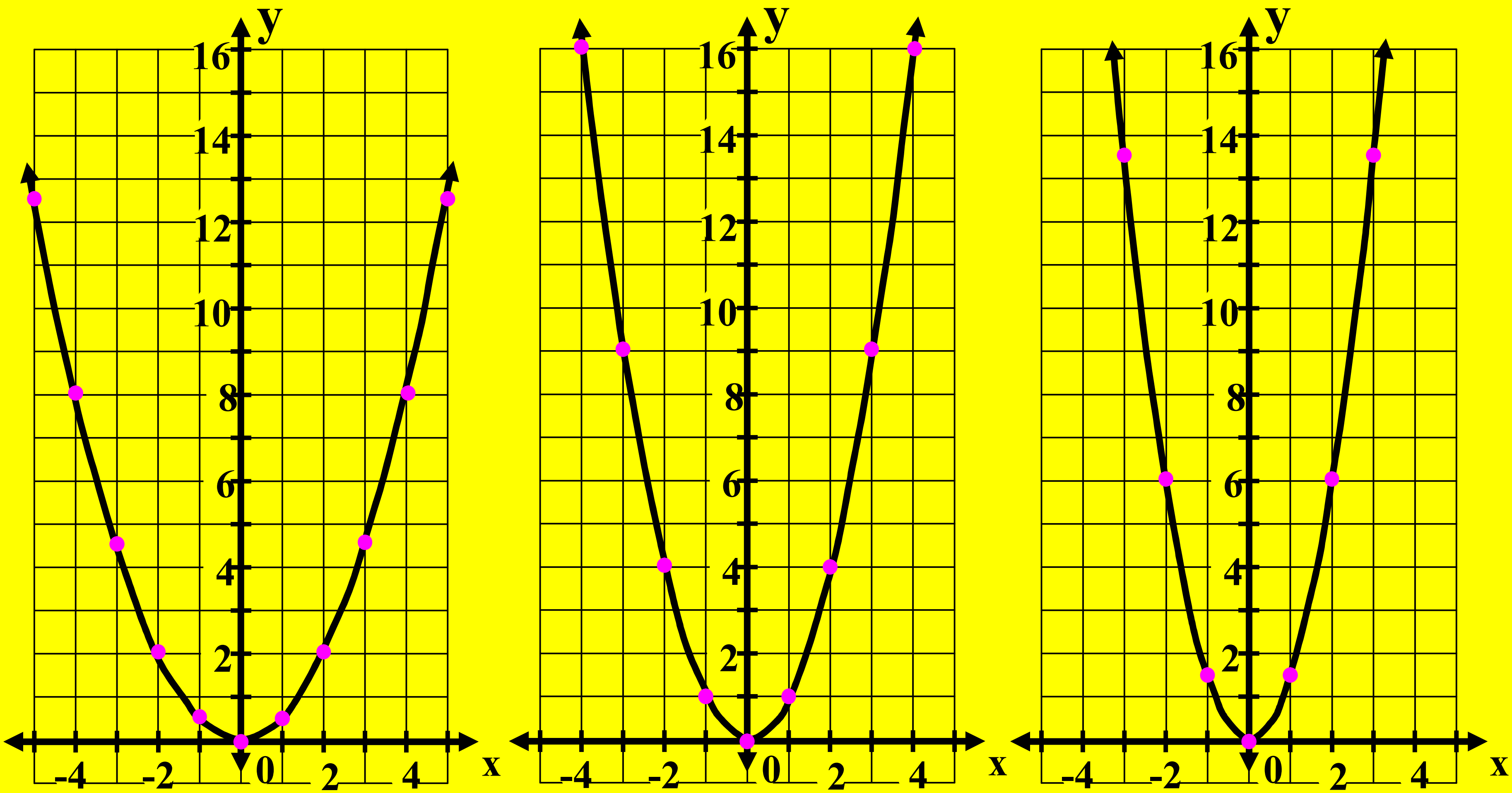
$y = \frac{1}{2}x^2$



$y = 1x^2$

Now, we will compare the three graphs we have completed.

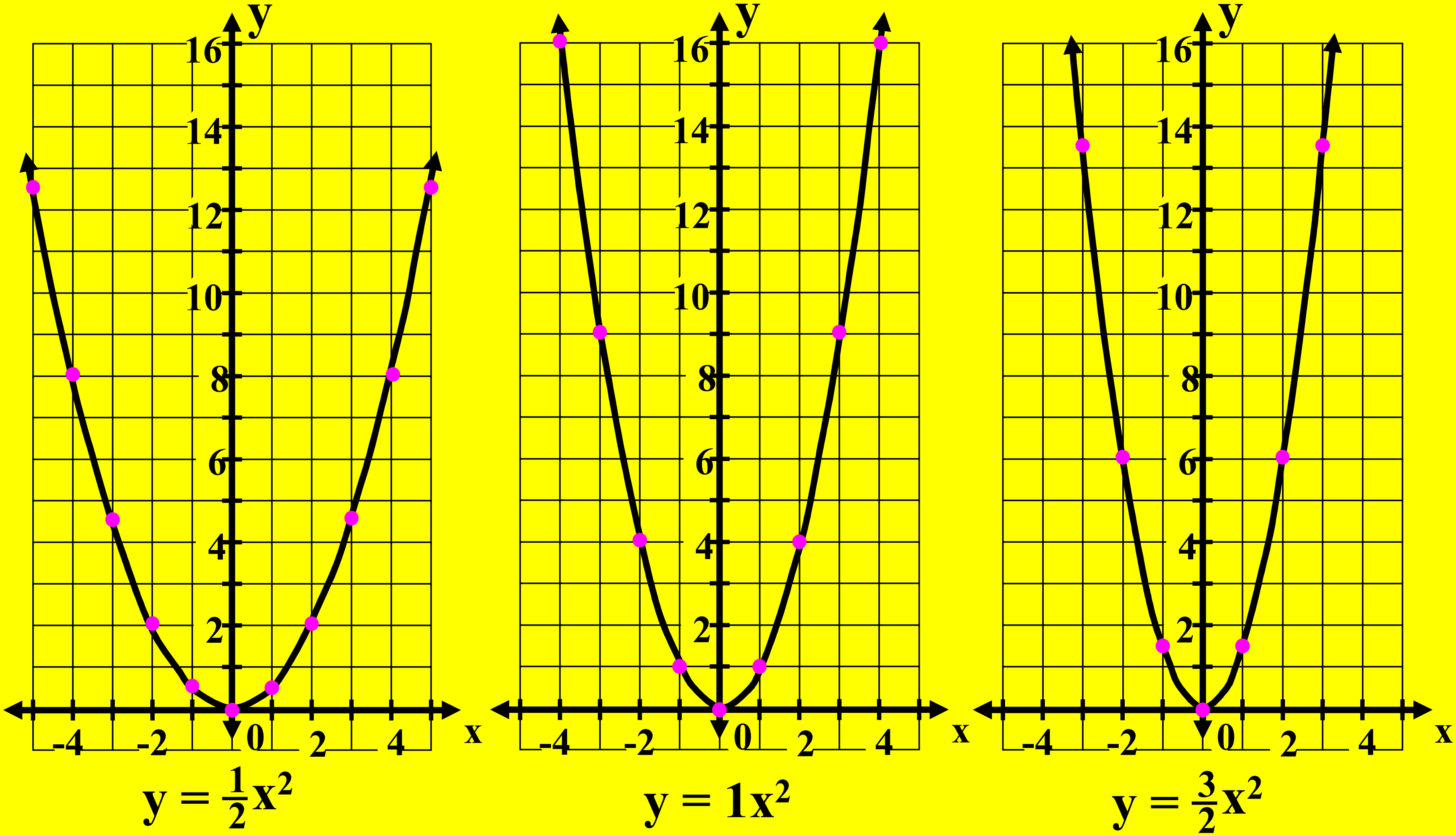
The Shape of a Parabola.



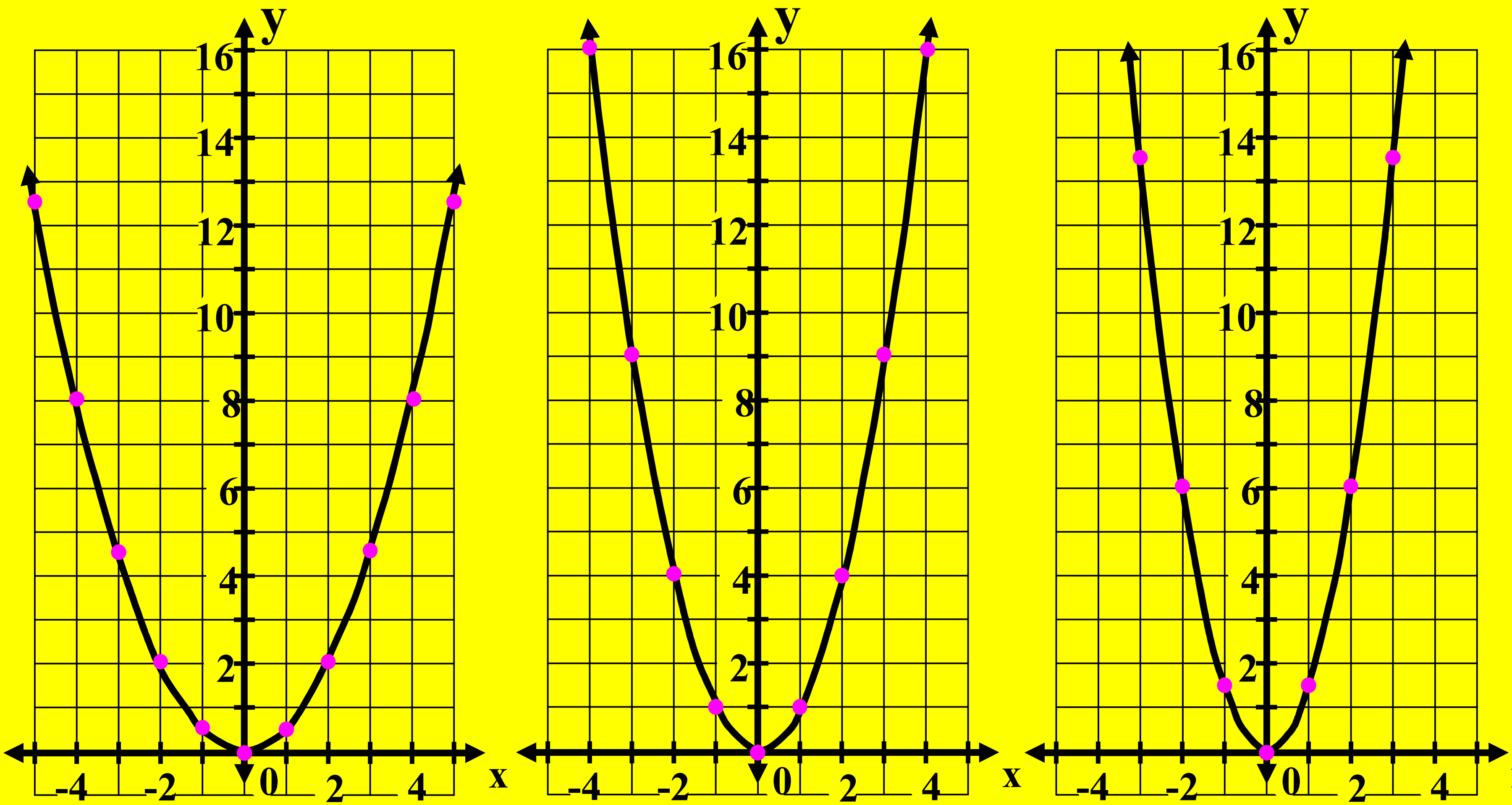
$y = \frac{1}{2}x^2$ $y = 1x^2$ $y = \frac{3}{2}x^2$

Now, we will compare the three graphs we have completed.

The Shape of a Parabola.



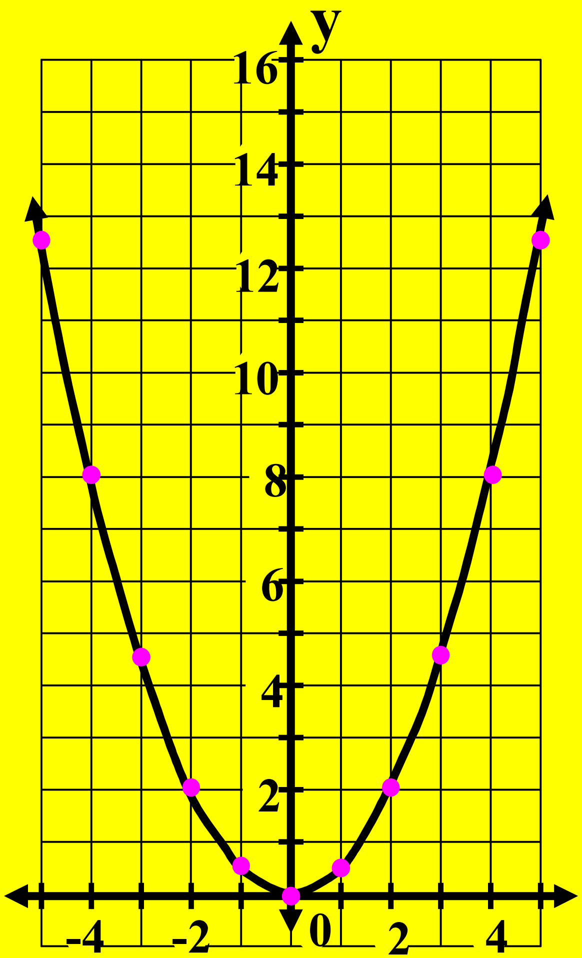
The Shape of a Parabola.



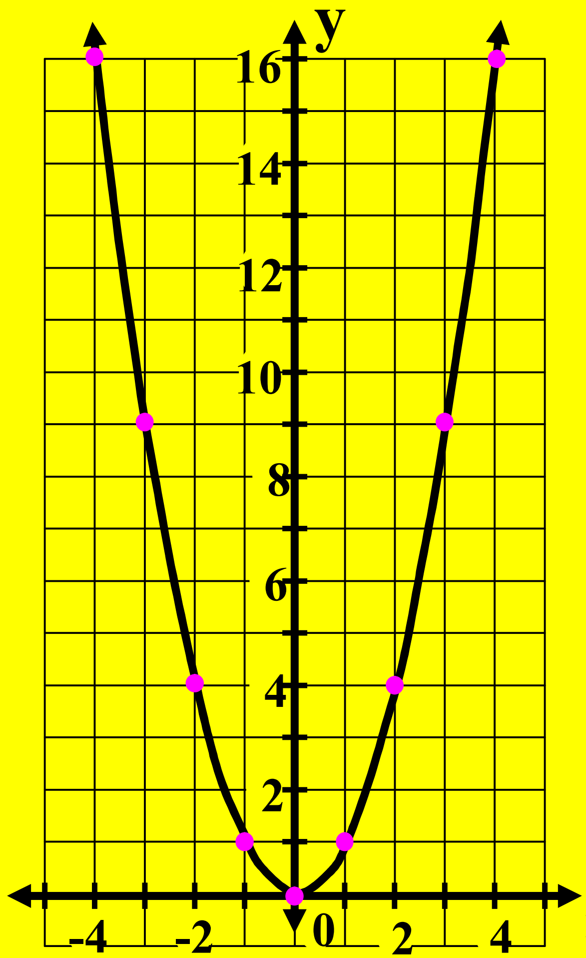
$y = \frac{1}{2}x^2$ $\qquad$ $y = 1x^2$ $\qquad$ $y = \frac{3}{2}x^2$

Each of these graphs deal with equations of the form $y = ax^2$.

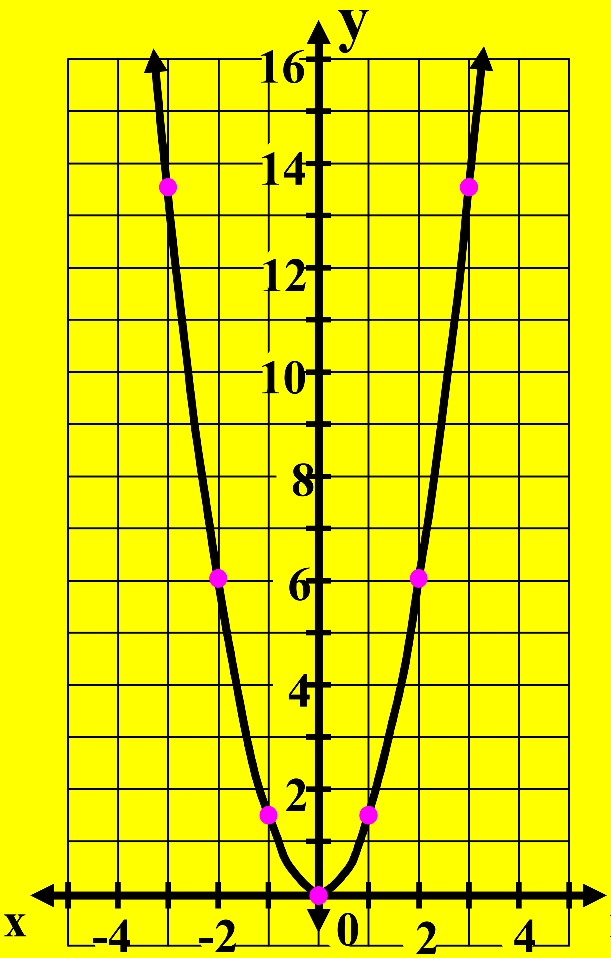
The Shape of a Parabola.



$y = \frac{1}{2}x^2$



$y = 1x^2$

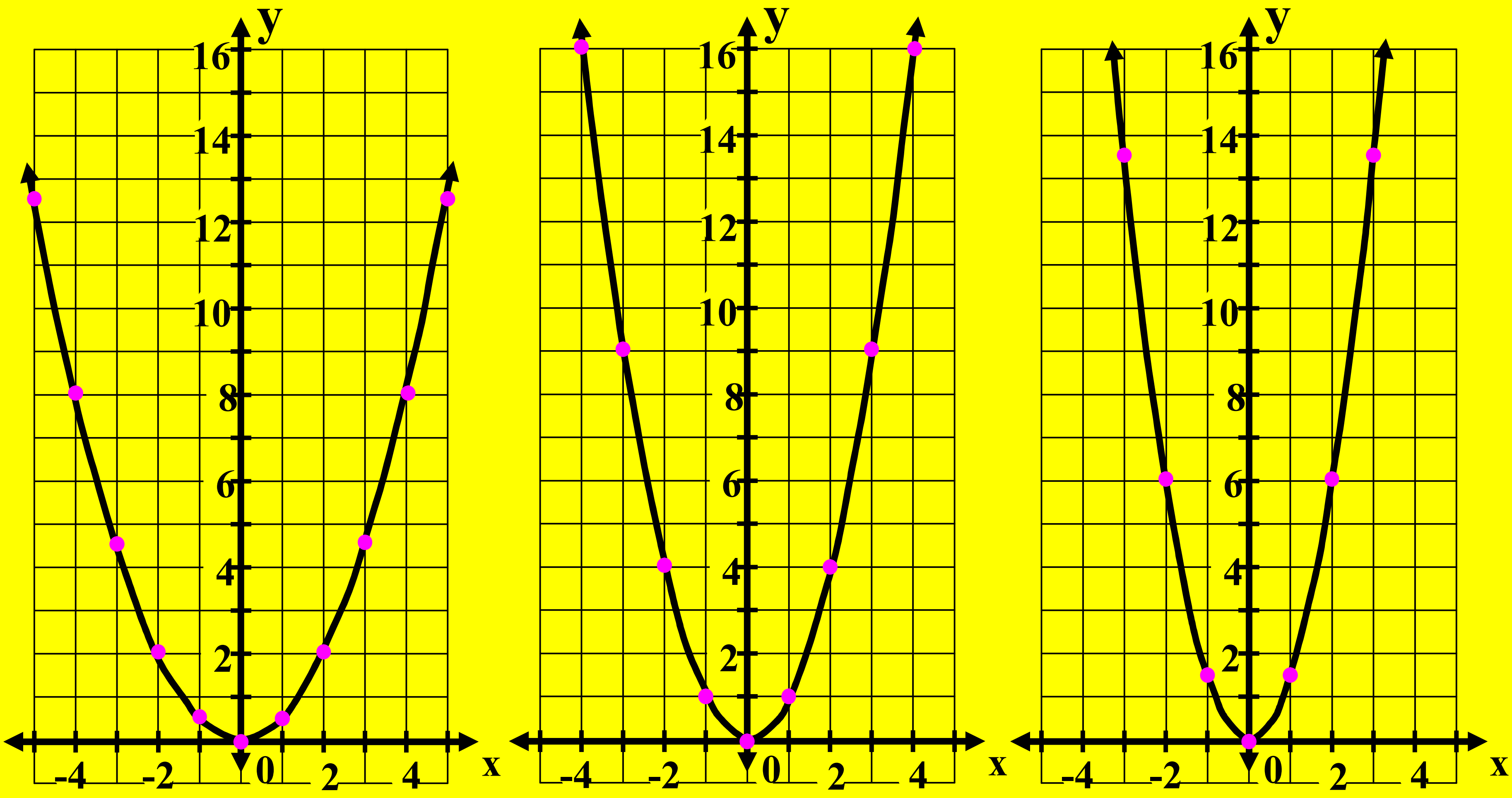


$y = \frac{3}{2}x^2$

Each of these graphs deal with equations of the form $y = ax^2$.

As the value of <u>a</u> increases, the parabola gets narrower.

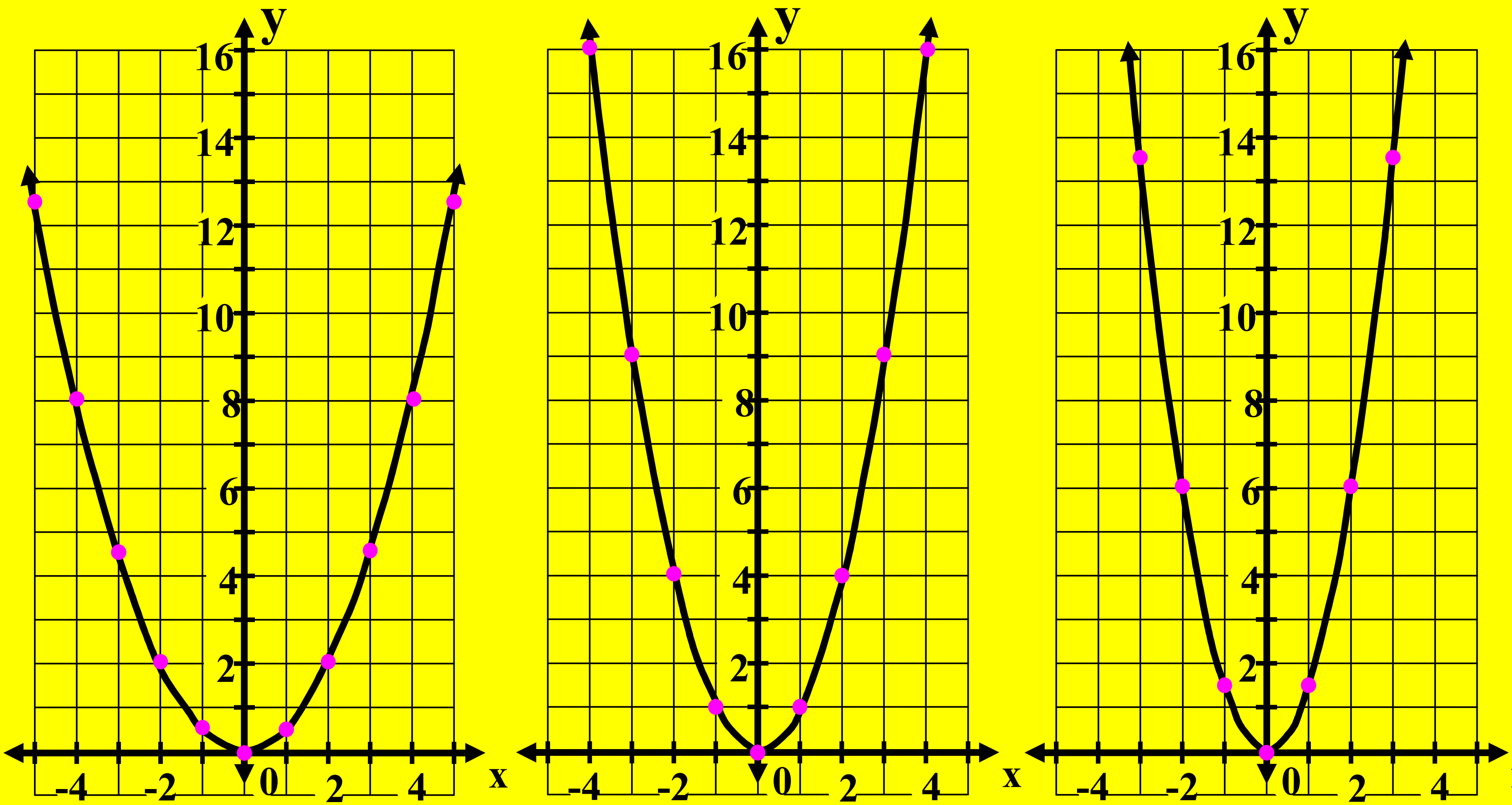
The Shape of a Parabola.



$$y = \frac{1}{2}x^2 \qquad y = 1x^2 \qquad y = \frac{3}{2}x^2$$

Each of these graphs deal with equations of the form $y = ax^2$.
As the value of <u>a</u> increases, the parabola gets narrower.
But, there is more !!

The Shape of a Parabola.



$y = \frac{1}{2}x^2$ $y = 1x^2$ $y = \frac{3}{2}x^2$

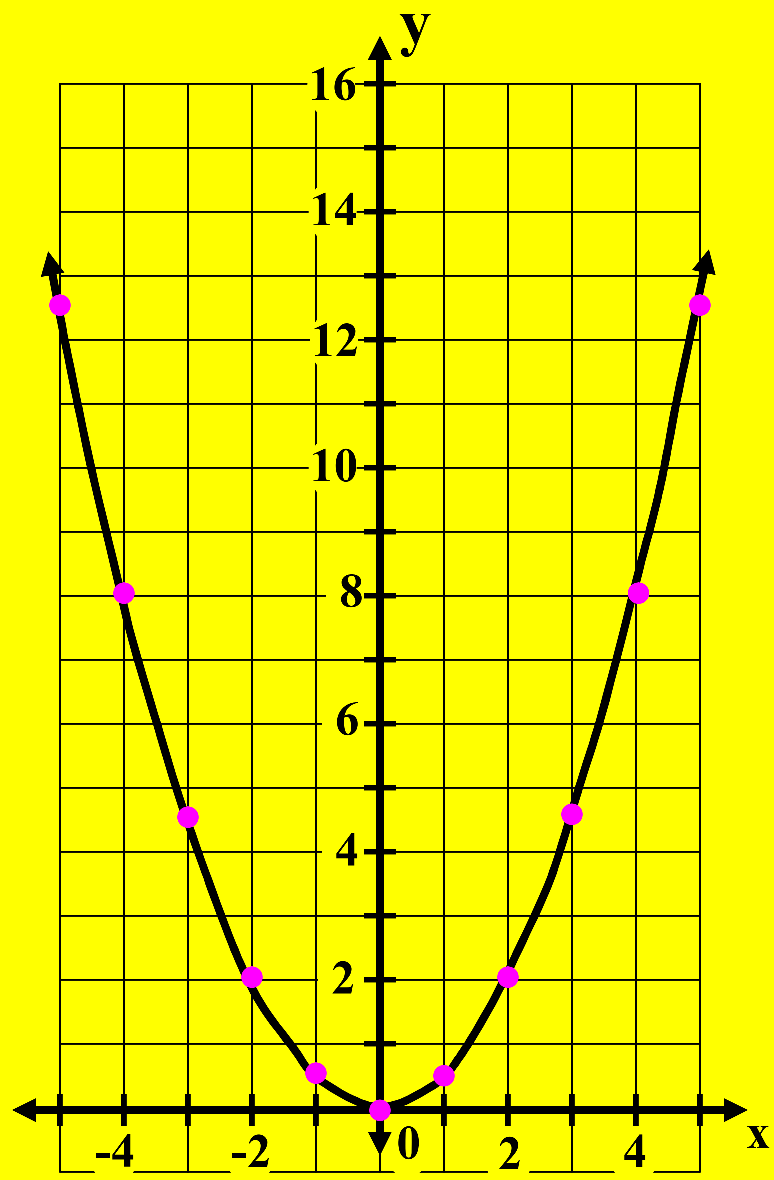
Each of these graphs deal with equations of the form $y = ax^2$.
As the value of <u>a</u> increases, the parabola gets narrower.
We will take a closer look.

The Shape of a Parabola.

$y = ax^2$

$a = \frac{1}{2} \Rightarrow y = \frac{1}{2}x^2$

x	y
0	0
± 1	$\frac{1}{2}$
± 2	2
± 3	$\frac{9}{2}$
± 4	8
± 5	$\frac{25}{2}$

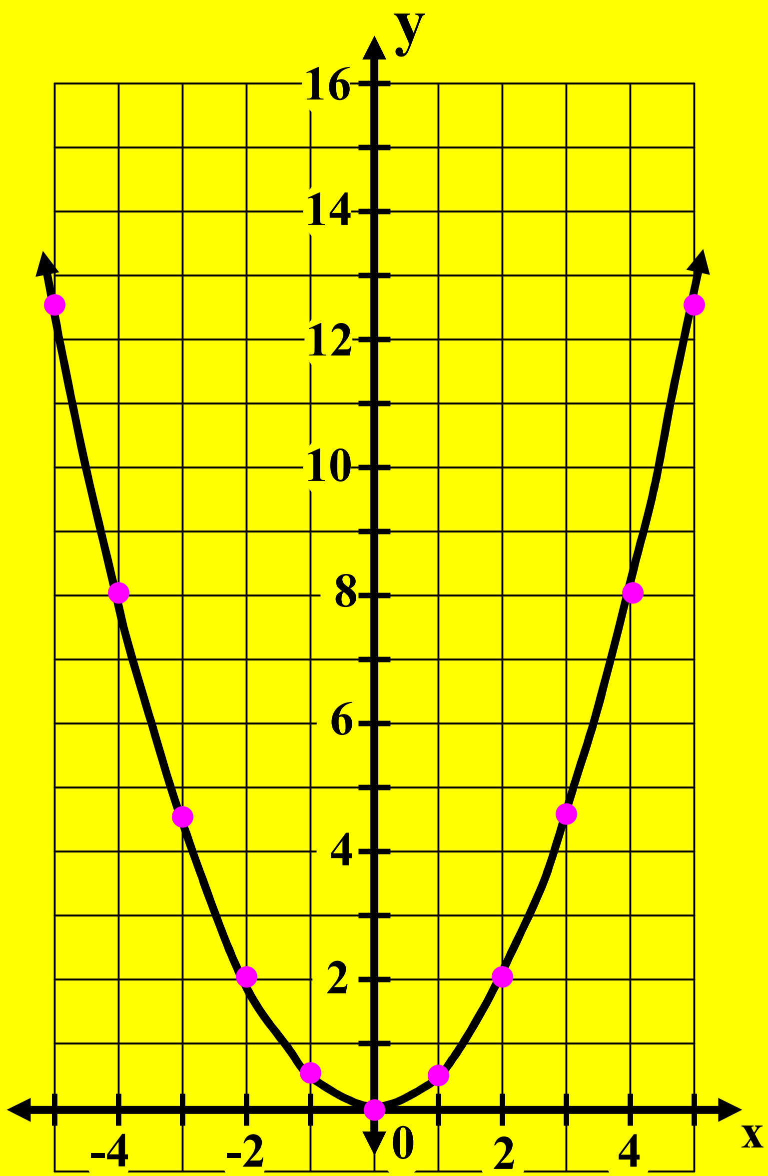


The Shape of a Parabola.

$$y = ax^2$$

$$a = \frac{1}{2} \Rightarrow y = \frac{1}{2}x^2$$

x	y
0	0
± 1	$\frac{1}{2}$
± 2	2
± 3	$\frac{9}{2}$
± 4	8
± 5	$\frac{25}{2}$



As you go down through the table, |x| increases by 1 each time.

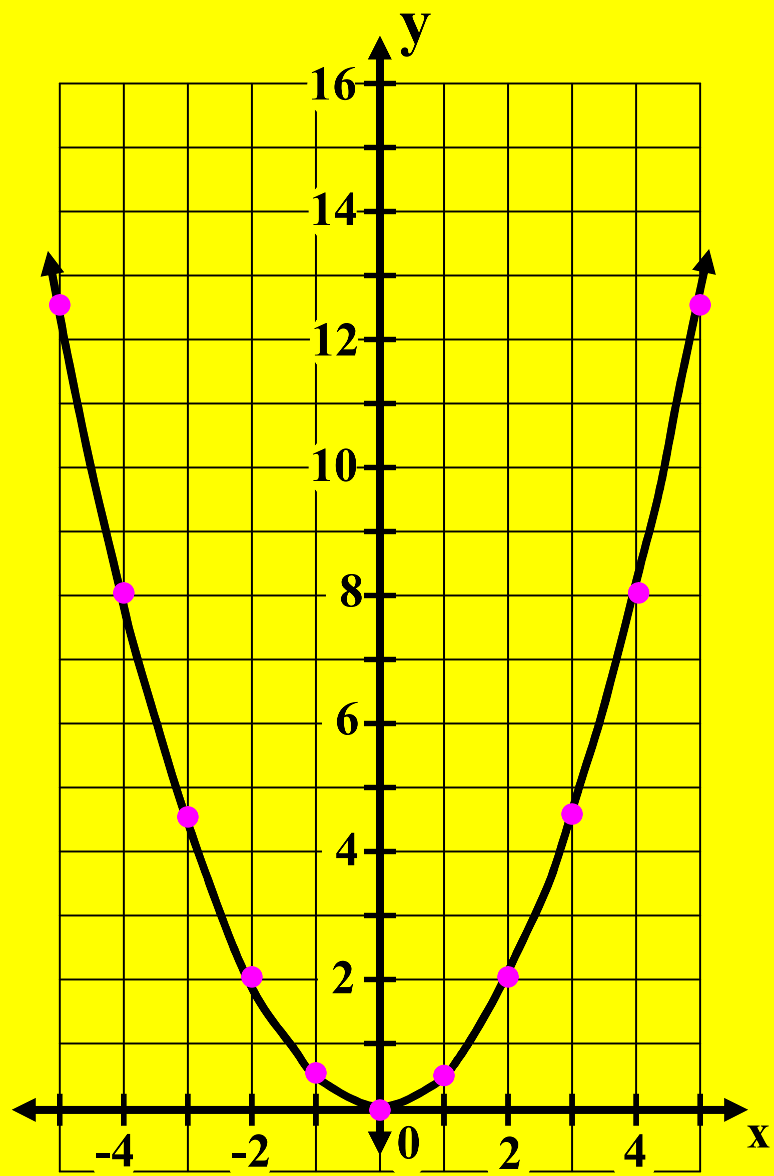
The Shape of a Parabola.

$$y = ax^2$$

$$a = \frac{1}{2} \Rightarrow y = \frac{1}{2}x^2$$

x	y
0	0
± 1	$\frac{1}{2}$
± 2	2
± 3	$\frac{9}{2}$
± 4	8
± 5	$\frac{25}{2}$

As you go down through the table, |x| increases by 1 each time. The increase in y

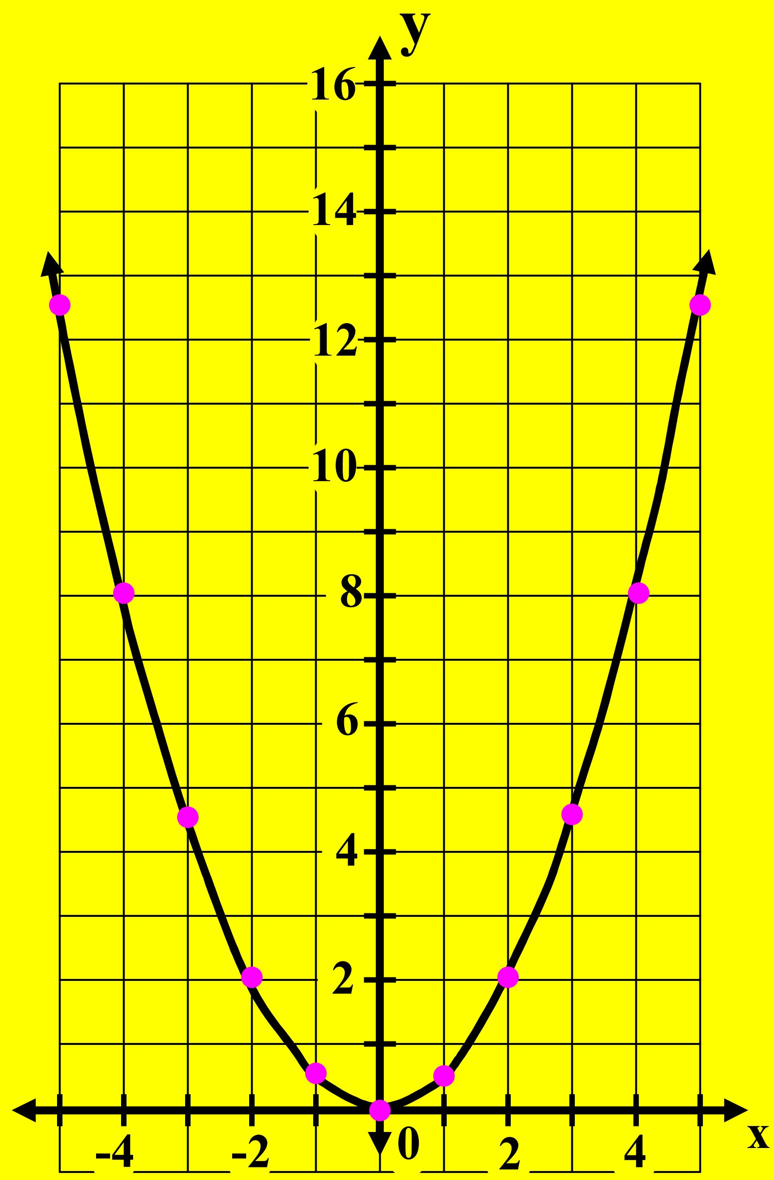


The Shape of a Parabola.

$$y = ax^2$$

$$a = \frac{1}{2} \Rightarrow y = \frac{1}{2}x^2$$

x	y
0	0
± 1	$\frac{1}{2}$
± 2	2
± 3	$\frac{9}{2}$
± 4	8
± 5	$\frac{25}{2}$



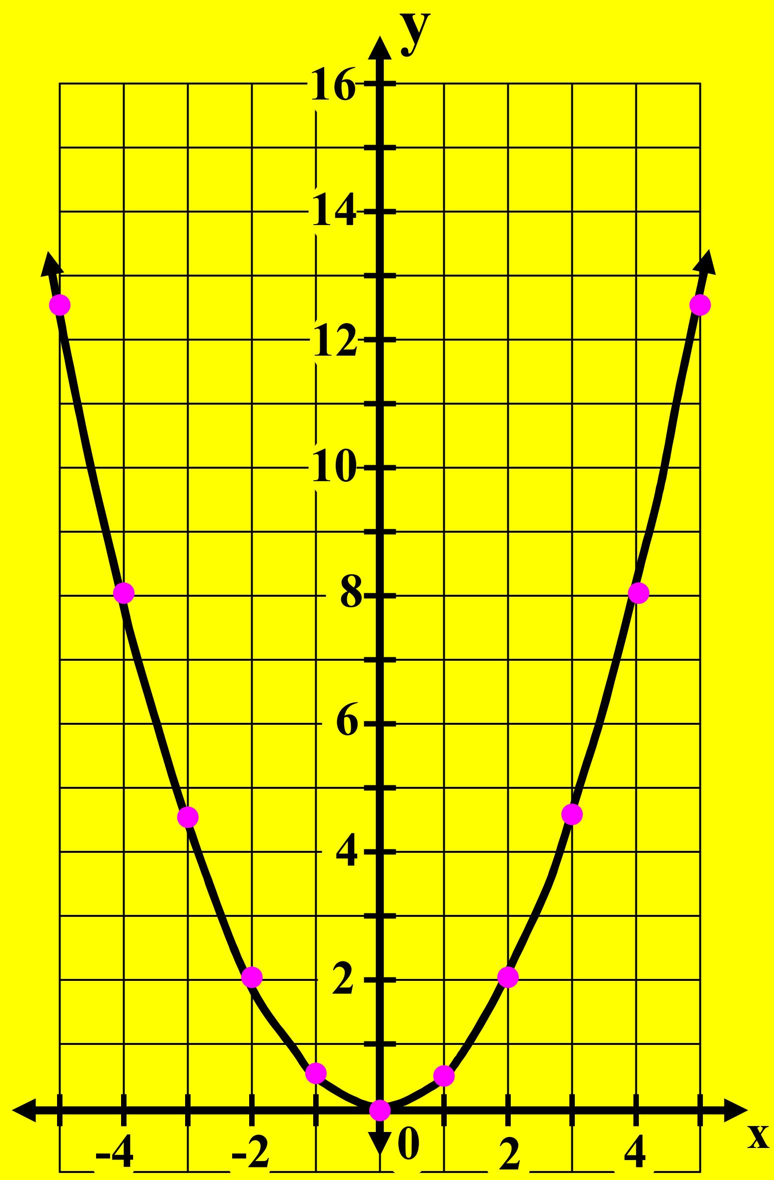
As you go down through the table, |x| increases by 1 each time. The increase in y is completely dependent upon the value of a,

The Shape of a Parabola.

$$y = ax^2$$

$$a = \frac{1}{2} \Rightarrow y = \frac{1}{2}x^2$$

x	y
0	0
± 1	$\frac{1}{2}$
± 2	2
± 3	$\frac{9}{2}$
± 4	8
± 5	$\frac{25}{2}$



As you go down through the table, |x| increases by 1 each time. The increase in y is completely dependent upon the value of a, in a very interesting, and consistent way.

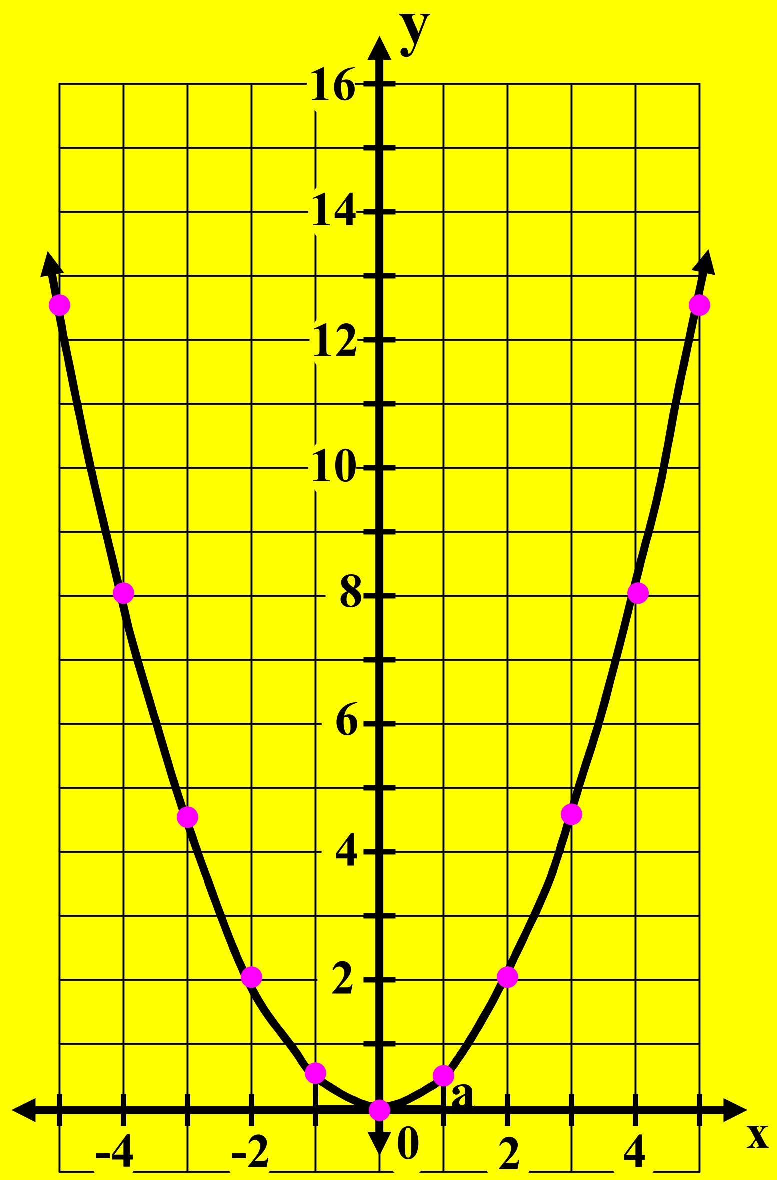
The Shape of a Parabola.

$$y = ax^2$$

$$a = \frac{1}{2} \Rightarrow y = \frac{1}{2}x^2$$

x	y
0	0
± 1	$\frac{1}{2}$
± 2	2
± 3	$\frac{9}{2}$
± 4	8
± 5	$\frac{25}{2}$

+ 1a



As you go down through the table, |x| increases by 1 each time. The increase in y is completely dependent upon the value of a, in a very interesting, and consistent way.

The Shape of a Parabola.

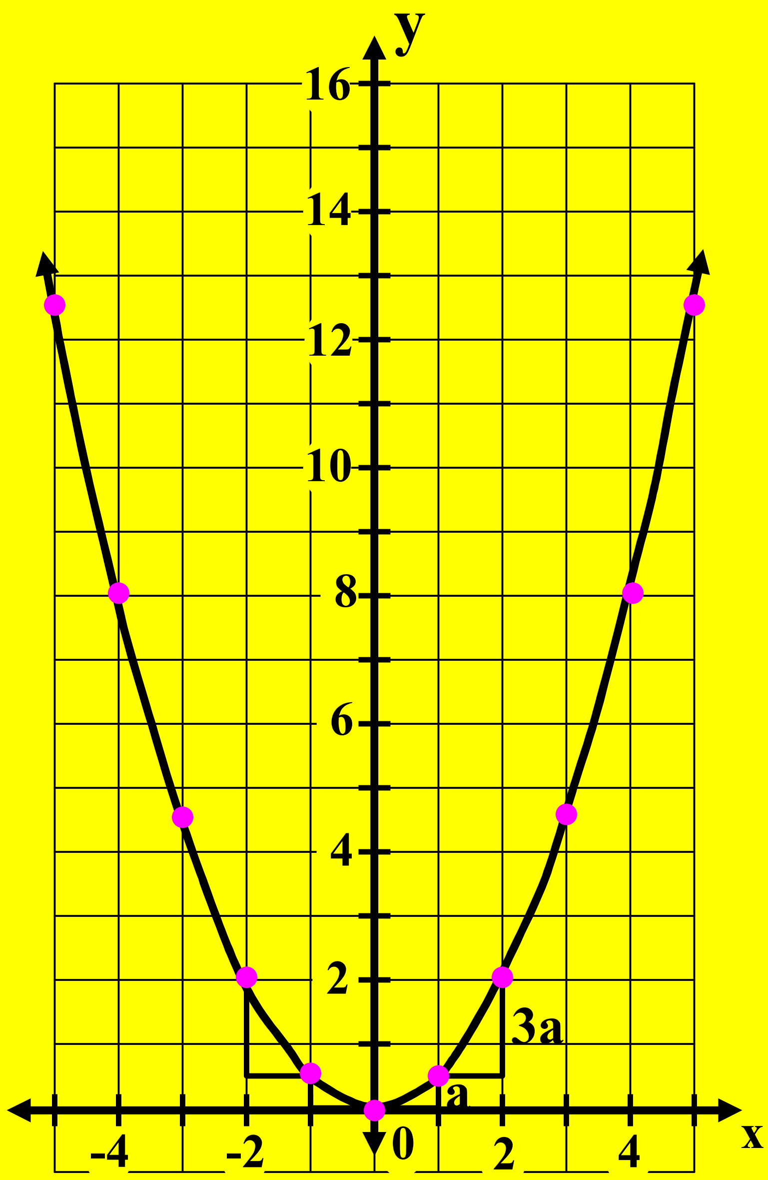
$$y = ax^2$$

$a = \frac{1}{2}$ → $y = \frac{1}{2}x^2$

x	y
0	0
± 1	$\frac{1}{2}$
± 2	2
± 3	$\frac{9}{2}$
± 4	8
± 5	$\frac{25}{2}$

+ 1a

+ 3a



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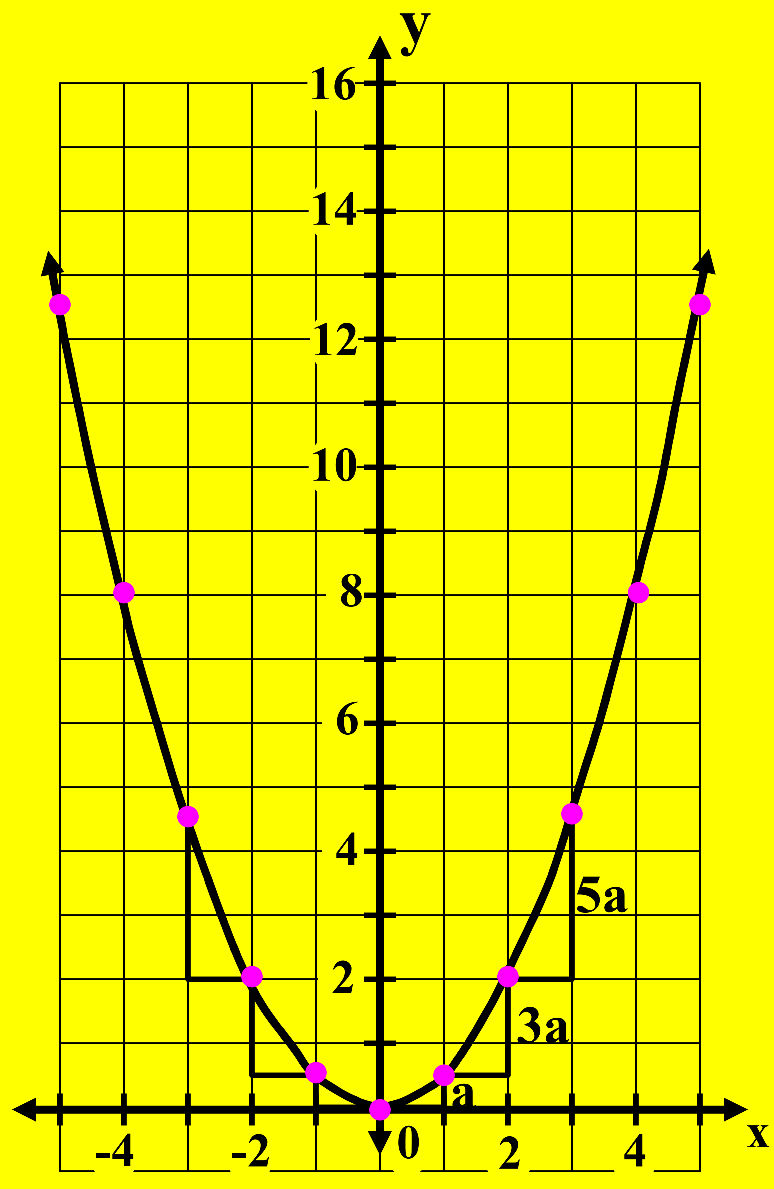
The Shape of a Parabola.

$$y = ax^2$$

$$a = \tfrac{1}{2} \rightarrow y = \tfrac{1}{2}x^2$$

x	y	
0	0	
		+ 1a
± 1	$\frac{1}{2}$	
		+ 3a
± 2	2	
		+ 5a
± 3	$\frac{9}{2}$	
± 4	8	
± 5	$\frac{25}{2}$	

As you go down through the table, |x| increases by 1 each time. The increase in y is completely dependent upon the value of a, in a very interesting, and consistent way.

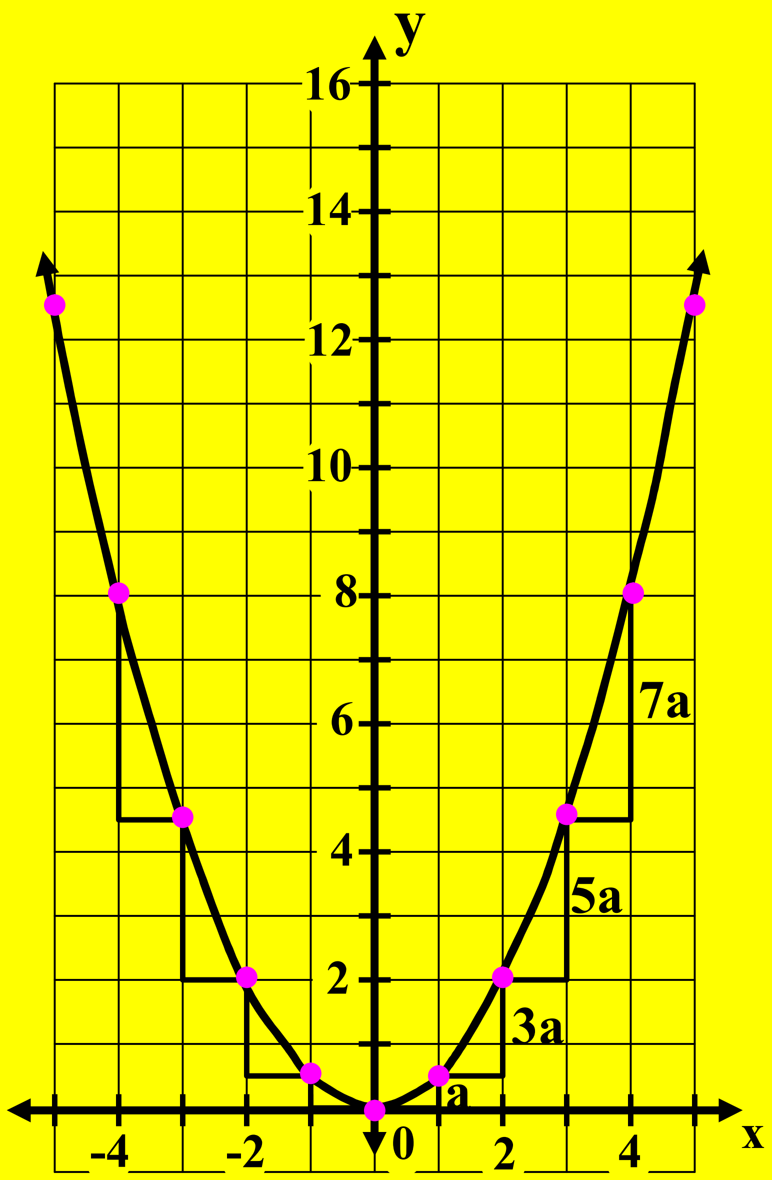


The Shape of a Parabola.

$$y = ax^2$$

$$a = \tfrac{1}{2} \Rightarrow y = \tfrac{1}{2}x^2$$

x	y	
0	0	
		+ 1a
± 1	$\frac{1}{2}$	
		+ 3a
± 2	2	
		+ 5a
± 3	$\frac{9}{2}$	
		+ 7a
± 4	8	
± 5	$\frac{25}{2}$	



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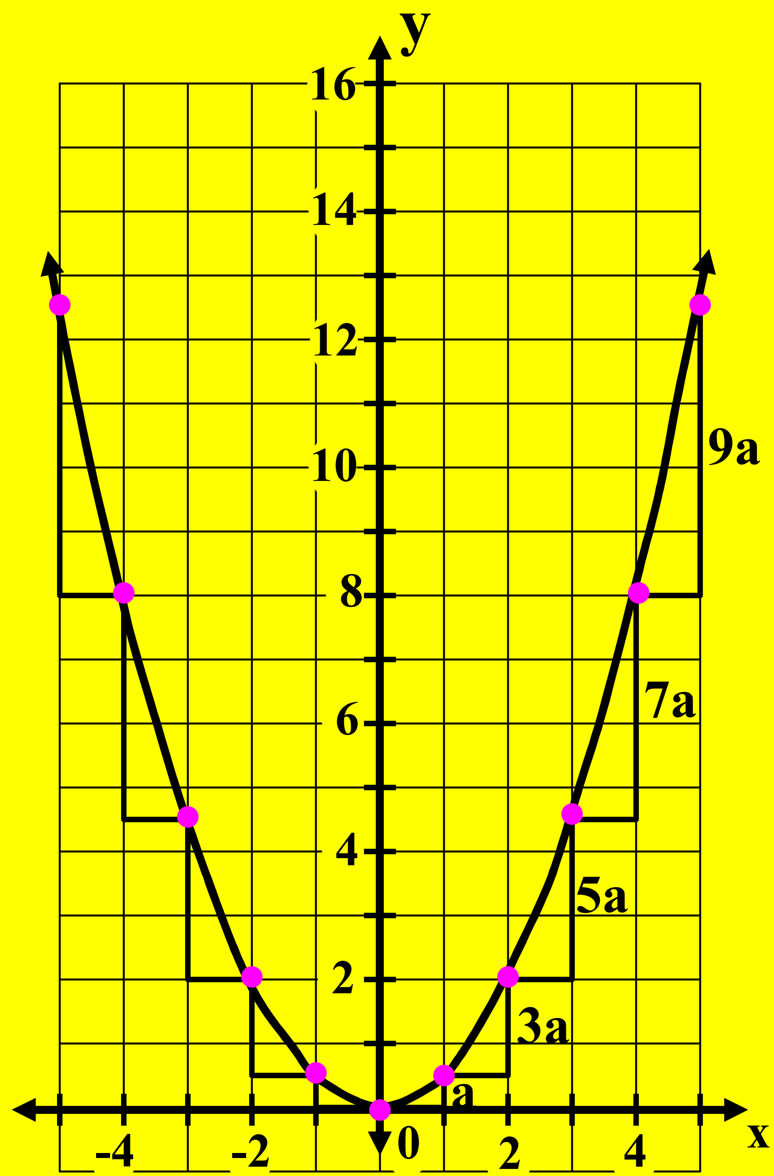
The Shape of a Parabola.

$$y = ax^2$$

$$a = \tfrac{1}{2} \;\Rightarrow\; y = \tfrac{1}{2}x^2$$

x	y	
0	0	
		+ 1a
± 1	$\frac{1}{2}$	
		+ 3a
± 2	2	
		+ 5a
± 3	$\frac{9}{2}$	
		+ 7a
± 4	8	
		+ 9a
± 5	$\frac{25}{2}$	



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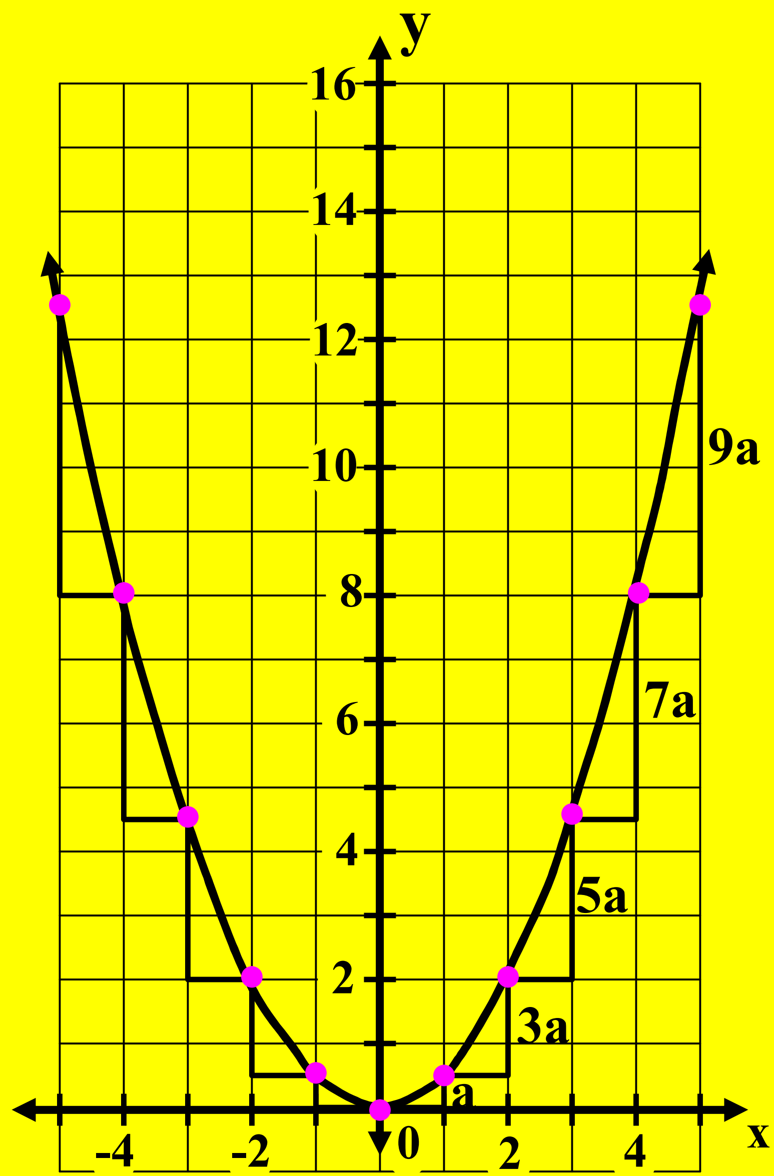
The Shape of a Parabola.

$$y = ax^2$$

$a = \frac{1}{2}$ → $y = \frac{1}{2}x^2$

x	y
0	0
± 1	$\frac{1}{2}$
± 2	2
± 3	$\frac{9}{2}$
± 4	8
± 5	$\frac{25}{2}$

+ 1a
+ 3a
+ 5a
+ 7a
+ 9a



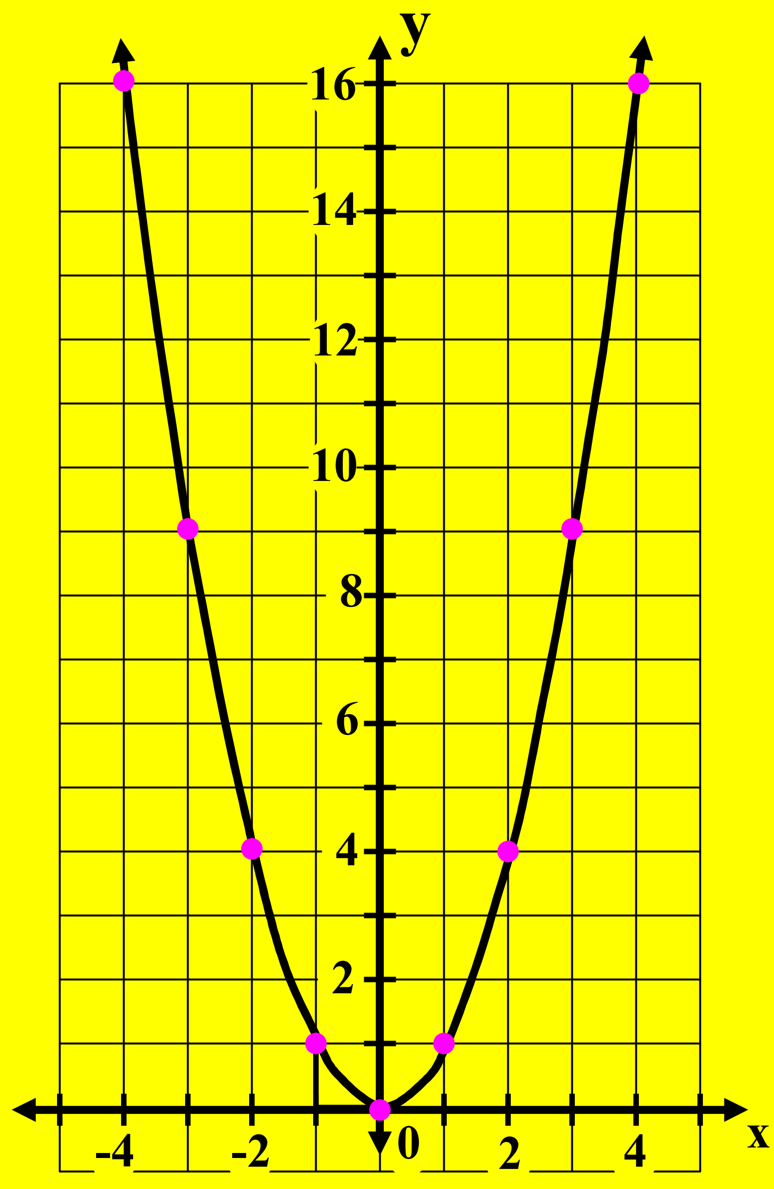
Let's look at the next function.

The Shape of a Parabola.

$y = ax^2$

$a = 1 \rightarrow y = x^2$

x	y
0	0
± 1	1
± 2	4
± 3	9
± 4	16
± 5	25



Let's look at the next function.

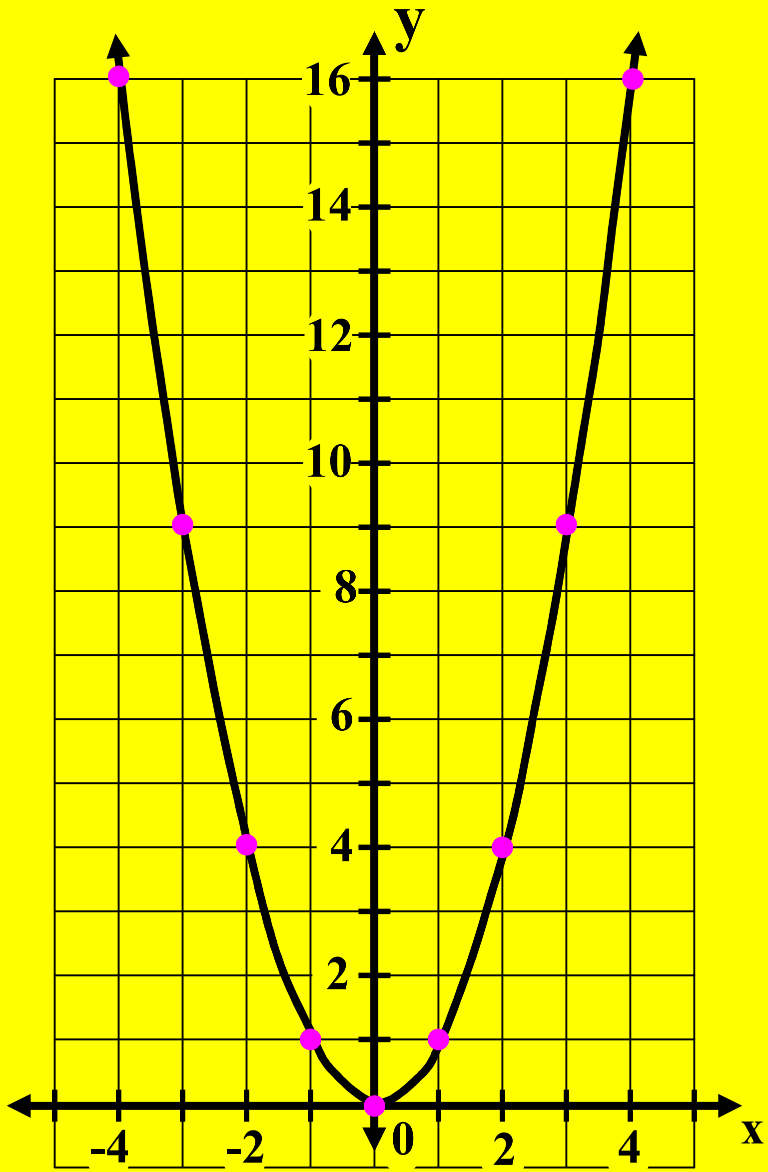
The Shape of a Parabola.

$$y = ax^2$$

$a = 1$ → $y = x^2$

x	y
0	0
± 1	1
± 2	4
± 3	9
± 4	16
± 5	25

Once again, as you go down through the table, |x| increases by 1 each time.

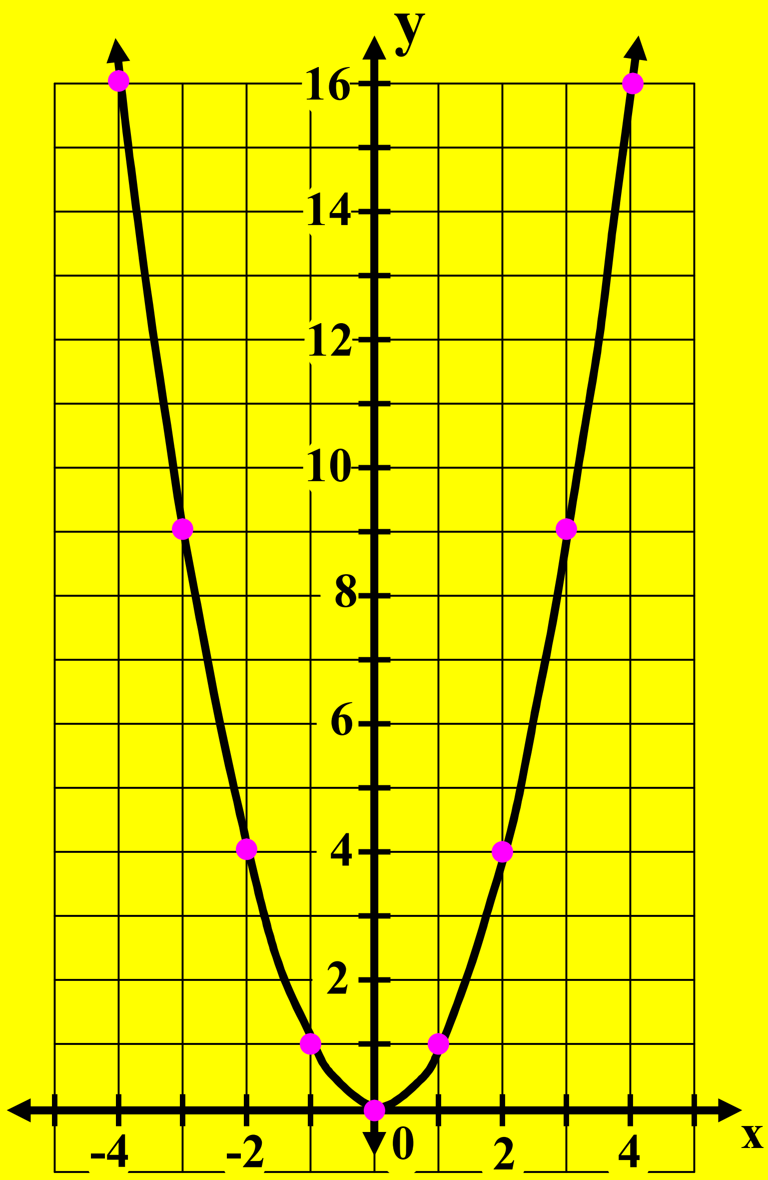


The Shape of a Parabola.

$$y = ax^2$$

$a = 1$ ⇨ $y = x^2$

x	y
0	0
± 1	1
± 2	4
± 3	9
± 4	16
± 5	25



Once again, as you go down through the table, |x| increases by 1 each time. We see the same pattern in the way the increase in y is related to the value of a.

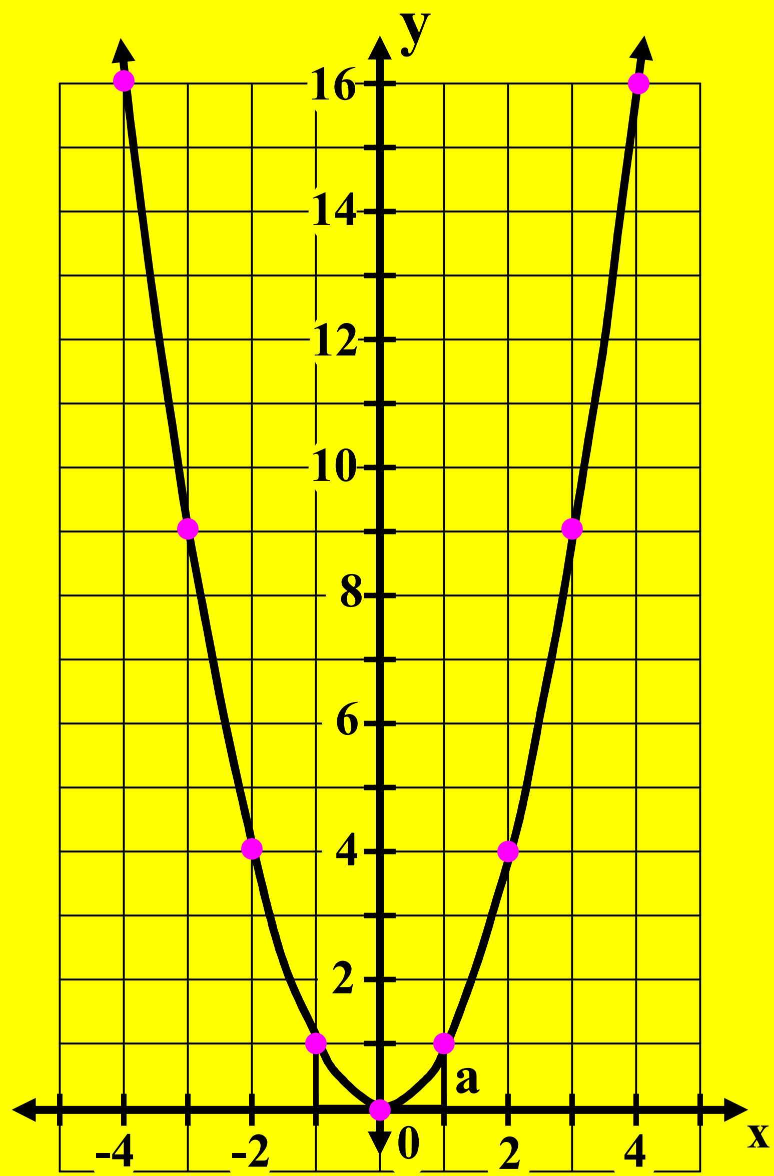
The Shape of a Parabola.

$y = ax^2$

$a = 1$ → $y = x^2$

x	y
0	0
± 1	1
± 2	4
± 3	9
± 4	16
± 5	25

+ 1a



Once again, as you go down through the table, |x| increases by 1 each time. We see the same pattern in the way the increase in y is related to the value of <u>a</u>.

The Shape of a Parabola.

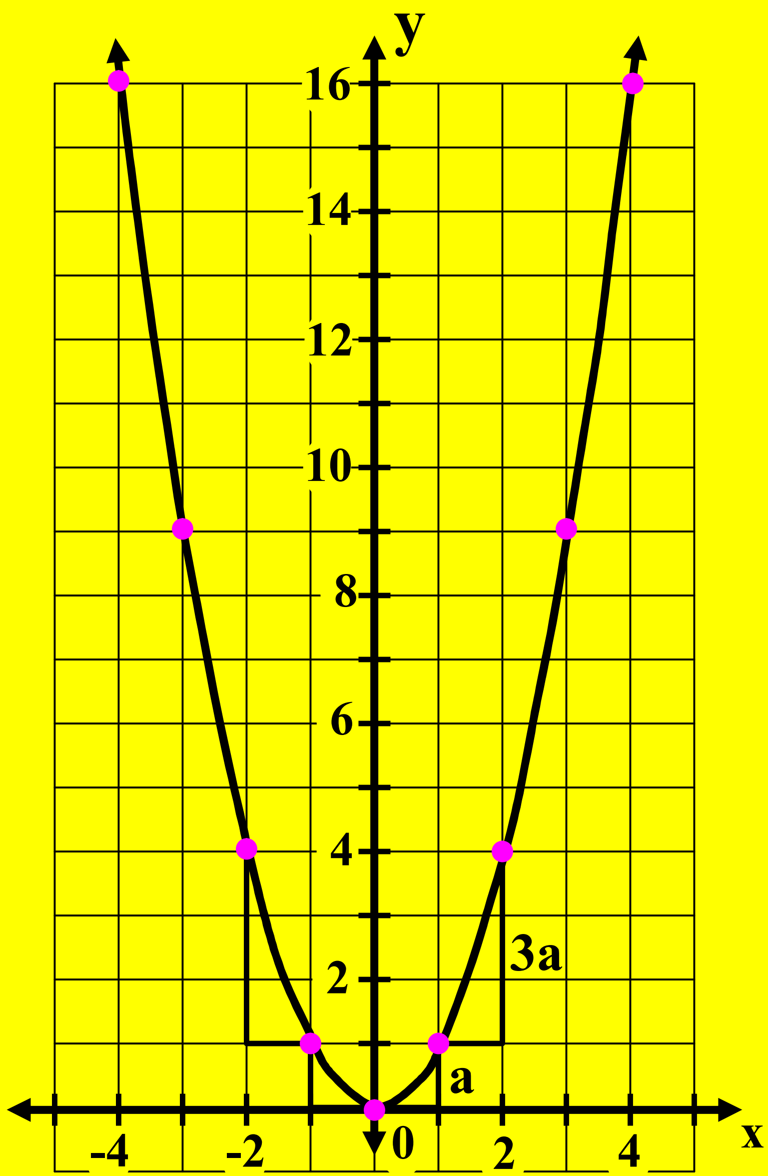
$y = ax^2$

$a = 1 \rightarrow y = x^2$

x	y
0	0
± 1	1
± 2	4
± 3	9
± 4	16
± 5	25

+ 1a

+ 3a



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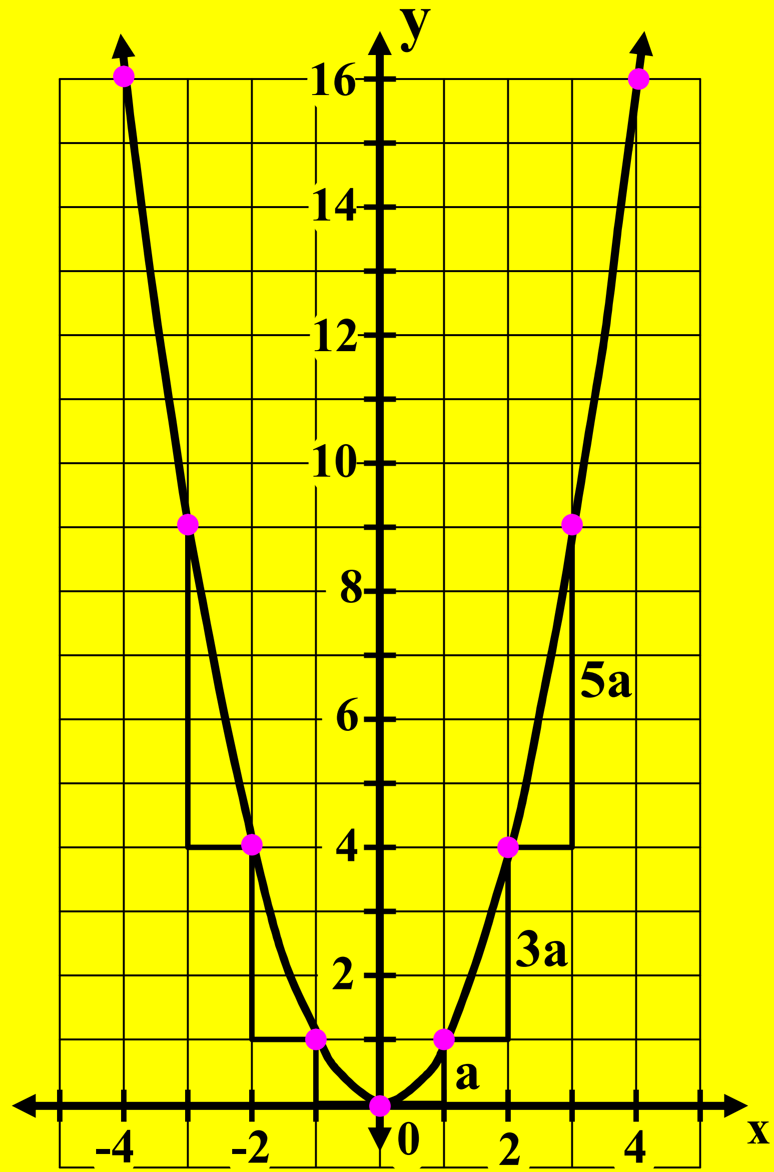
The Shape of a Parabola.

$$y = ax^2$$

$a = 1 \rightarrow y = x^2$

x	y
0	0
± 1	1
± 2	4
± 3	9
± 4	16
± 5	25

+ 1a
+ 3a
+ 5a



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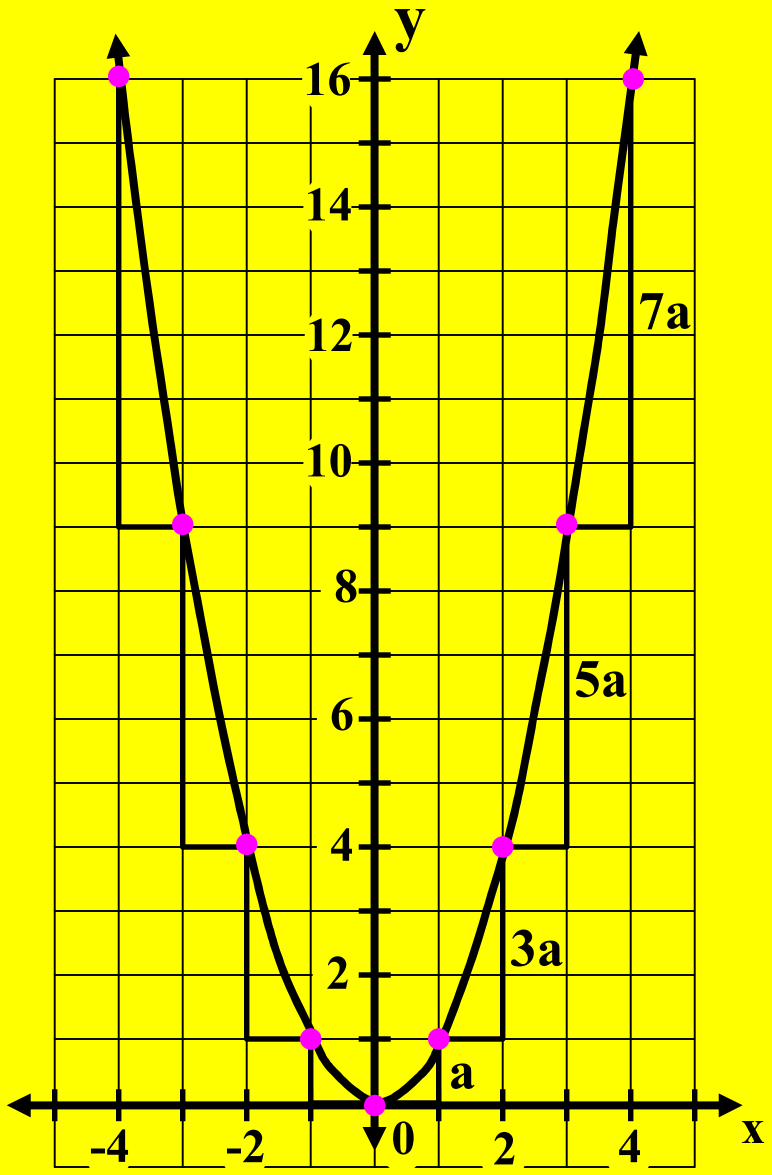
The Shape of a Parabola.

$y = ax^2$

$a = 1 \rightarrow y = x^2$

x	y	
0	0	
		+ 1a
± 1	1	
		+ 3a
± 2	4	
		+ 5a
± 3	9	
		+ 7a
± 4	16	
± 5	25	



Once again, as you go down through the table, |x| increases by 1 each time. We see the same pattern in the way the increase in y is related to the value of a.

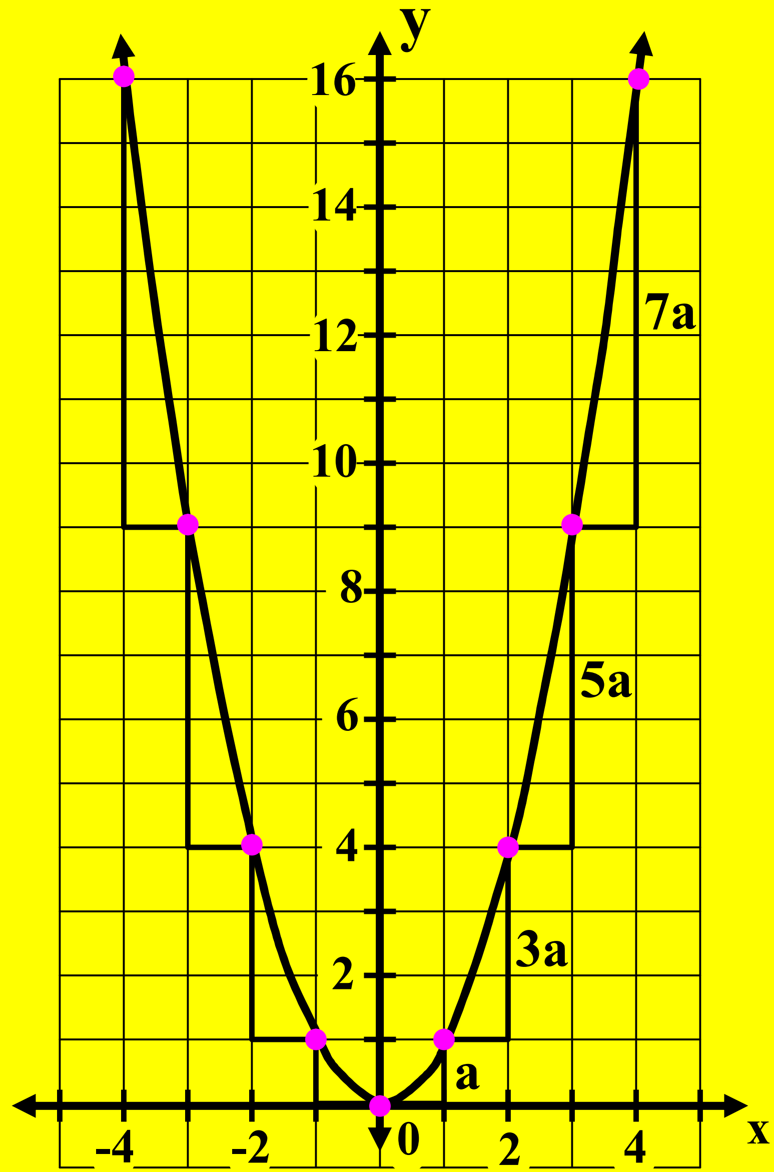
The Shape of a Parabola.

$$y = ax^2$$

$a = 1$ ➡ $y = x^2$

x	y
0	0
± 1	1
± 2	4
± 3	9
± 4	16
± 5	25

+ 1a
+ 3a
+ 5a
+ 7a
+ 9a



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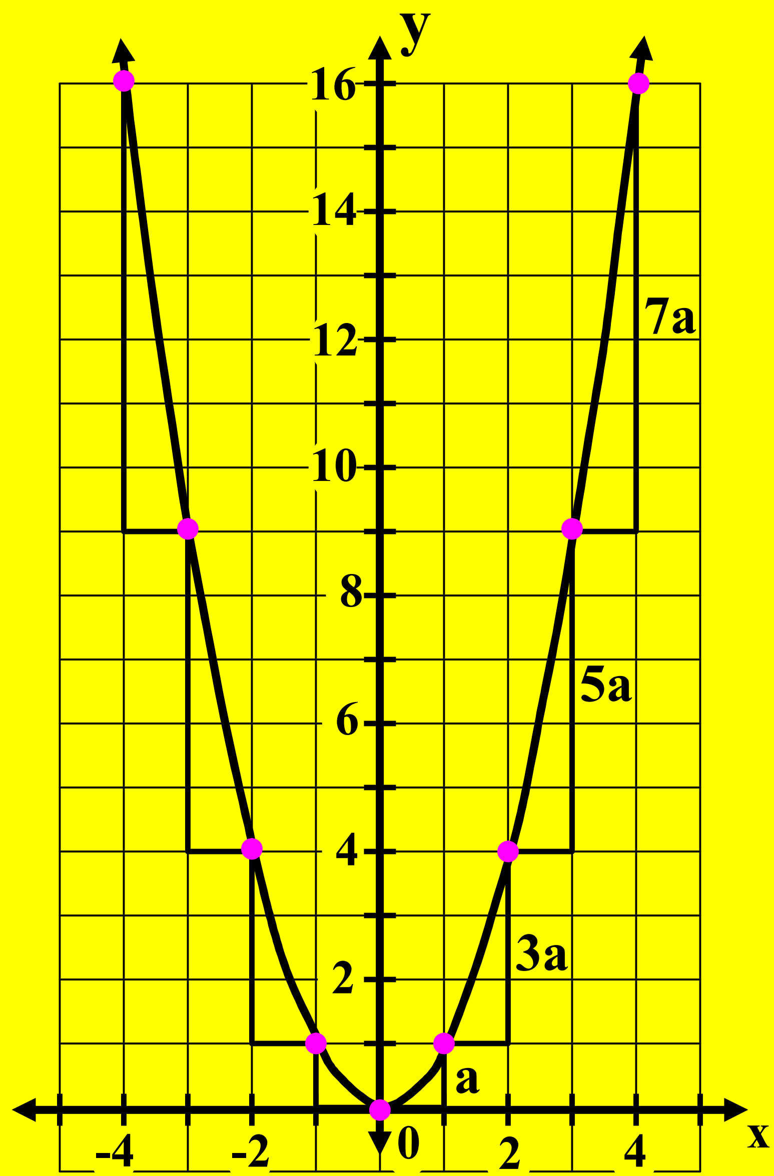
The Shape of a Parabola.

$y = ax^2$

$a = 1 \rightarrow y = x^2$

x	y
0	0
± 1	1
± 2	4
± 3	9
± 4	16
± 5	25

+ 1a
+ 3a
+ 5a
+ 7a
+ 9a



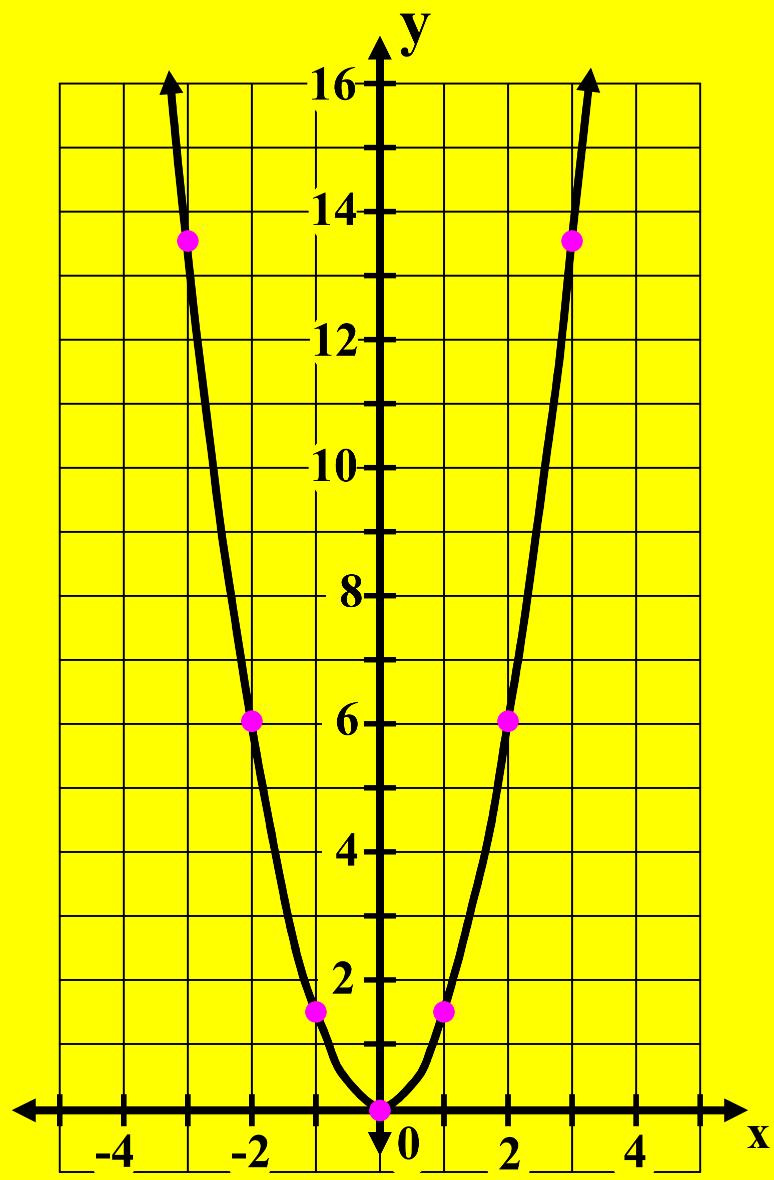
Lets look at the next function.

The Shape of a Parabola.

$$y = ax^2$$

$a = \frac{3}{2}$ ⇨ $y = \frac{3}{2}x^2$

x	y
0	0
± 1	$\frac{3}{2}$
± 2	6
± 3	$\frac{27}{2}$
± 4	24
± 5	$\frac{75}{2}$



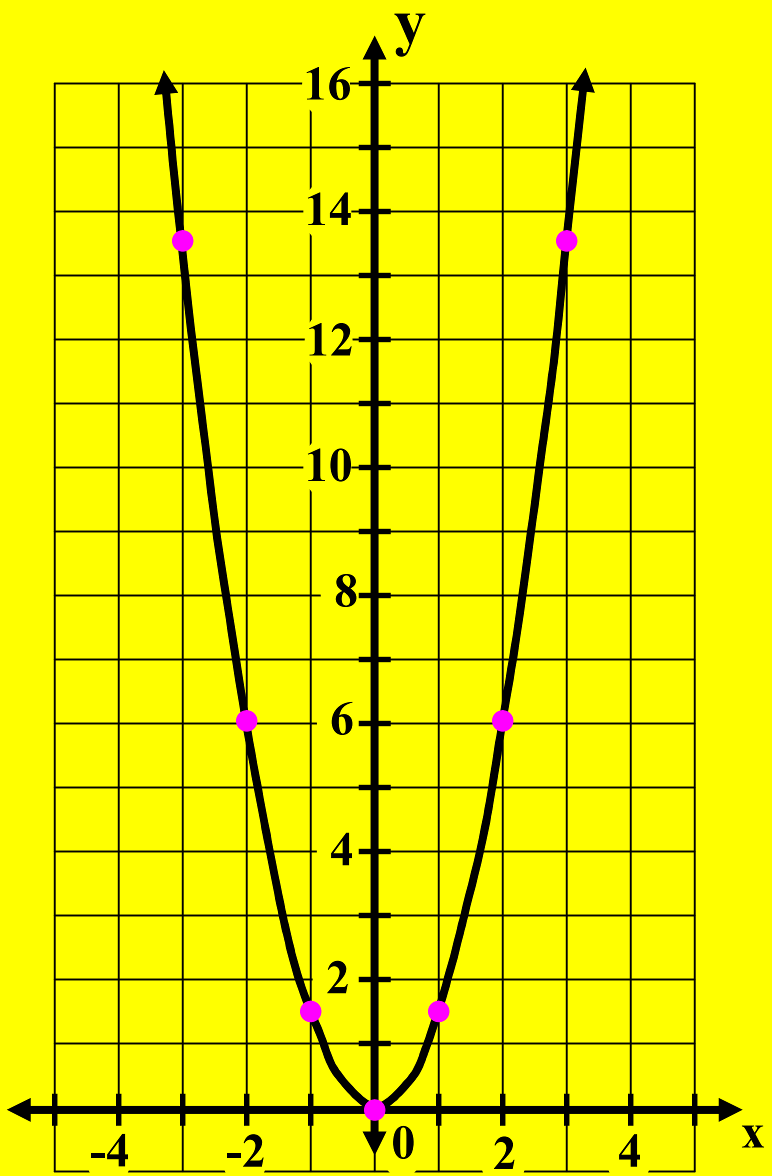
The Shape of a Parabola.

$$y = ax^2$$

$$a = \frac{3}{2} \Rightarrow y = \frac{3}{2}x^2$$

x	y
0	0
± 1	$\frac{3}{2}$
± 2	6
± 3	$\frac{27}{2}$
± 4	24
± 5	$\frac{75}{2}$

Once again, as you go down through the table, |x| increases by 1 each time.

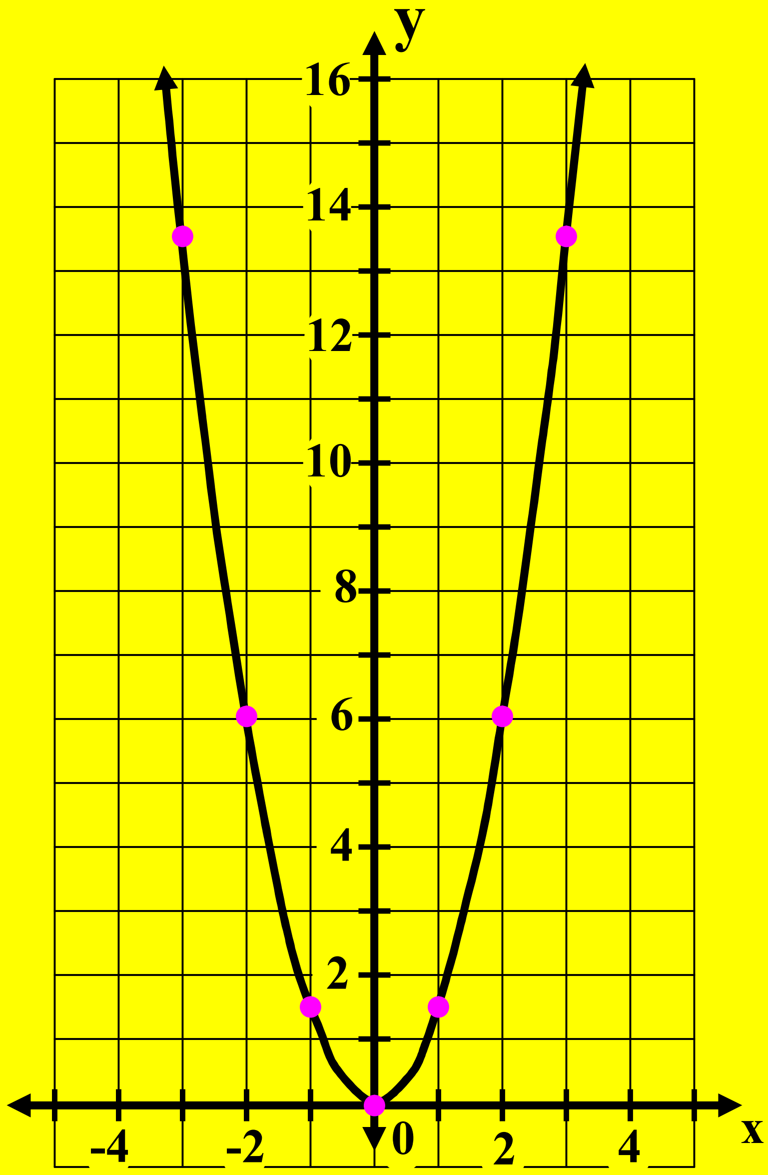


The Shape of a Parabola.

$$y = ax^2$$

$$a = \frac{3}{2} \Rightarrow y = \frac{3}{2}x^2$$

x	y
0	0
± 1	$\frac{3}{2}$
± 2	6
± 3	$\frac{27}{2}$
± 4	24
± 5	$\frac{75}{2}$



Once again, as you go down through the table, |x| increases by 1 each time. We see the same pattern in the way the increase in y is related to the value of a.

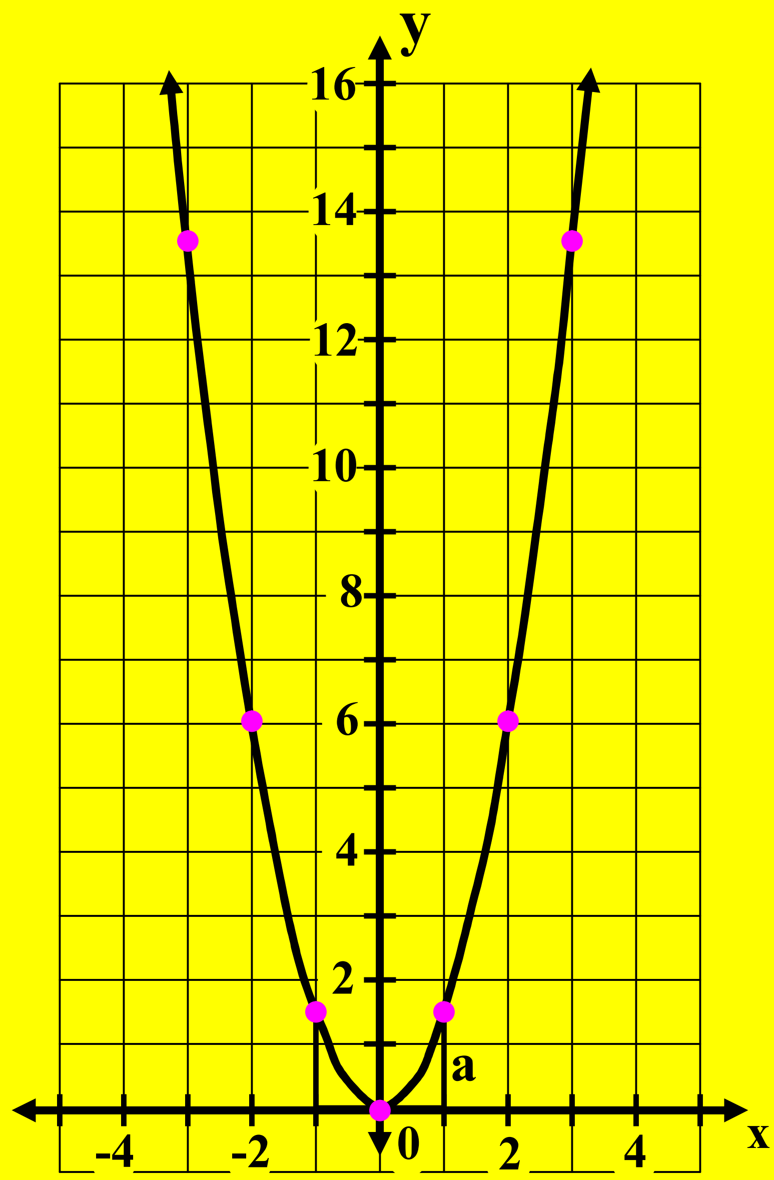
The Shape of a Parabola.

$y = ax^2$

$a = \frac{3}{2}$ ⇒ $y = \frac{3}{2}x^2$

x	y
0	0
± 1	$\frac{3}{2}$
± 2	6
± 3	$\frac{27}{2}$
± 4	24
± 5	$\frac{75}{2}$

+ 1a



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The Shape of a Parabola.

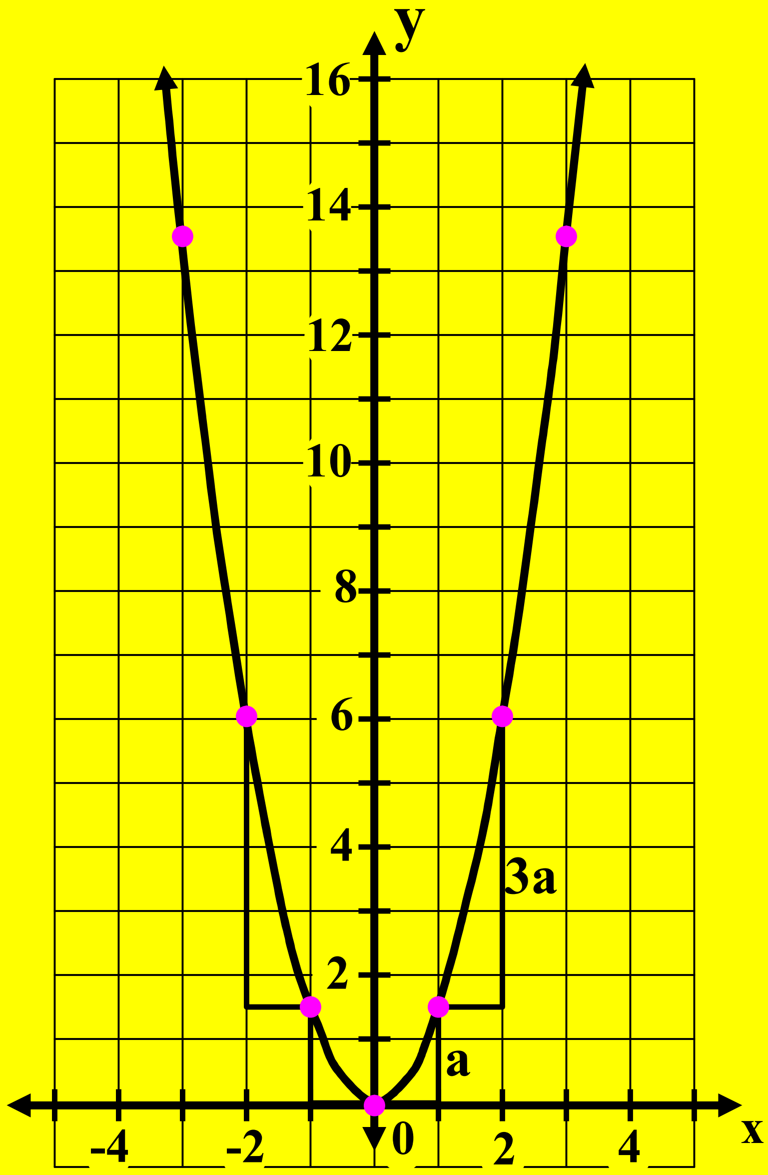
$$y = ax^2$$

$$a = \frac{3}{2} \quad \Rightarrow \quad y = \frac{3}{2}x^2$$

x	y
0	0
± 1	$\frac{3}{2}$
± 2	6
± 3	$\frac{27}{2}$
± 4	24
± 5	$\frac{75}{2}$

+ 1a

+ 3a



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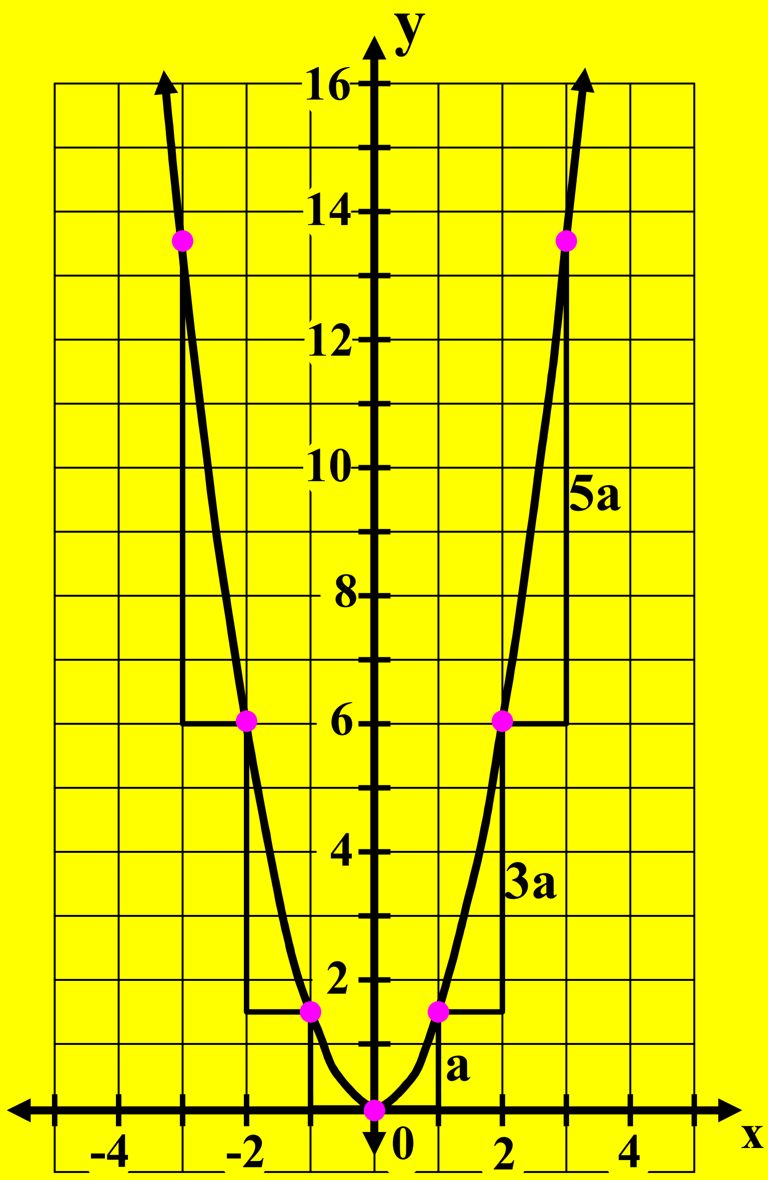
The Shape of a Parabola.

$$y = ax^2$$

$$a = \frac{3}{2} \rightarrow y = \frac{3}{2}x^2$$

x	y	
0	0	
		+ 1a
± 1	$\frac{3}{2}$	
		+ 3a
± 2	6	
		+ 5a
± 3	$\frac{27}{2}$	
± 4	24	
± 5	$\frac{75}{2}$	



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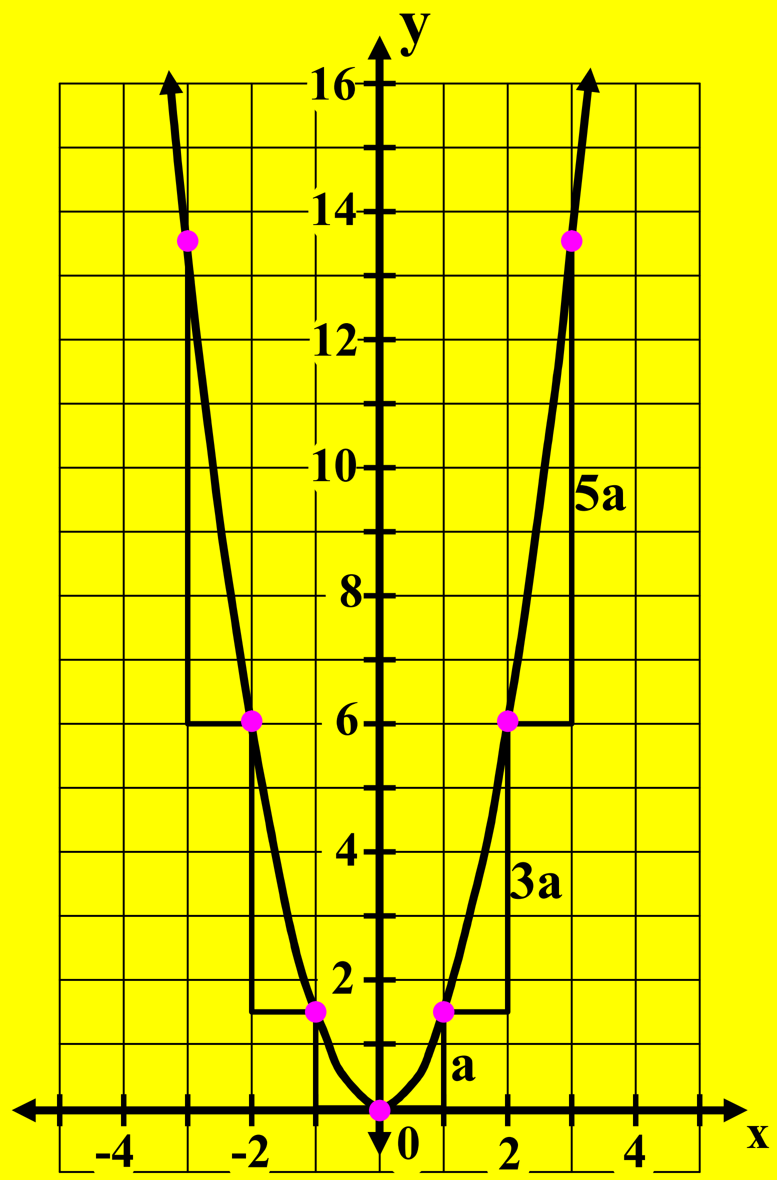
$$y = ax^2$$

$a = \frac{3}{2}$ → $y = \frac{3}{2}x^2$

x	y
0	0
± 1	$\frac{3}{2}$
± 2	6
± 3	$\frac{27}{2}$
± 4	24
± 5	$\frac{75}{2}$

+ 1a
+ 3a
+ 5a
+ 7a



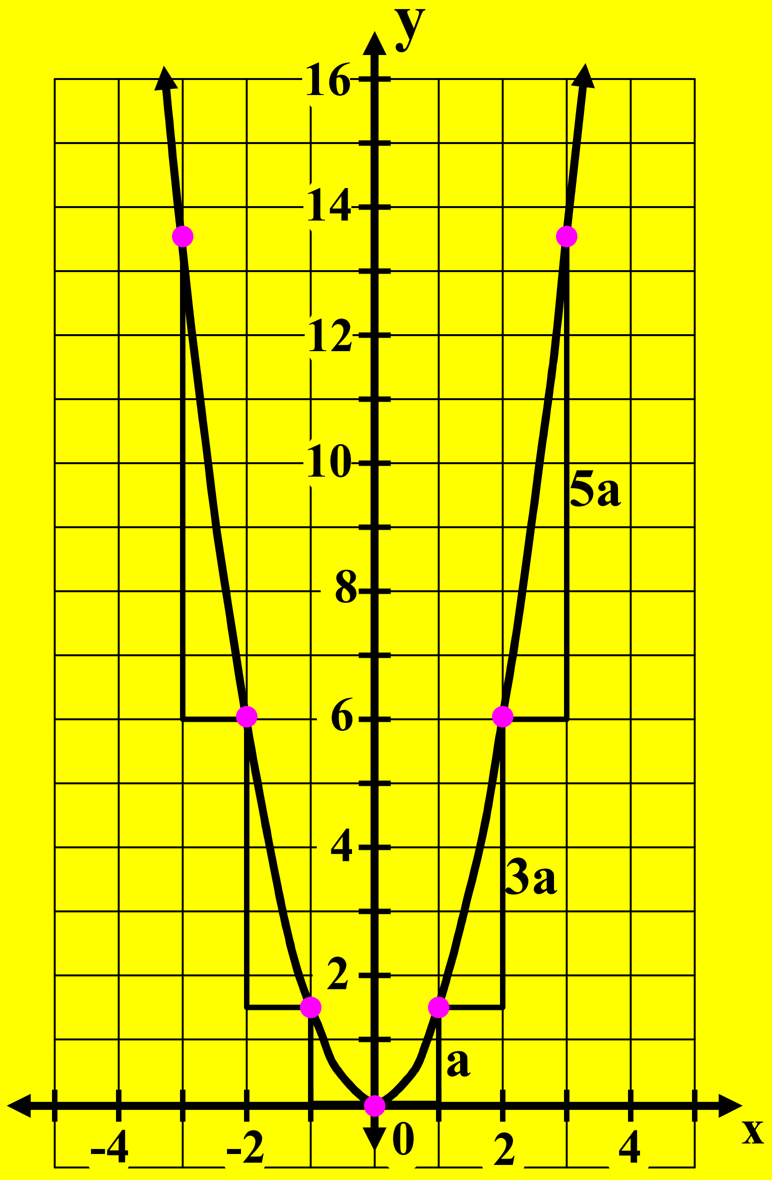
Once again, as you go down through the table, |x| increases by 1 each time. We see the same pattern in the way the increase in y is related to the value of a.

The Shape of a Parabola.

$$y = ax^2$$

$$a = \frac{3}{2} \Rightarrow y = \frac{3}{2}x^2$$

x	y	
0	0	
		+ 1a
± 1	$\frac{3}{2}$	
		+ 3a
± 2	6	
		+ 5a
± 3	$\frac{27}{2}$	
		+ 7a
± 4	24	
		+ 9a
± 5	$\frac{75}{2}$	



Once again, as you go down through the table, |x| increases by 1 each time. We see the same pattern in the way the increase in y is related to the value of a.

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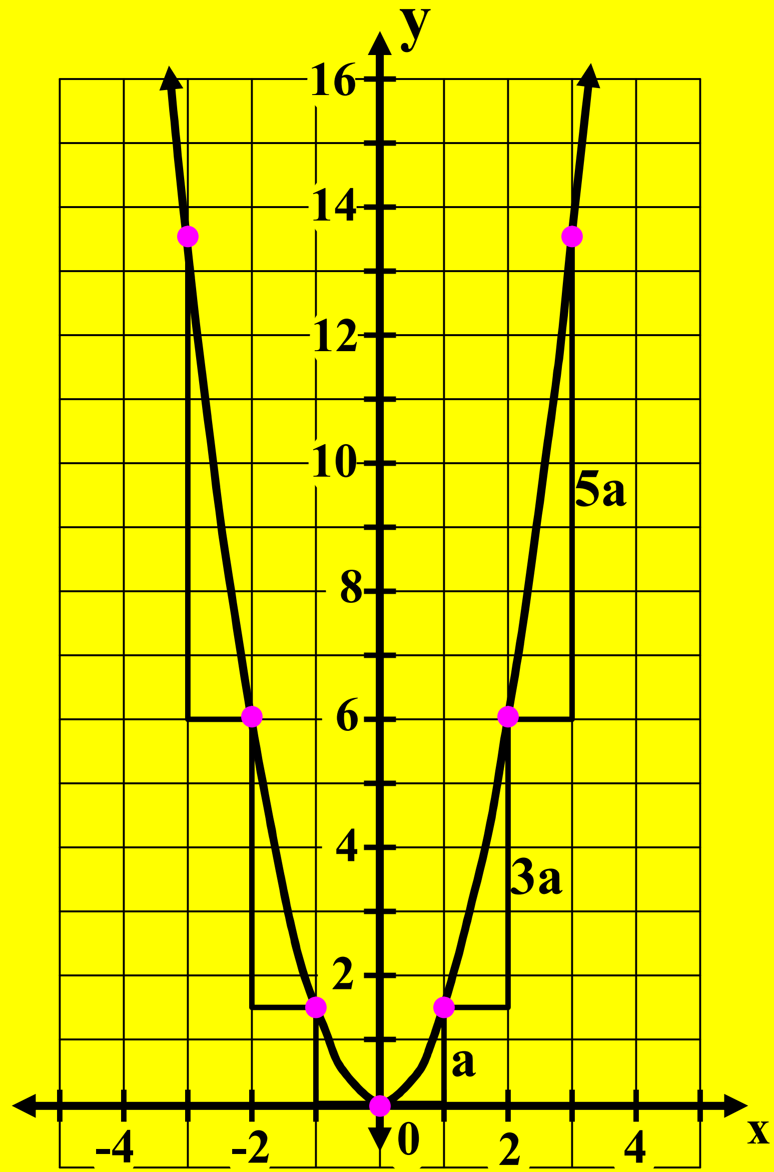
x	y	
0	0	
± 1	$\frac{3}{2}$	+ 1a
± 2	6	+ 3a
± 3	$\frac{27}{2}$	+ 5a
± 4	24	+ 7a
± 5	$\frac{75}{2}$	+ 9a



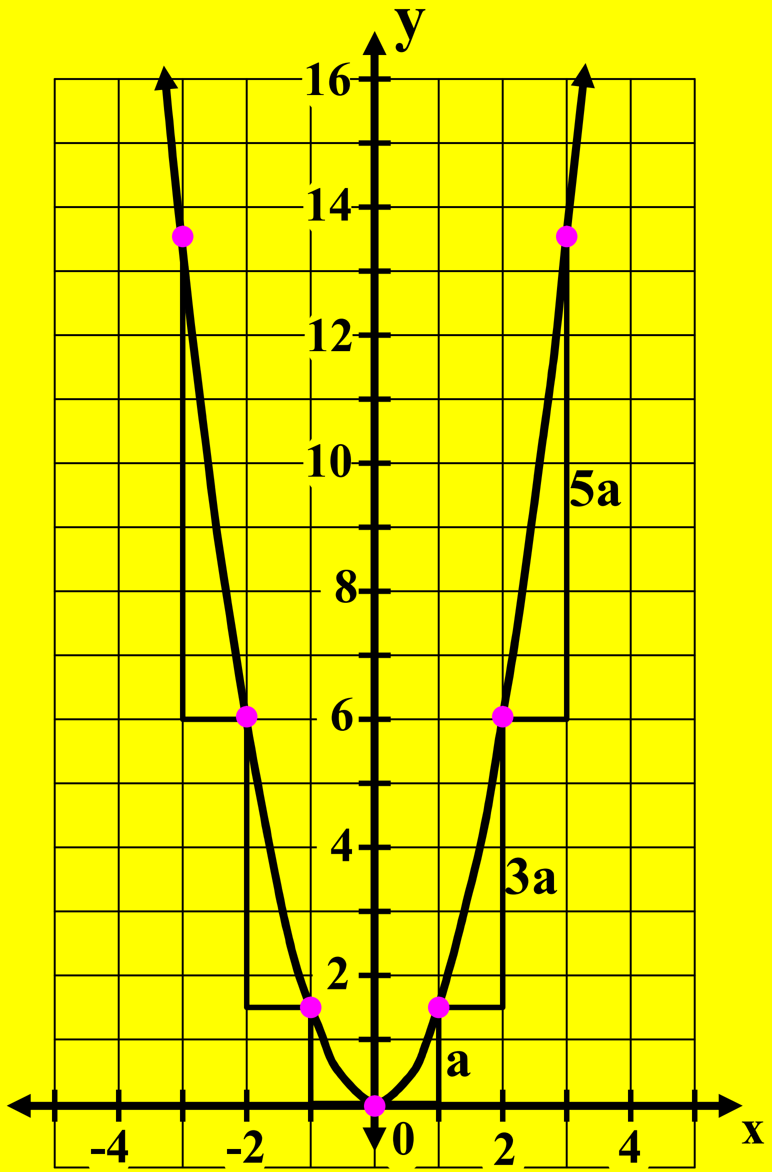
The Shape of a Parabola.

$$y = ax^2$$

$$a = \frac{3}{2} \rightarrow y = \frac{3}{2}x^2$$

x	y
0	0
± 1	$\frac{3}{2}$
± 2	6
± 3	$\frac{27}{2}$
± 4	24
± 5	$\frac{75}{2}$

+ 1a
+ 3a
+ 5a
+ 7a
+ 9a



This same pattern exists in every second degree function!

The Shape of a Parabola.

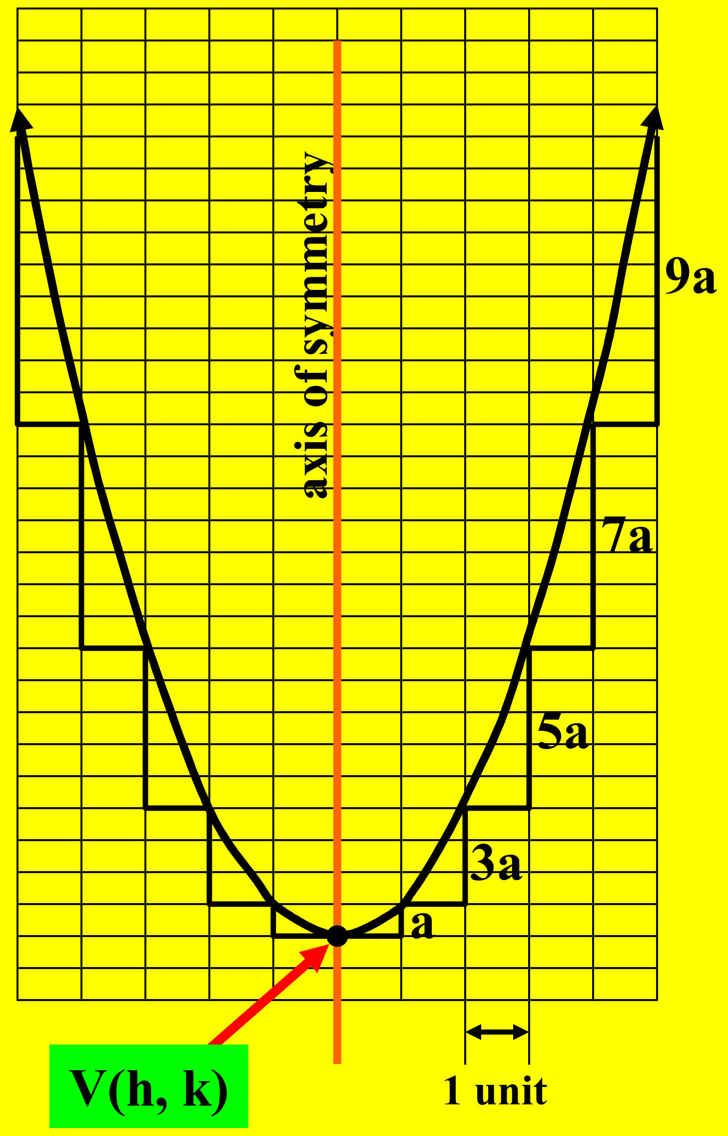
Type 1 Parabola
Standard form equation

$$y - k = a(x - h)^2$$

Vertex: (h, k) $\quad a = \dfrac{1}{4p}$

p is the <u>directed distance</u> from the vertex to the focus.

Latus Rectum: |4p| units long



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Vertex: (h, k) $a = \dfrac{1}{4p}$

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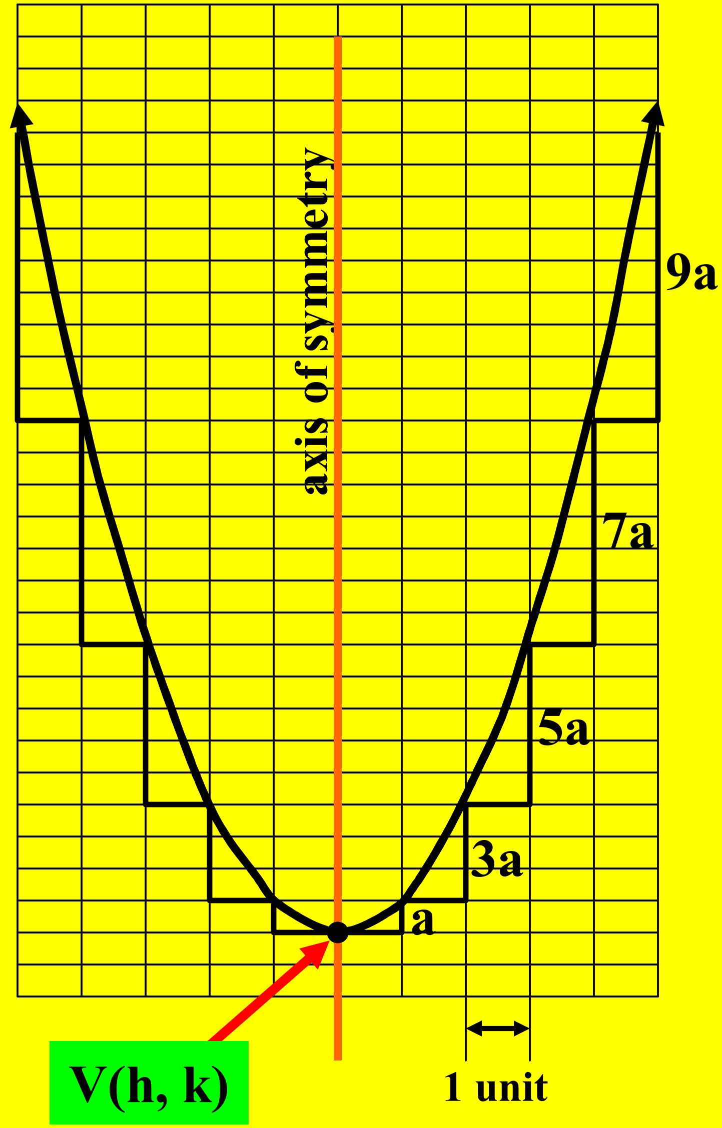
Latus Rectum: |4p| units long

This diagram is intended to further illustrate how the shape of a parabola is related to the value of <u>a</u> in the standard form equation.



The Shape of a Parabola.

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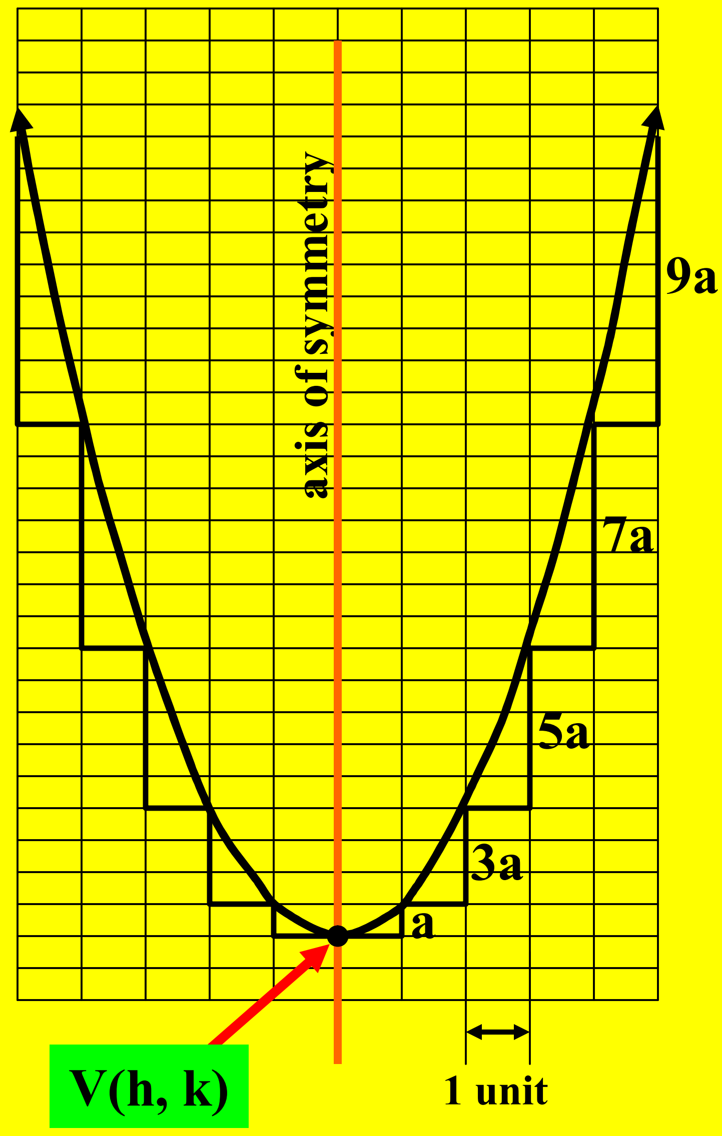
This diagram is intended to further illustrate how the shape of a parabola is related to the value of <u>a</u> in the standard form equation. Of course, the vertex is the point V(h, k).



The Shape of a Parabola.

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$$y - k = a(x - h)^2$$

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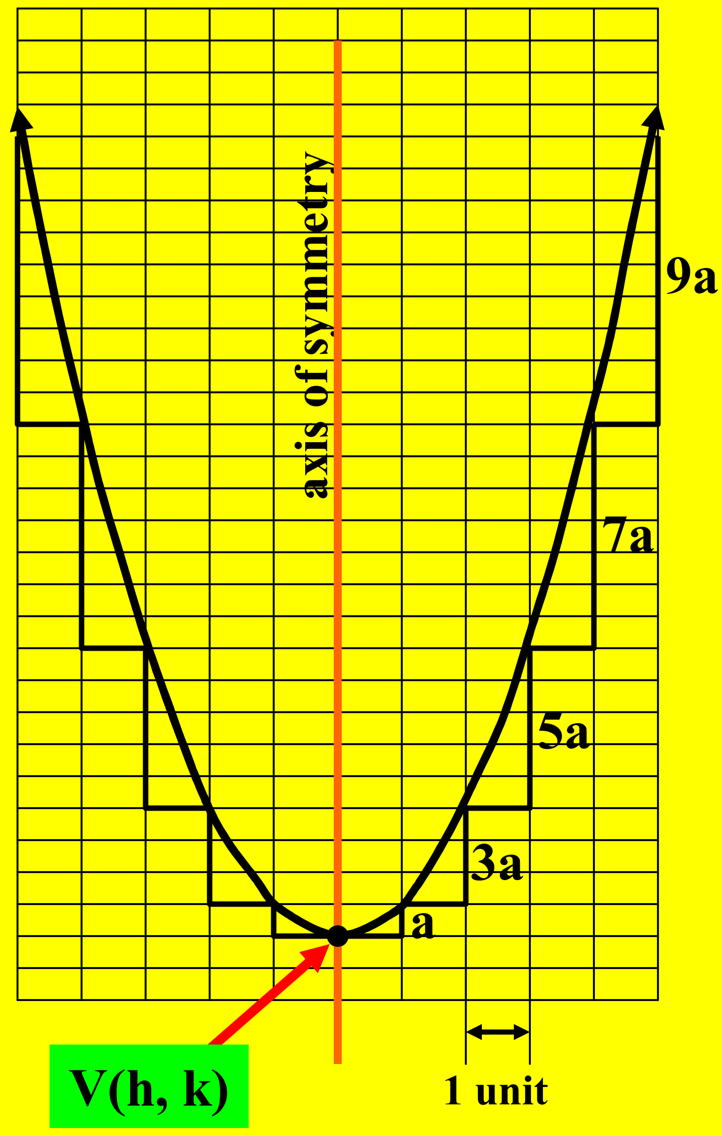
This diagram is intended to further illustrate how the shape of a parabola is related to the value of <u>a</u> in the standard form equation. Of course, the vertex is the point V(h, k).
In this graph, <u>a</u> is a positive number,



The Shape of a Parabola.

Type 1 Parabola
Standard form equation

$$y - k = a(x - h)^2$$

Vertex: (h, k) $a = \frac{1}{4p}$

p is the <u>directed distance</u> from the vertex to the focus.
Latus Rectum: |4p| units long

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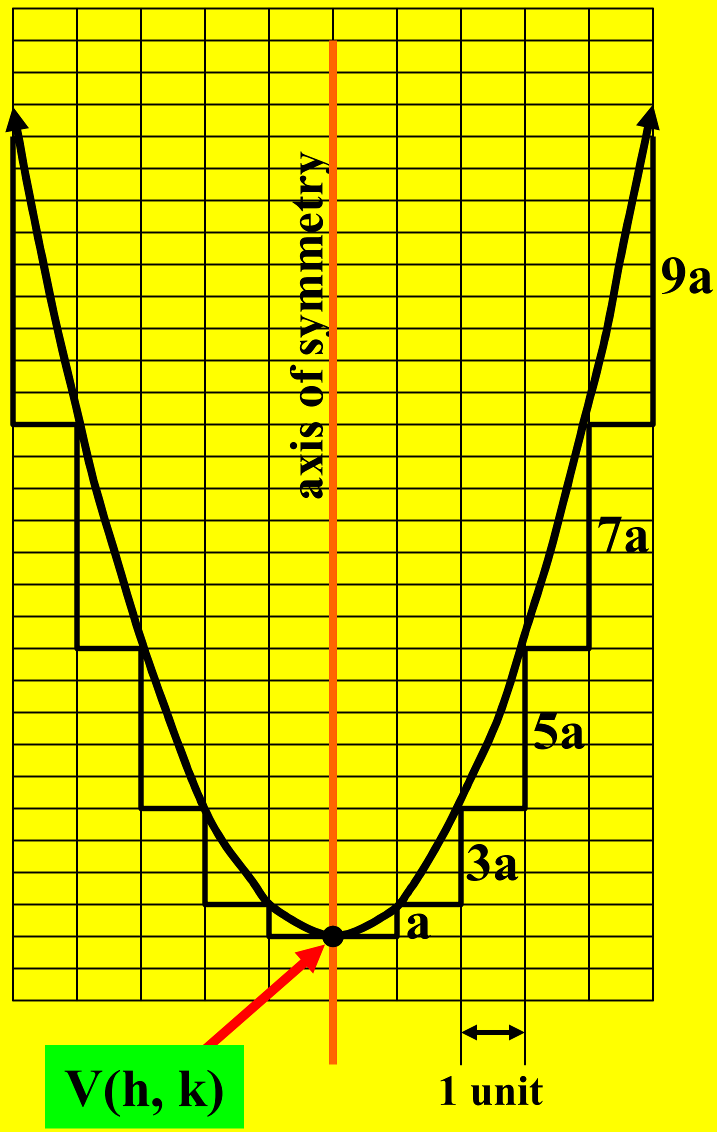
In this graph, <u>a</u> is a positive number, and the parabola 'opens up'.



The Shape of a Parabola.

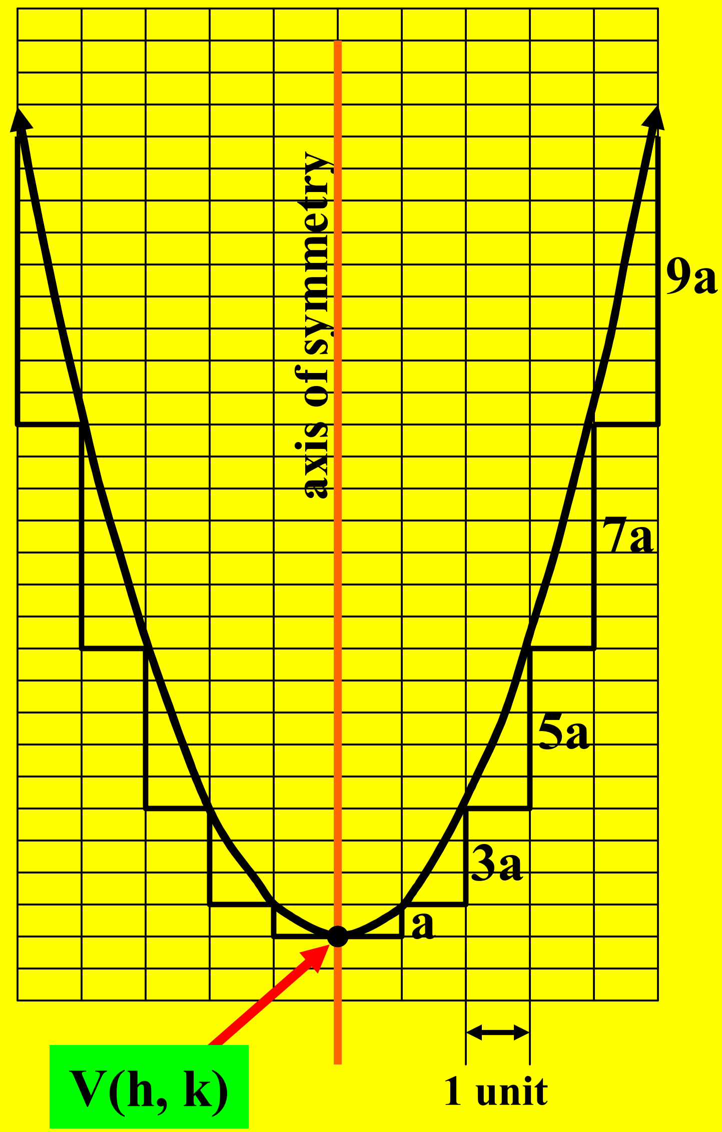
Type 1 Parabola
Standard form equation

$$y - k = a(x - h)^2$$

Vertex: (h, k) $a = \frac{1}{4p}$

p is the <u>directed distance</u> from the vertex to the focus.
Latus Rectum: |4p| units long

This diagram is intended to further illustrate how the shape of a parabola is related to the value of <u>a</u> in the standard form equation. Of course, the vertex is the point V(h, k). In this graph, <u>a</u> is a positive number, and the parabola 'opens up'. If <u>a</u> was negative,



The Shape of a Parabola.

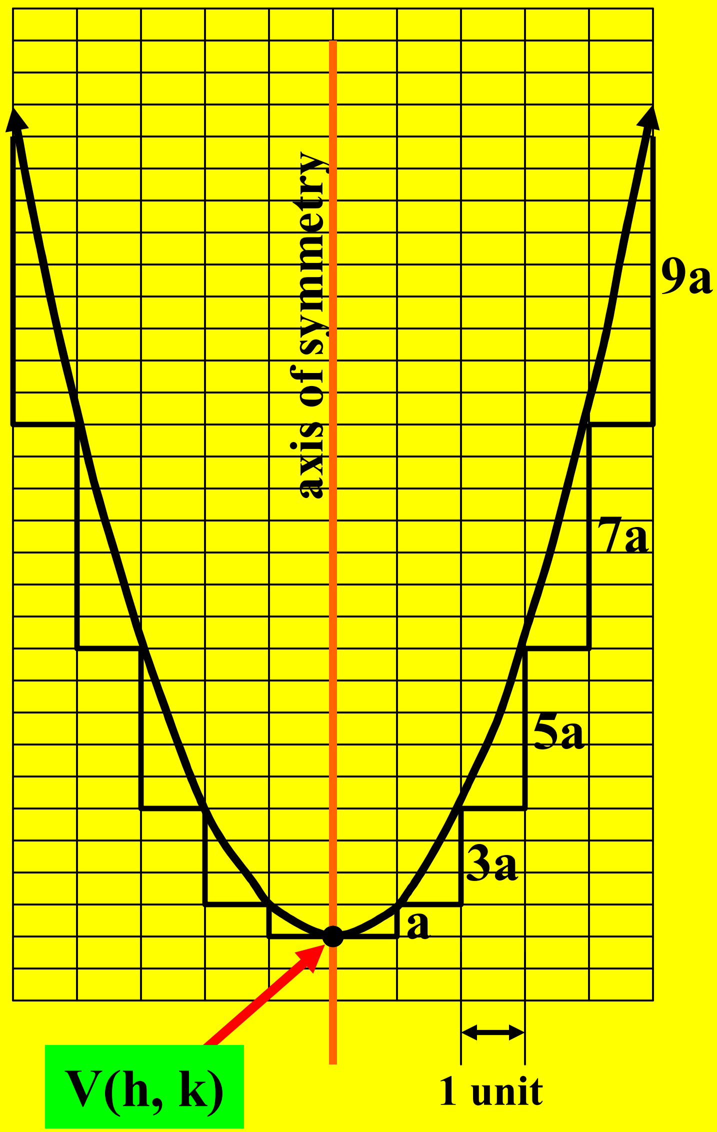
Type 1 Parabola
Standard form equation

$$y - k = a(x - h)^2$$

Vertex: (h, k) $\quad a = \dfrac{1}{4p}$

p is the <u>directed distance</u> from the vertex to the focus.
Latus Rectum: |4p| units long

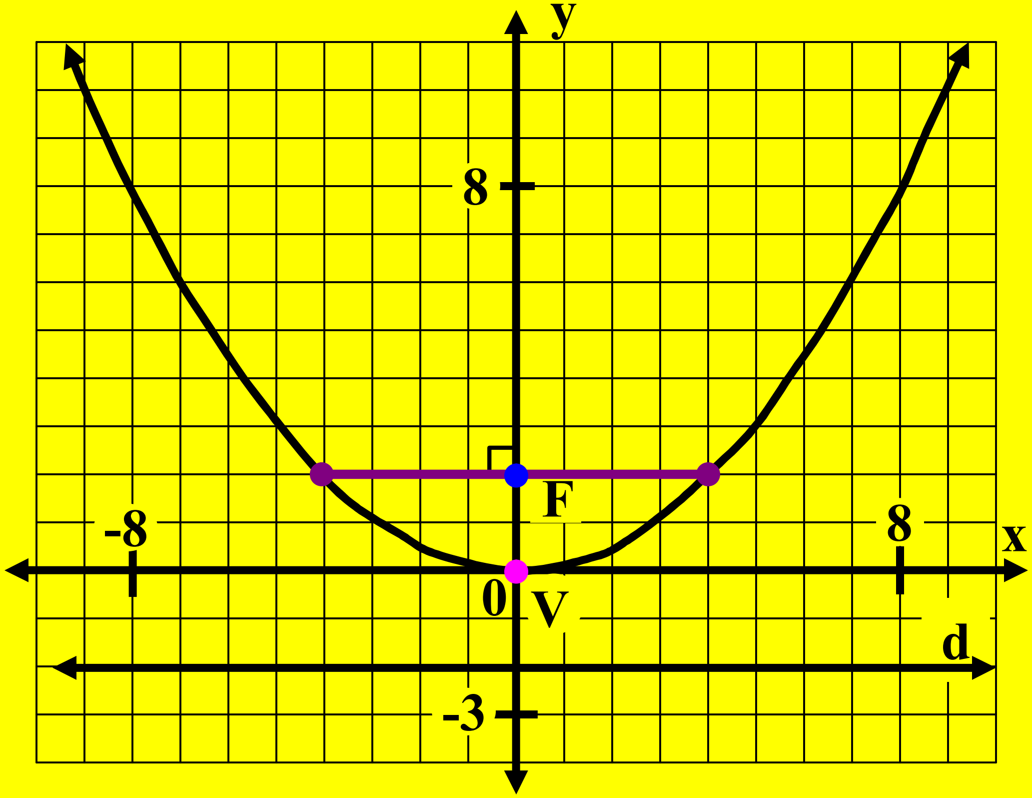
This diagram is intended to further illustrate how the shape of a parabola is related to the value of <u>a</u> in the standard form equation. Of course, the vertex is the point V(h, k).
In this graph, <u>a</u> is a positive number, and the parabola 'opens up'. If <u>a</u> was negative, the parabola would 'open down'.



The Equations of a Parabola.

Standard Form Equation

$$y = \frac{1}{8}x^2$$



The Equations of a Parabola.

Standard Form Equation

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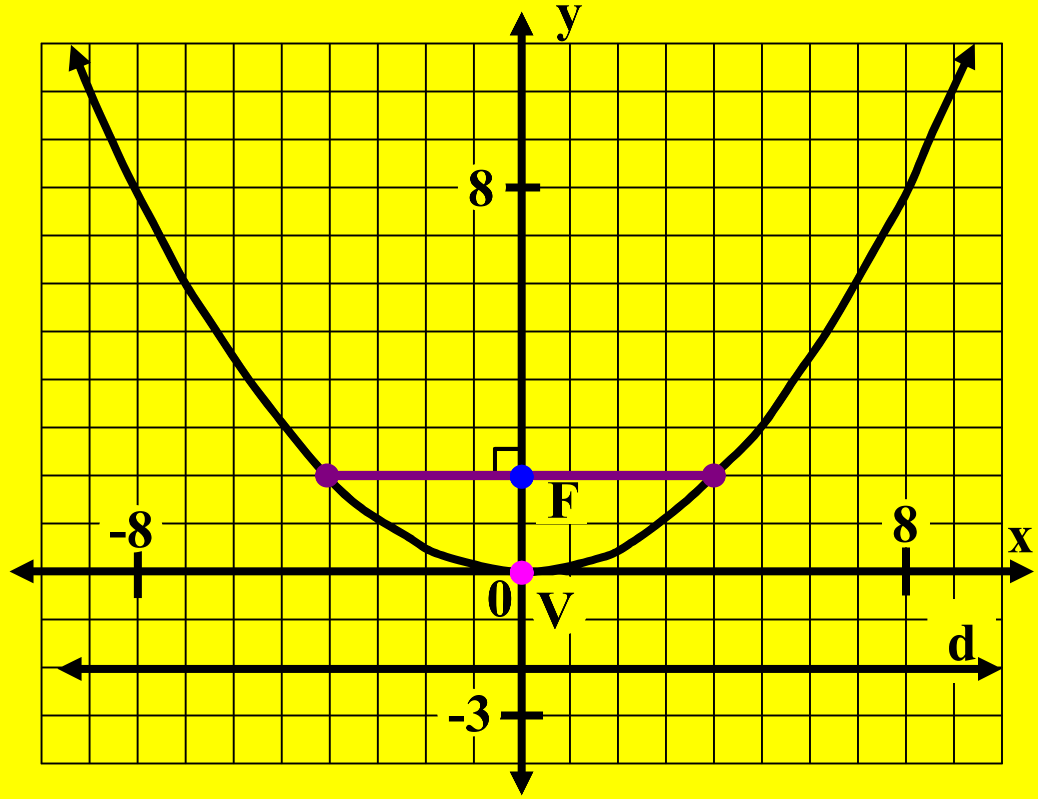

The general form equation of a parabola is similar to that of a circle, an ellipse, and a hyperbola.

The Equations of a Parabola.

Standard Form Equation

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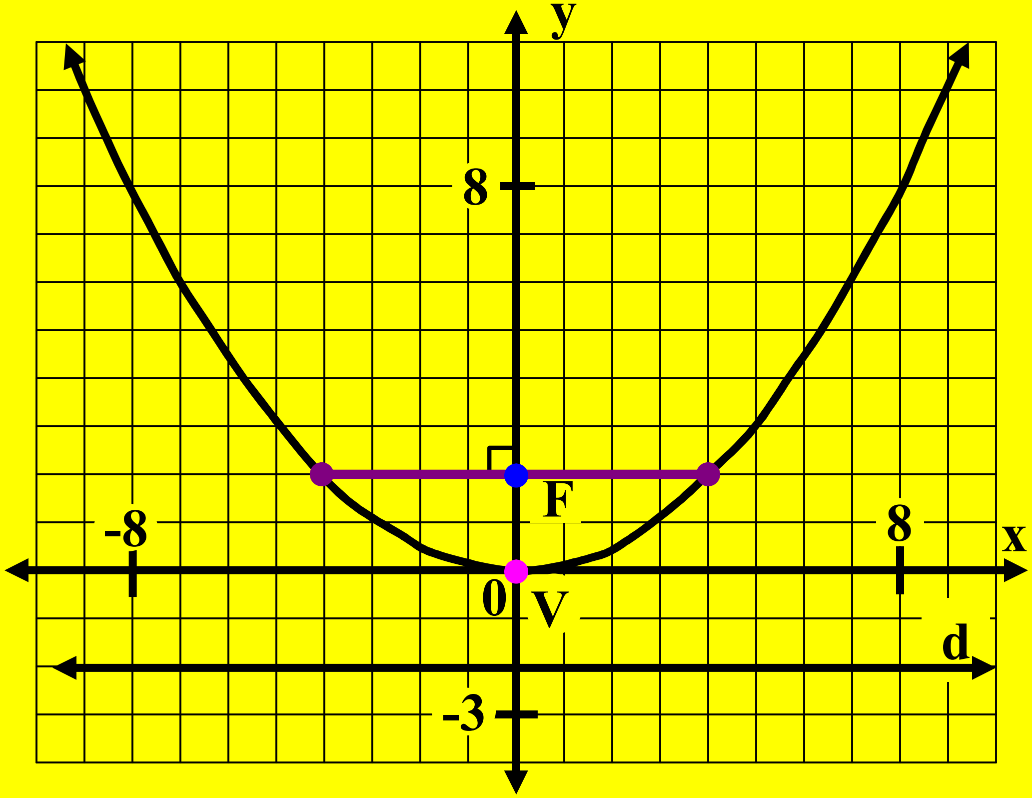


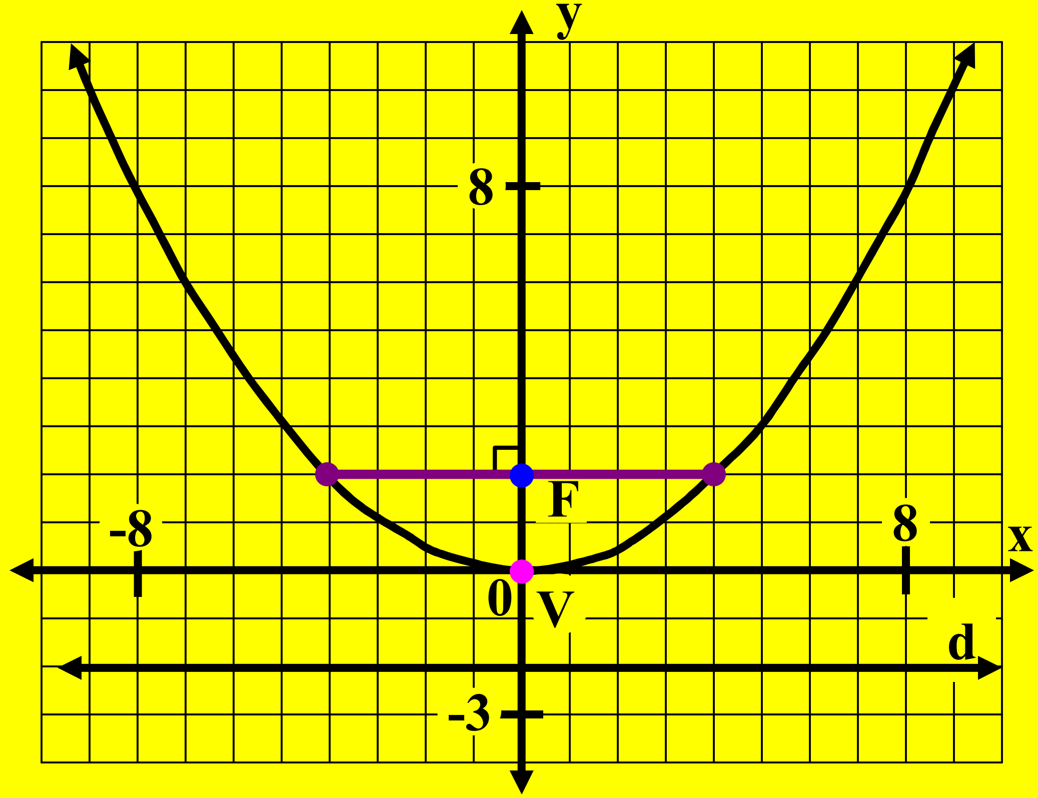
The general form equation of a parabola is similar to that of a circle, an ellipse, and a hyperbola. It looks like this.

$$Ax^2 + Cy^2 + Dx + Ey + F = 0$$

The Equations of a Parabola.

Standard Form Equation

$$y = \frac{1}{8}x^2$$



The general form equation of a parabola is similar to that of a circle, an ellipse, and a hyperbola. It looks like this.

$$Ax^2 + Cy^2 + Dx + Ey + F = 0$$

With a parabola, however,

The Equations of a Parabola.

Standard Form Equation

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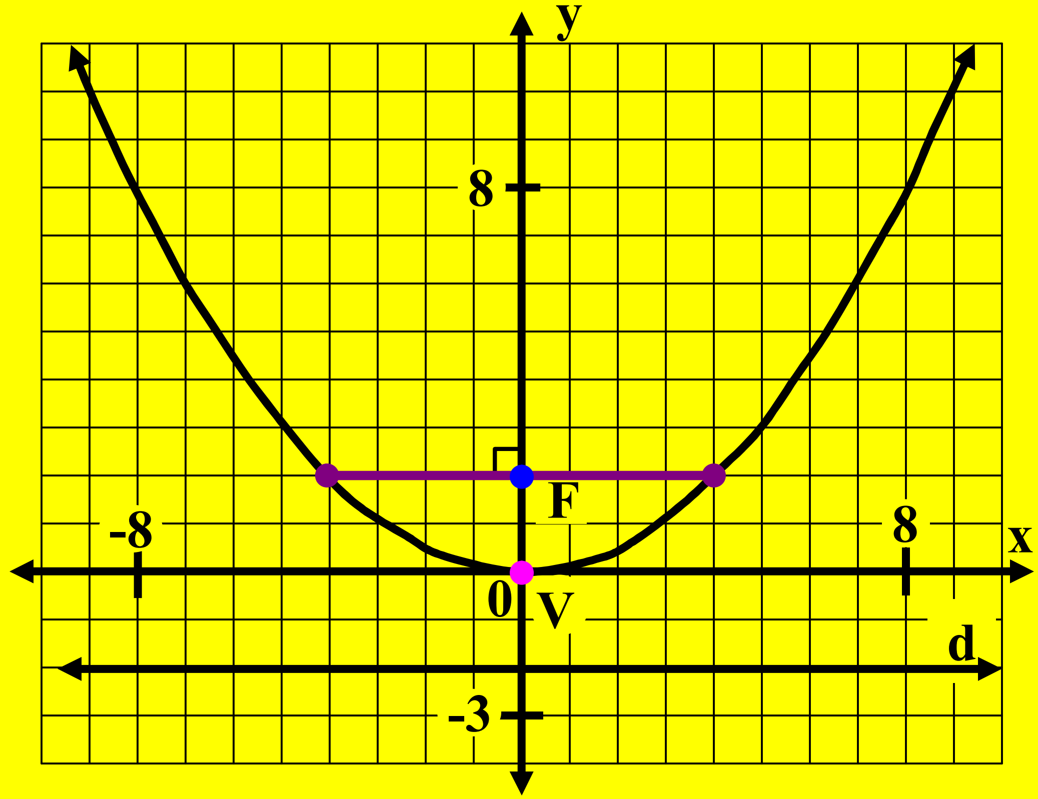

The general form equation of a parabola is similar to that of a circle, an ellipse, and a hyperbola. It looks like this.

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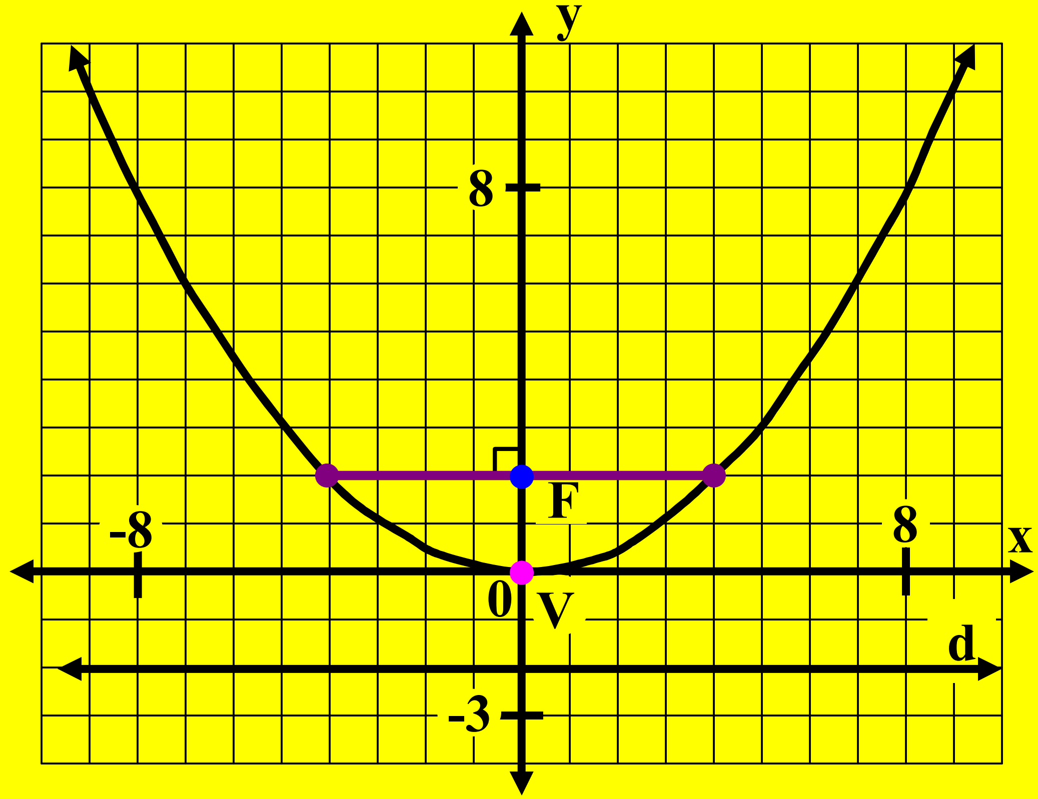
With a parabola, however, A = 0

The Equations of a Parabola.

Standard Form Equation

$$y = \frac{1}{8}x^2$$



The general form equation of a parabola is similar to that of a circle, an ellipse, and a hyperbola. It looks like this.

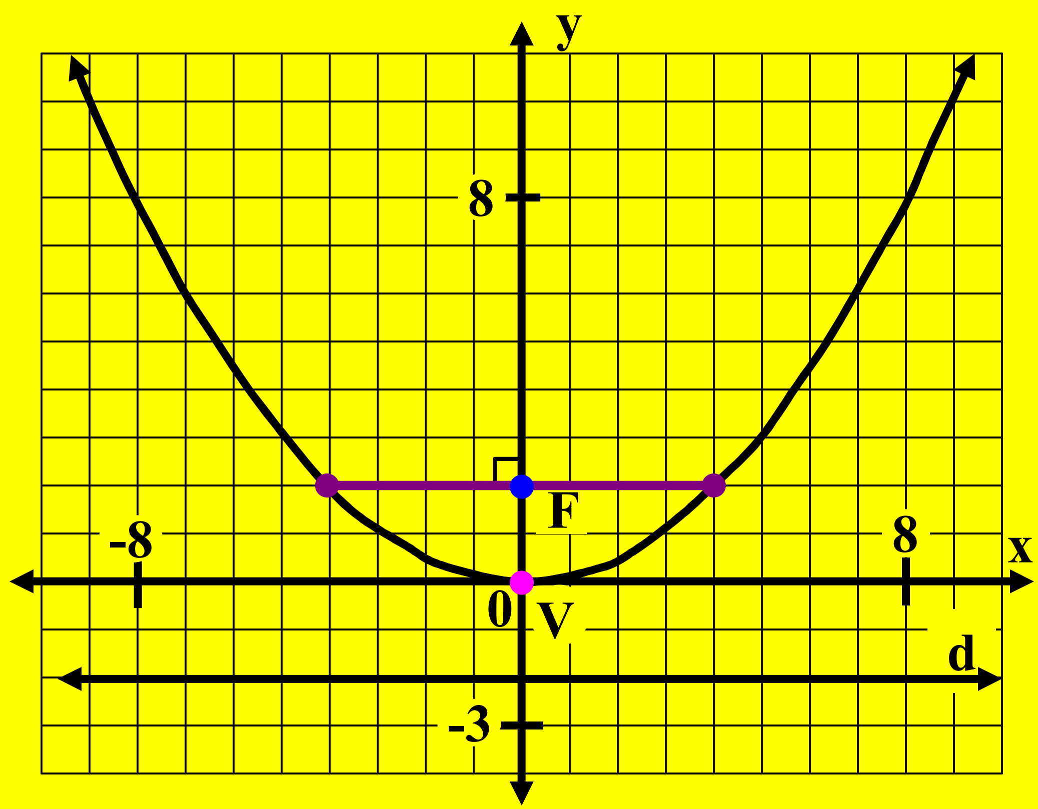
$$Ax^2 + Cy^2 + Dx + Ey + F = 0$$

With a parabola, however, A = 0 or C = 0.

The Equations of a Parabola.

Standard Form Equation

$$y = \frac{1}{8}x^2$$



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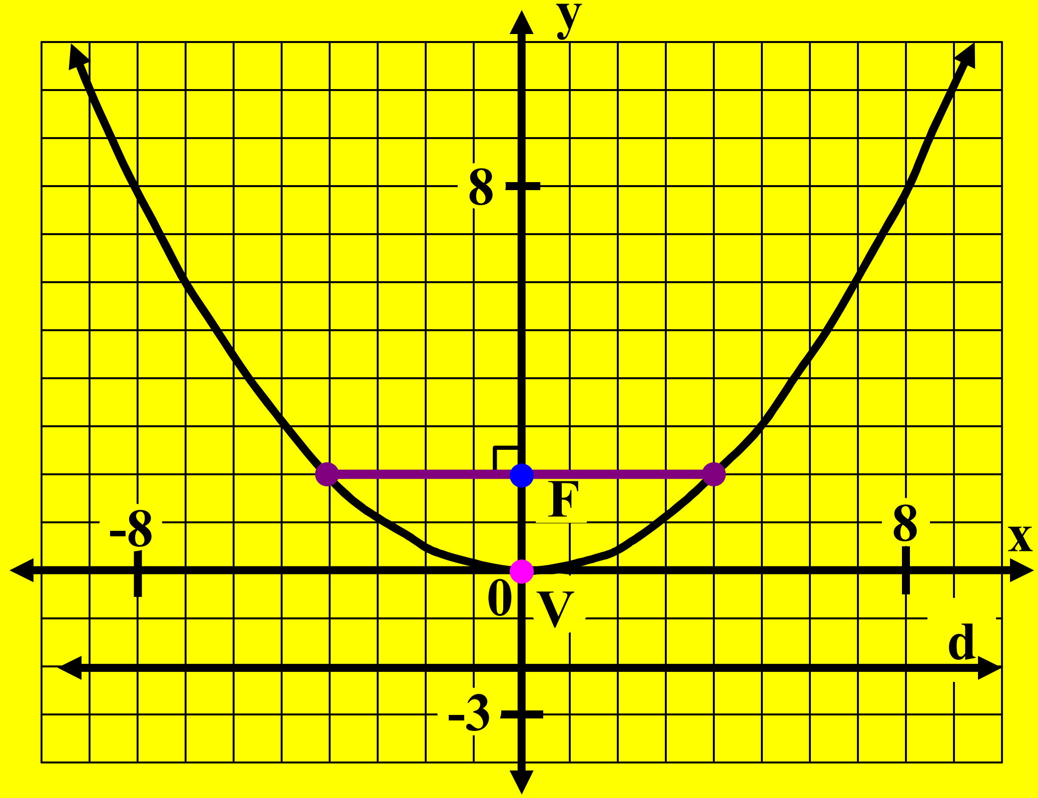
With a parabola, however, A = 0 or C = 0. (not both)

The Equations of a Parabola.

Standard Form Equation

$$y = \frac{1}{8}x^2$$



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$$Ax^2 + Cy^2 + Dx + Ey + F = 0$$

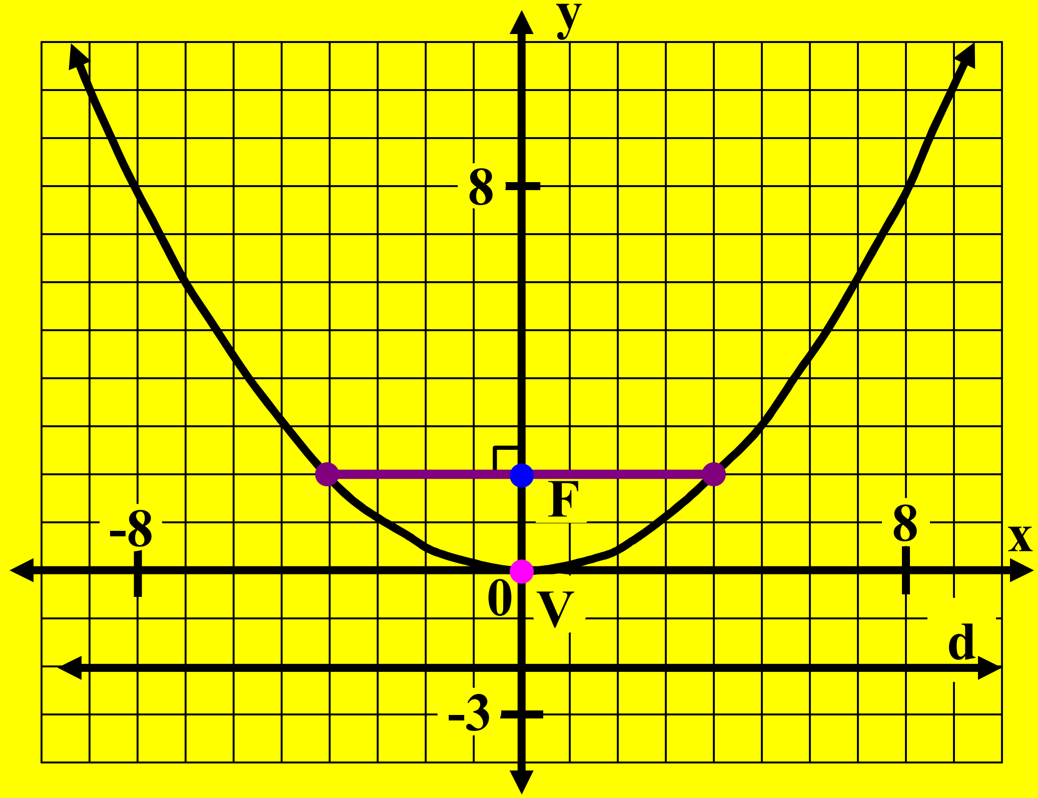
With a parabola, however, A = 0 or C = 0. (not both)

We will derive the general form equation of this parabola.

The Equations of a Parabola.

Standard Form Equation

$$y = \frac{1}{8}x^2$$



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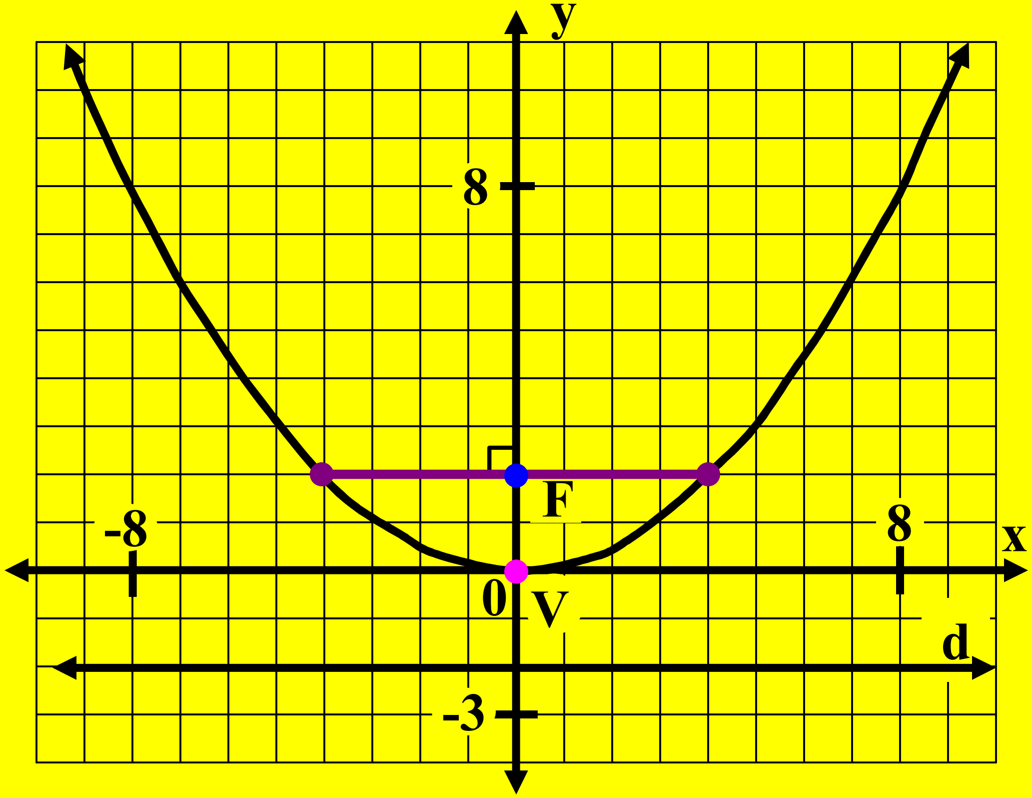

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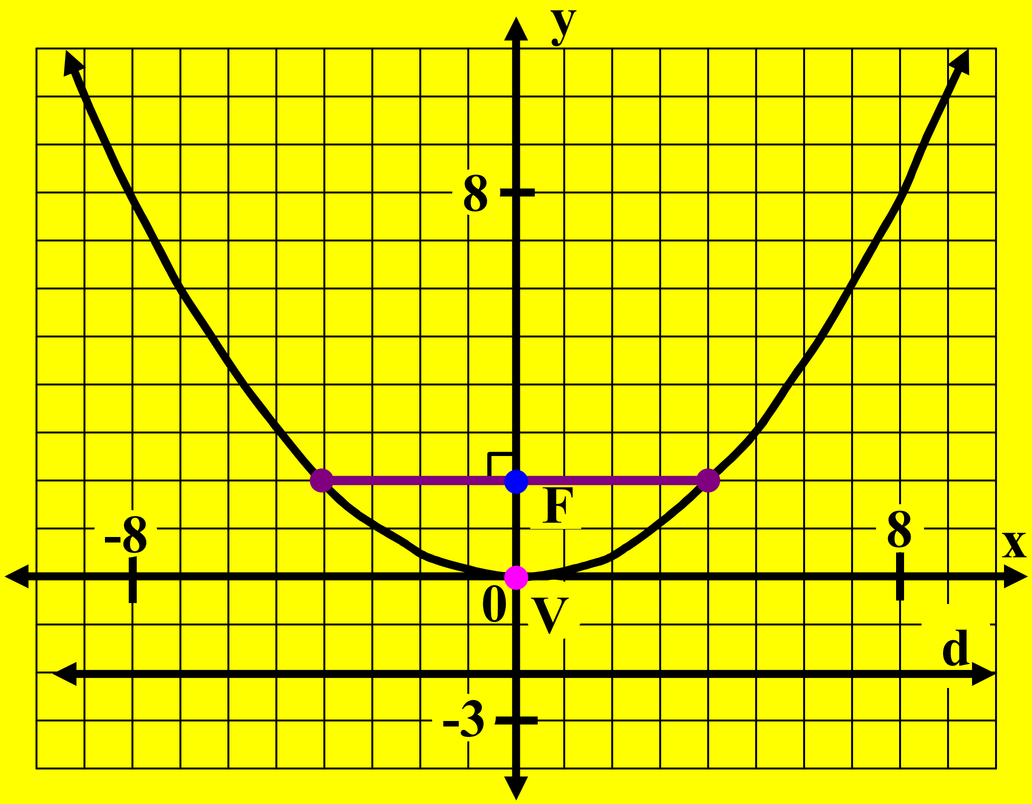
The Equations of a Parabola.

Standard Form Equation

$$y = \frac{1}{8}x^2$$

$$y = \frac{1}{8}x^2$$

Multiply both sides of the equation by 8.



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$$Ax^2 + Cy^2 + Dx + Ey + F = 0$$

With a parabola, however, A = 0 or C = 0. (not both)

We will derive the general form equation of this parabola.

The Equations of a Parabola.

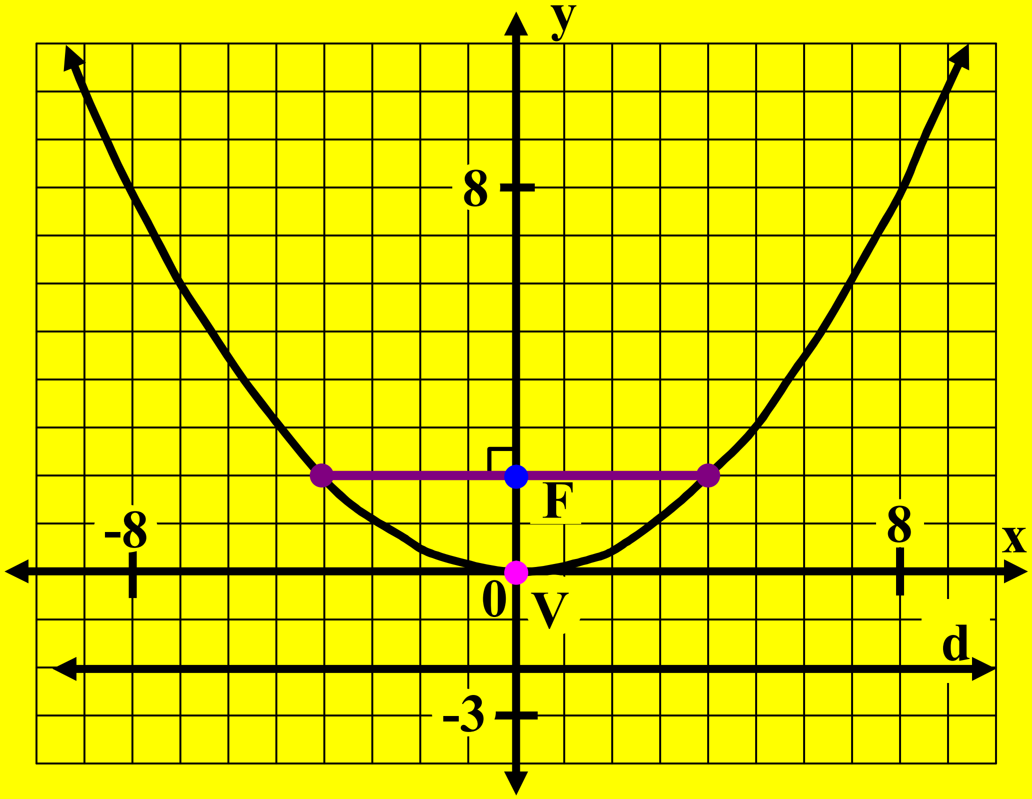
Standard Form Equation

$$y = \frac{1}{8}x^2$$

$$y = \frac{1}{8}x^2$$

$$8y$$

Multiply both sides of the equation by 8.



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$$Ax^2 + Cy^2 + Dx + Ey + F = 0$$

With a parabola, however, A = 0 or C = 0. (not both)

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The Equations of a Parabola.

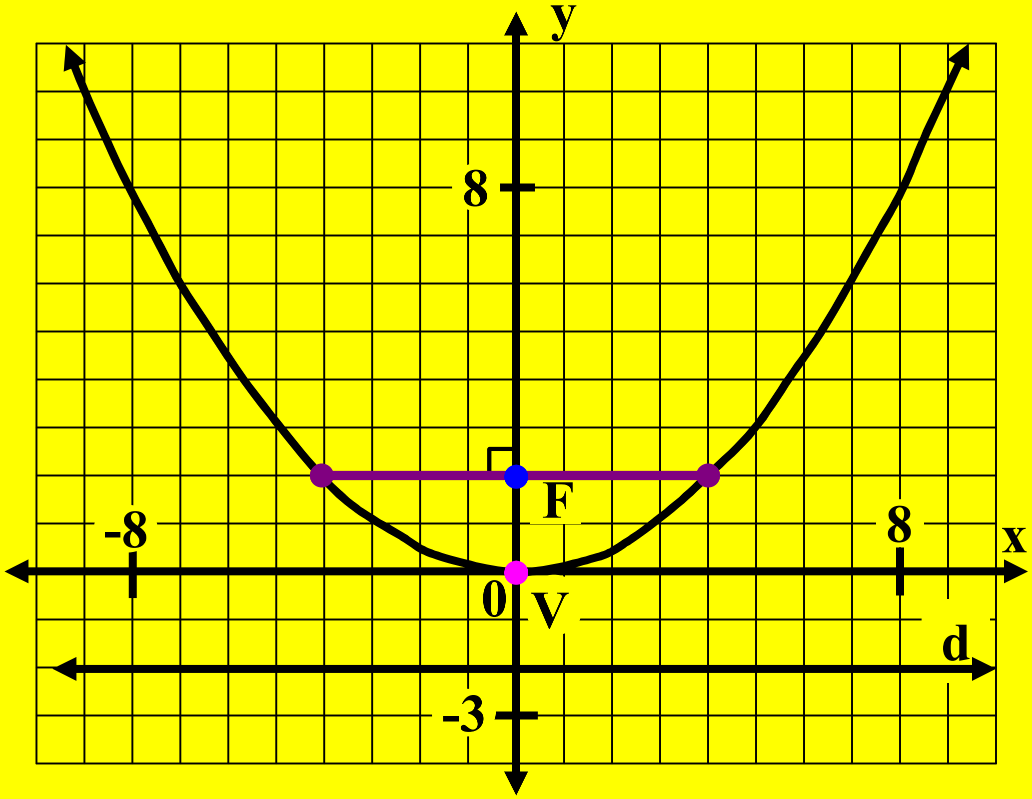
Standard Form Equation

$$y = \frac{1}{8}x^2$$

$$y = \frac{1}{8}x^2$$

$$8y =$$

Multiply both sides of the equation by 8.



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We will derive the general form equation of this parabola.

The Equations of a Parabola.

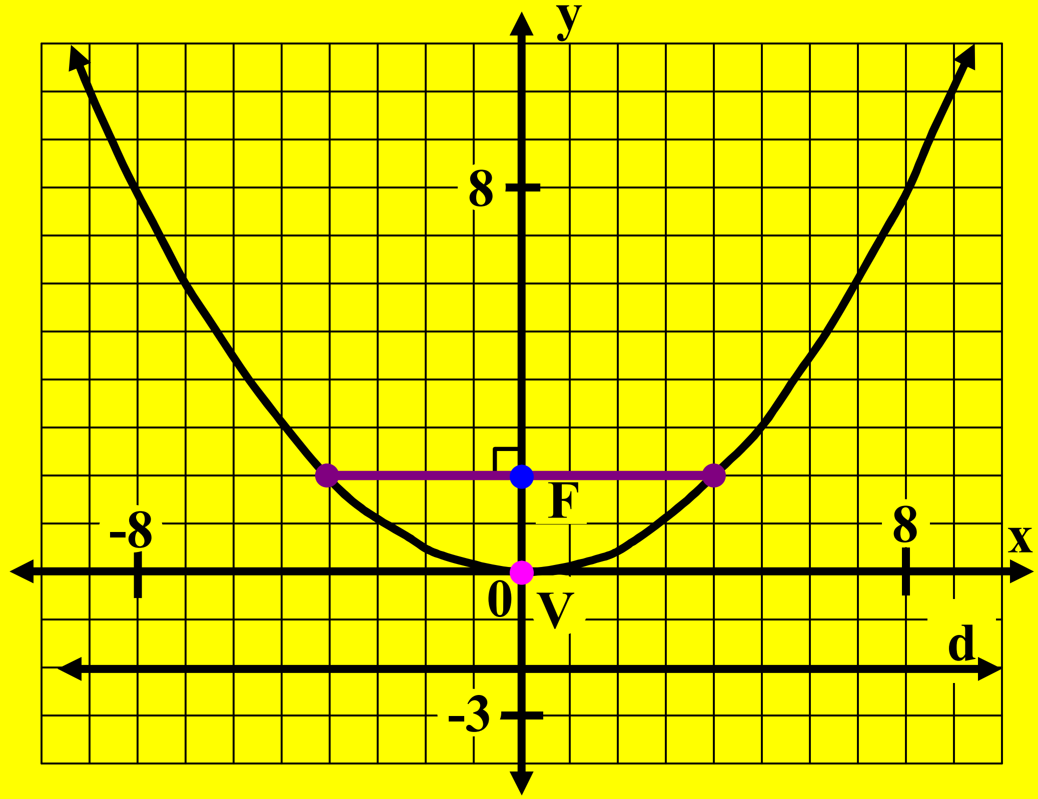
Standard Form Equation

$$y = \frac{1}{8}x^2$$

$$y = \frac{1}{8}x^2$$

$$8y = x^2$$

Multiply both sides of the equation by 8.



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The Equations of a Parabola.

Standard Form Equation

$$y = \frac{1}{8}x^2$$

$$y = \frac{1}{8}x^2$$

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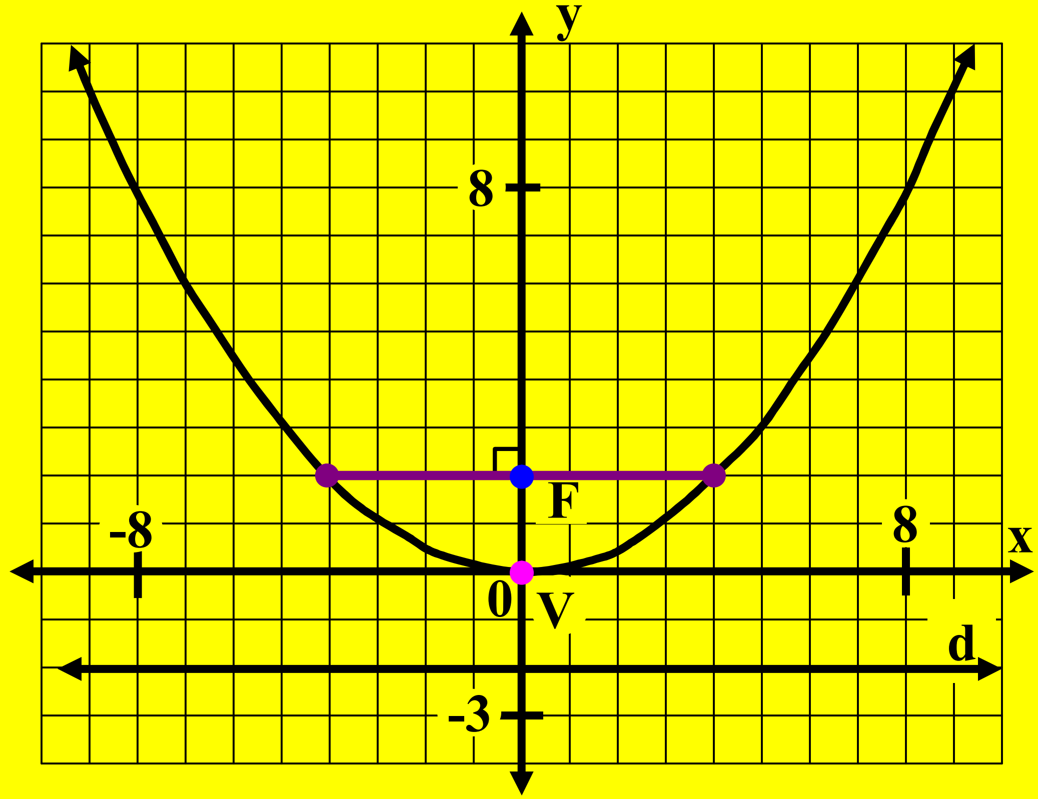

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The Equations of a Parabola.

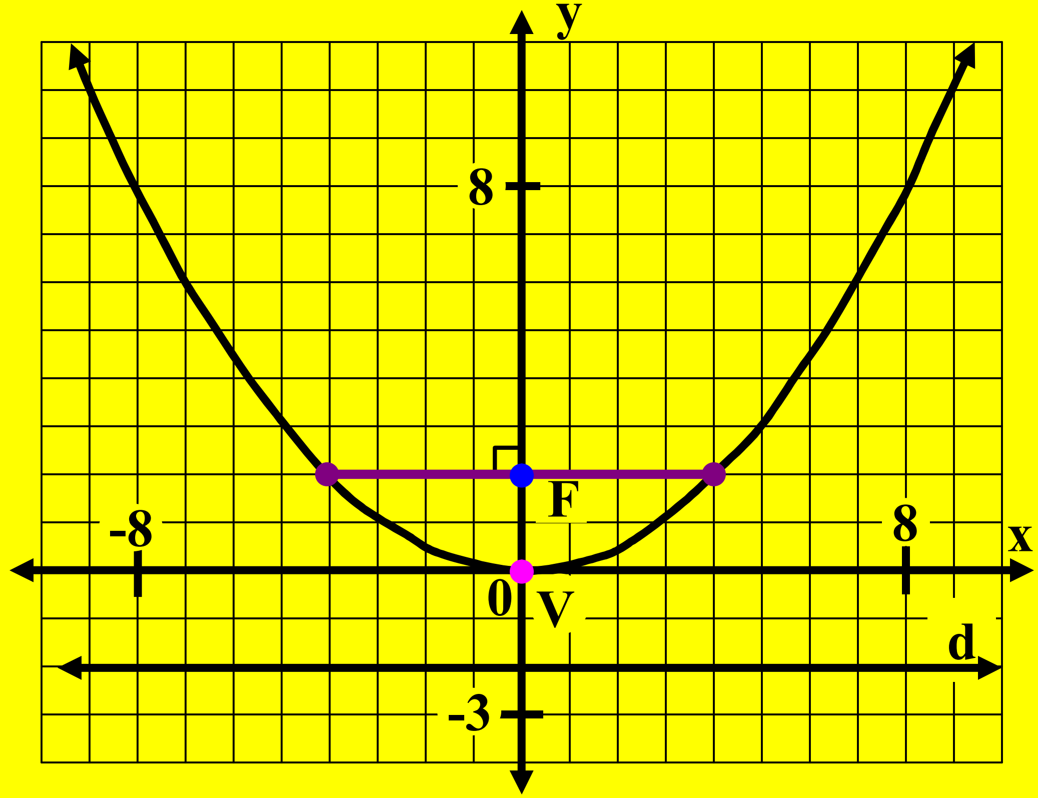
Standard Form Equation

$$y = \frac{1}{8}x^2$$

$$y = \frac{1}{8}x^2$$

$$8y = x^2$$

Subtract 8y from both sides.



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The Equations of a Parabola.

Standard Form Equation

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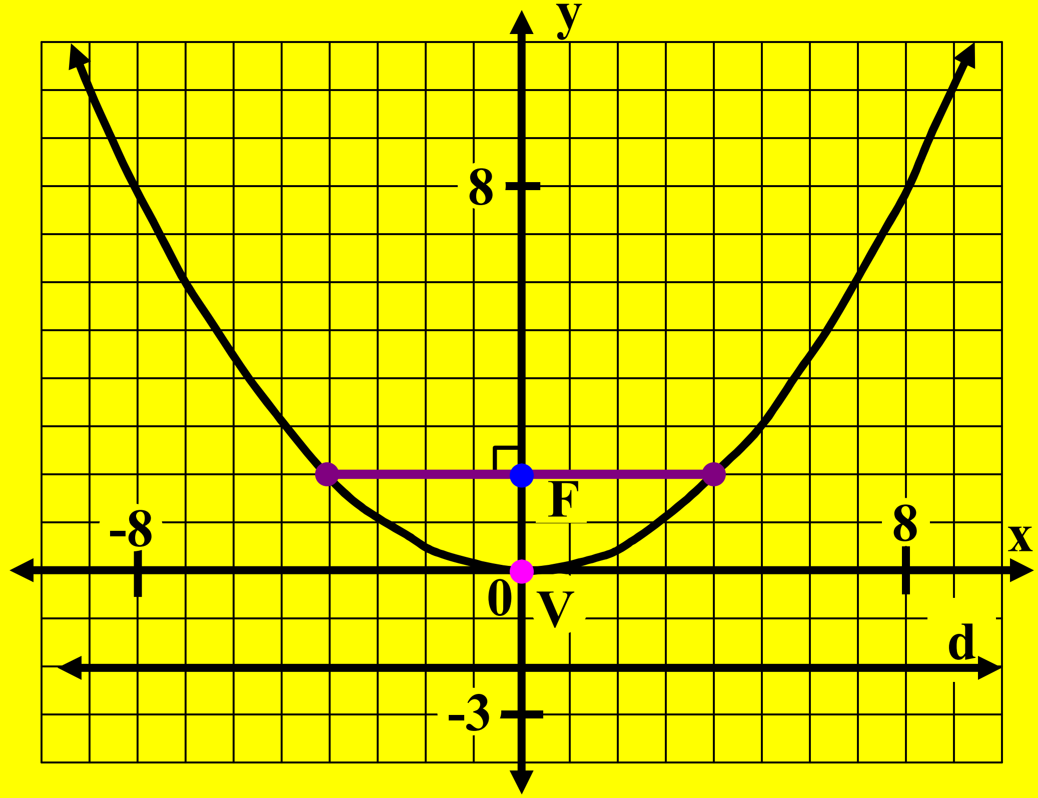
$$y = \frac{1}{8}x^2$$

$$8y = x^2$$

$$0$$

Subtract 8y from both sides.



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With a parabola, however, A = 0 or C = 0. (not both)

We will derive the general form equation of this parabola.

The Equations of a Parabola.

Standard Form Equation

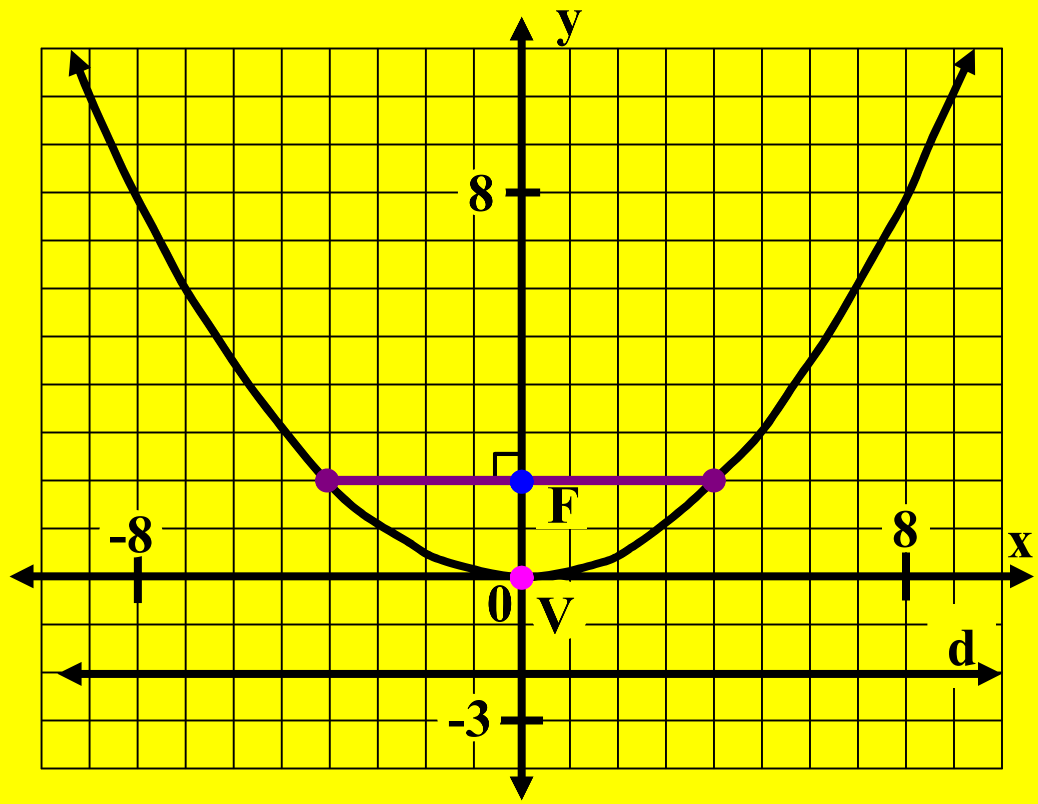
$$y = \frac{1}{8}x^2$$

$$y = \frac{1}{8}x^2$$

$$8y = x^2$$

$$0 =$$

Subtract 8y from both sides.



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The Equations of a Parabola.

Standard Form Equation

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$$y = \frac{1}{8}x^2$$

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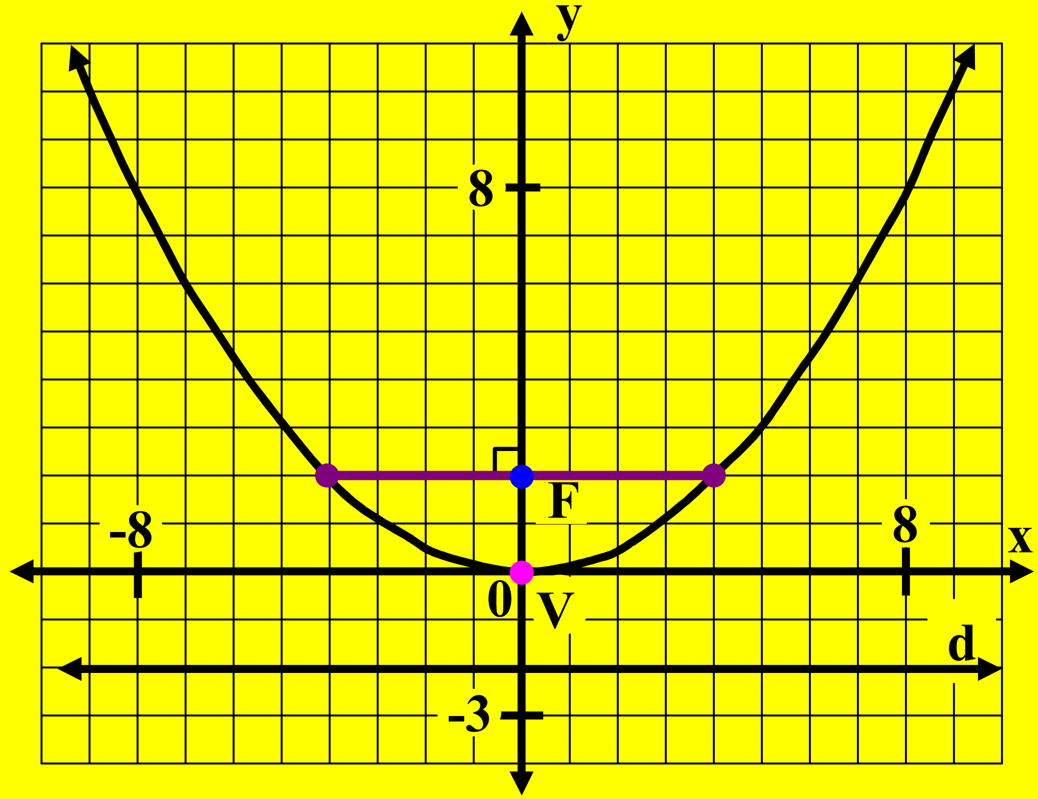
$$0 = x^2$$

Subtract 8y from both sides.



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The Equations of a Parabola.

Standard Form Equation

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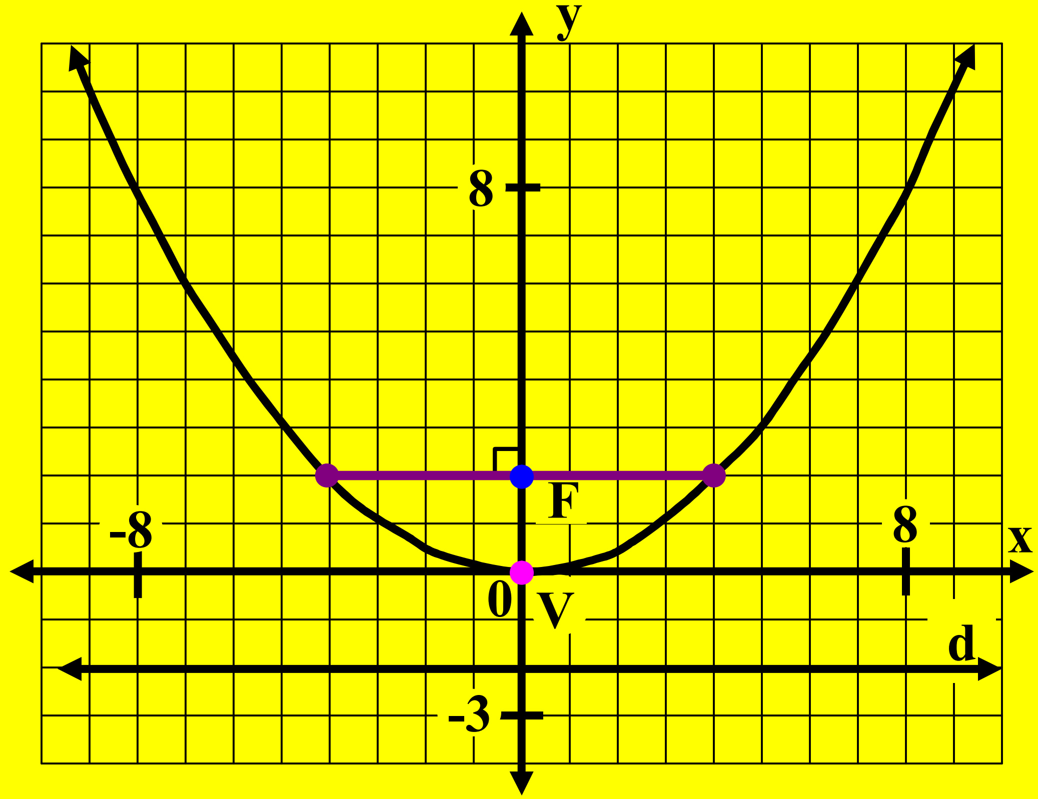
$$y = \frac{1}{8}x^2$$

$$8y = x^2$$

$$0 = x^2 -$$

Subtract 8y from both sides.



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We will derive the general form equation of this parabola.

The Equations of a Parabola.

Standard Form Equation

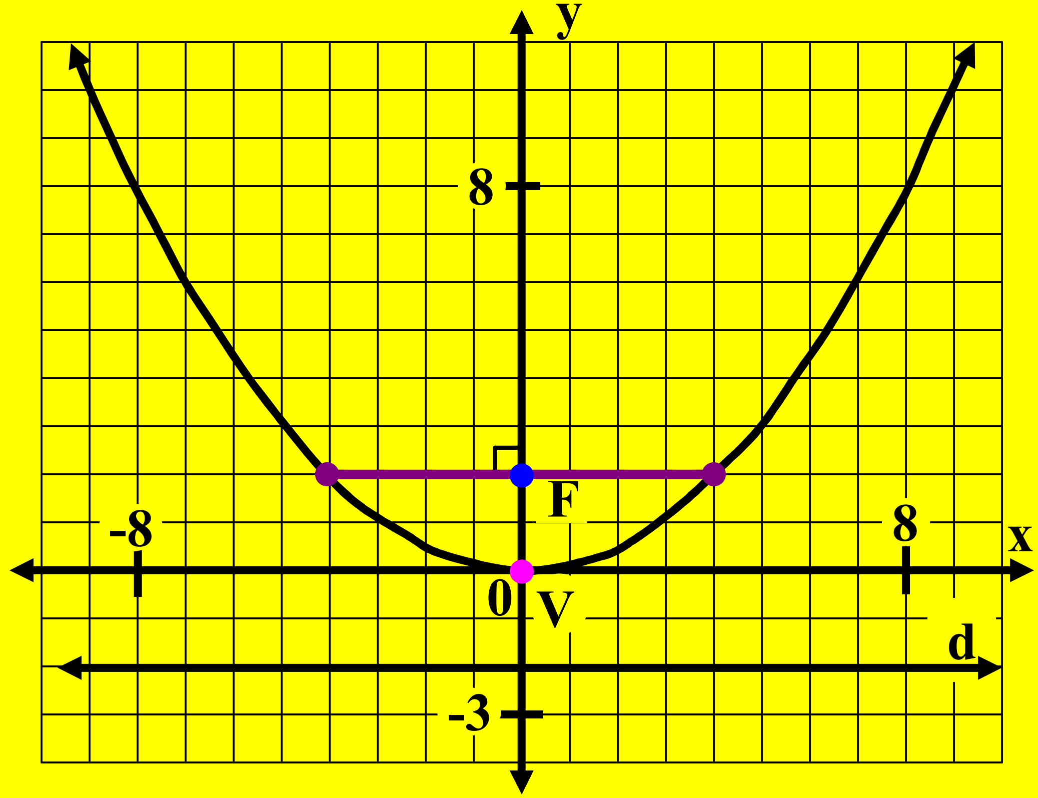
$$y = \frac{1}{8}x^2$$

$$y = \frac{1}{8}x^2$$

$$8y = x^2$$

$$0 = x^2 - 8y$$

Subtract 8y from both sides.



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The Equations of a Parabola.

Standard Form Equation

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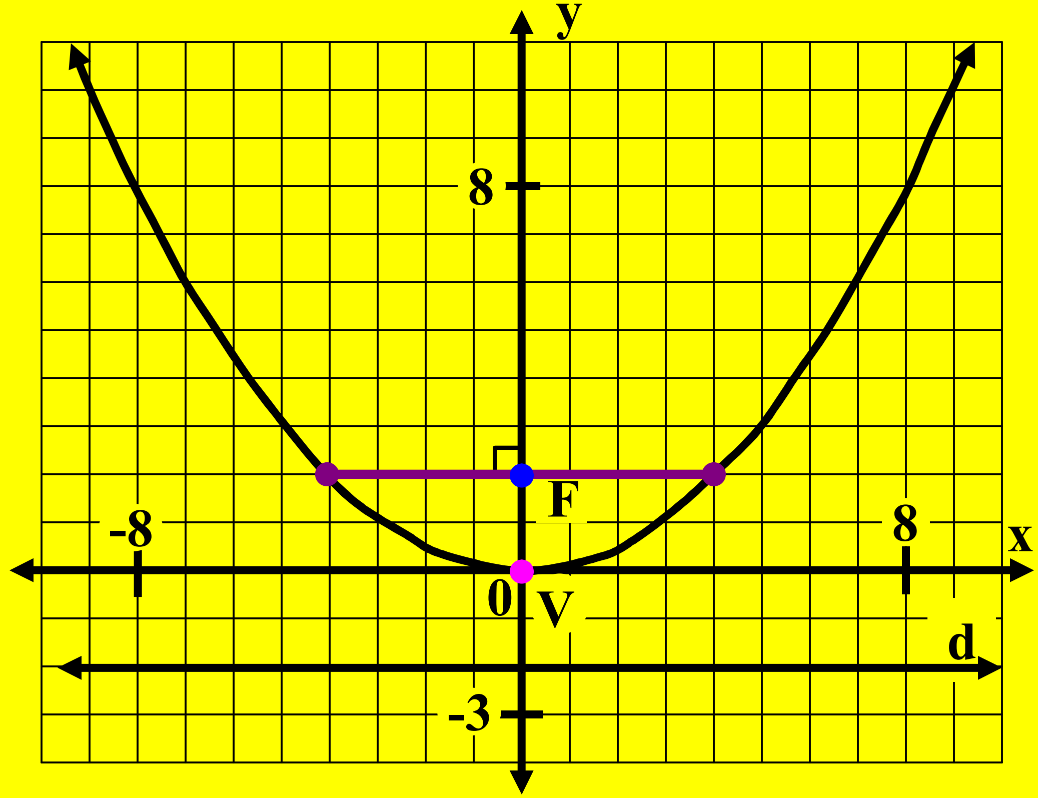
$$8y = x^2$$

$$0 = x^2 - 8y$$



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With a parabola, however, A = 0 or C = 0. (not both)

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The Equations of a Parabola.

Standard Form Equation

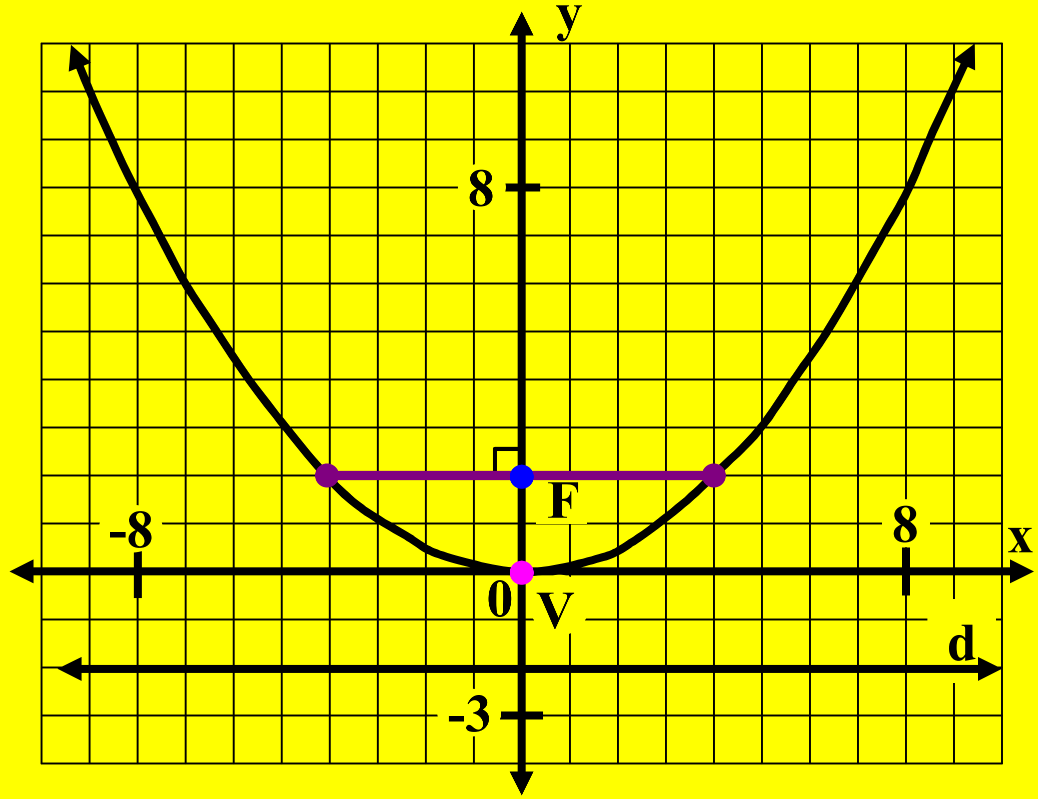
$$y = \frac{1}{8}x^2$$

$$y = \frac{1}{8}x^2$$

$$8y = x^2$$

$$0 = x^2 - 8y$$

General Form Equation



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The Equations of a Parabola.

Standard Form Equation

$$y = \frac{1}{8}x^2$$

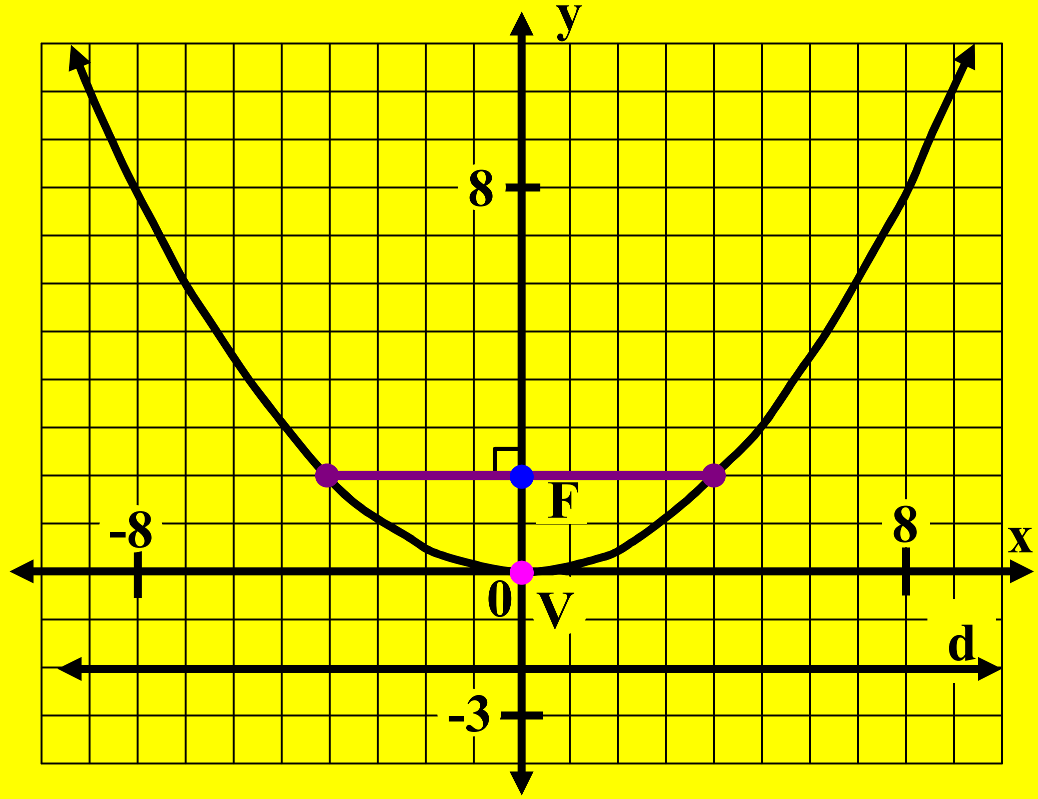
$$y = \frac{1}{8}x^2$$

$$8y = x^2$$

$$0 = x^2 - 8y$$

$$x^2$$

General Form Equation



The general form equation of a parabola is similar to that of a circle, an ellipse, and a hyperbola. It looks like this.

$$Ax^2 + Cy^2 + Dx + Ey + F = 0$$

With a parabola, however, $A = 0$ or $C = 0$. (not both)

We will derive the general form equation of this parabola.

The Equations of a Parabola.

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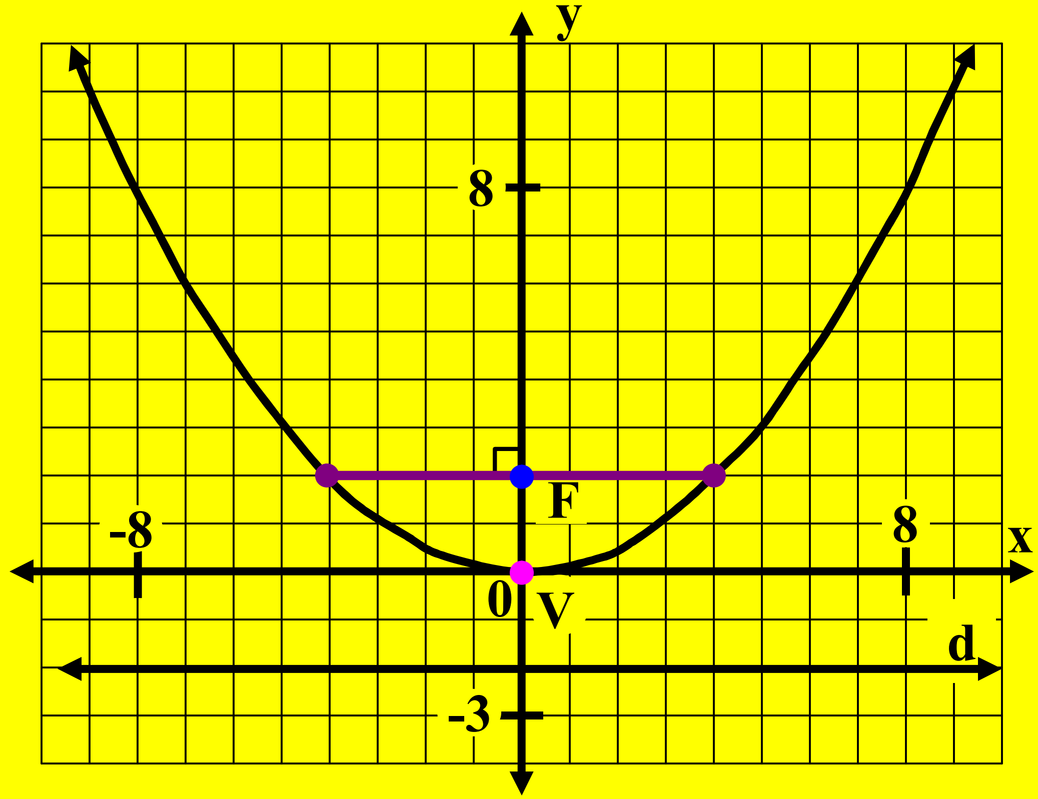

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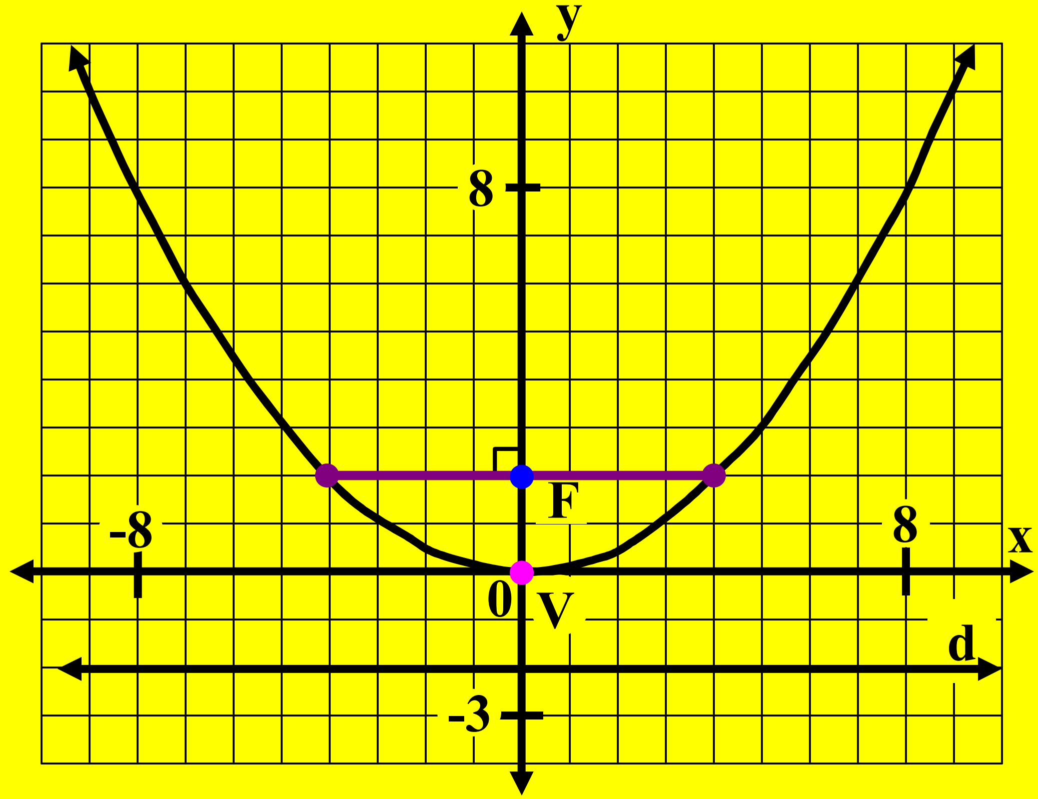

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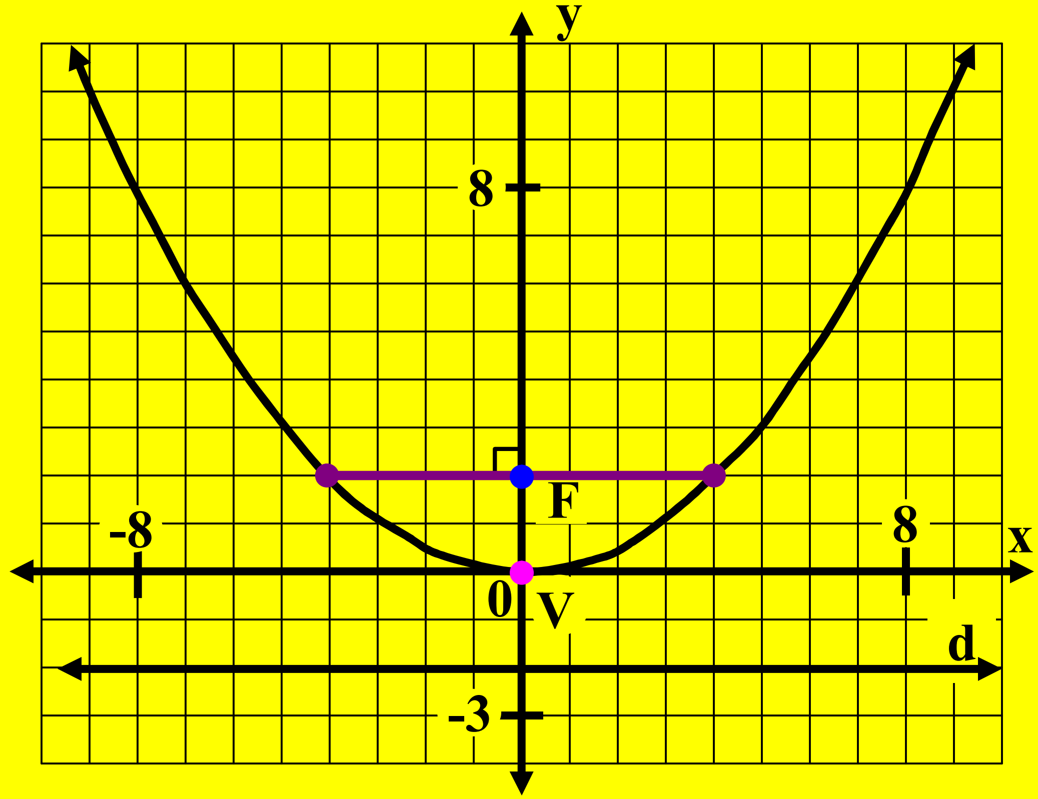

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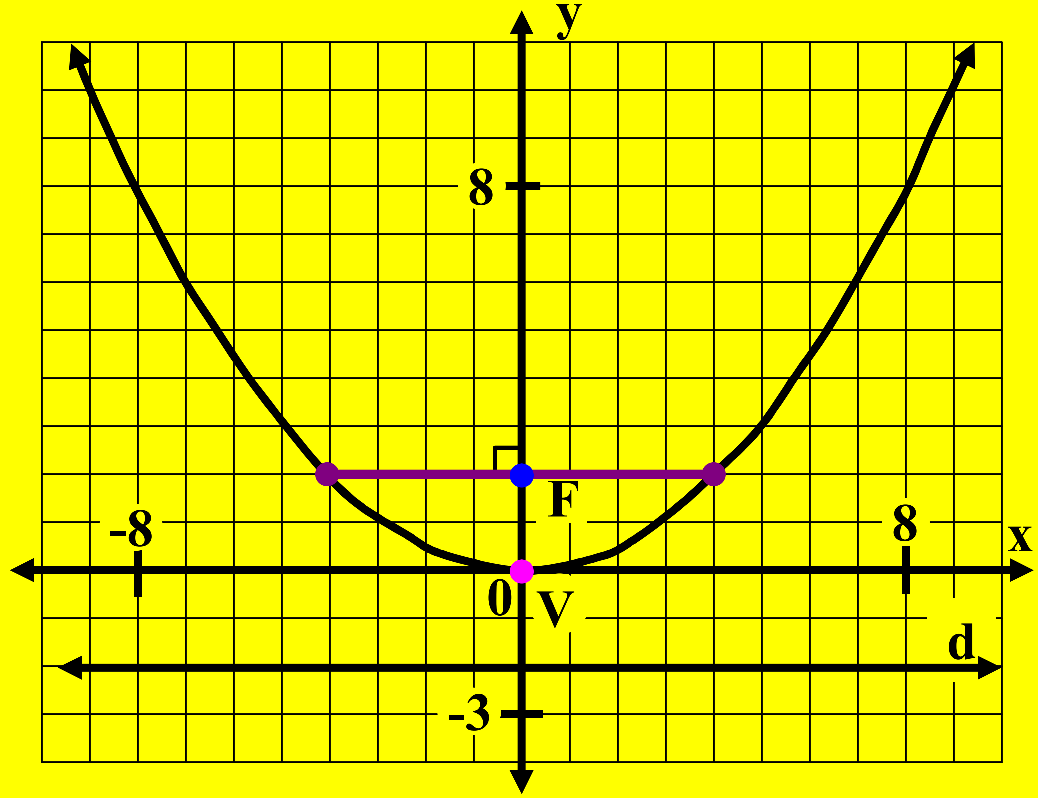

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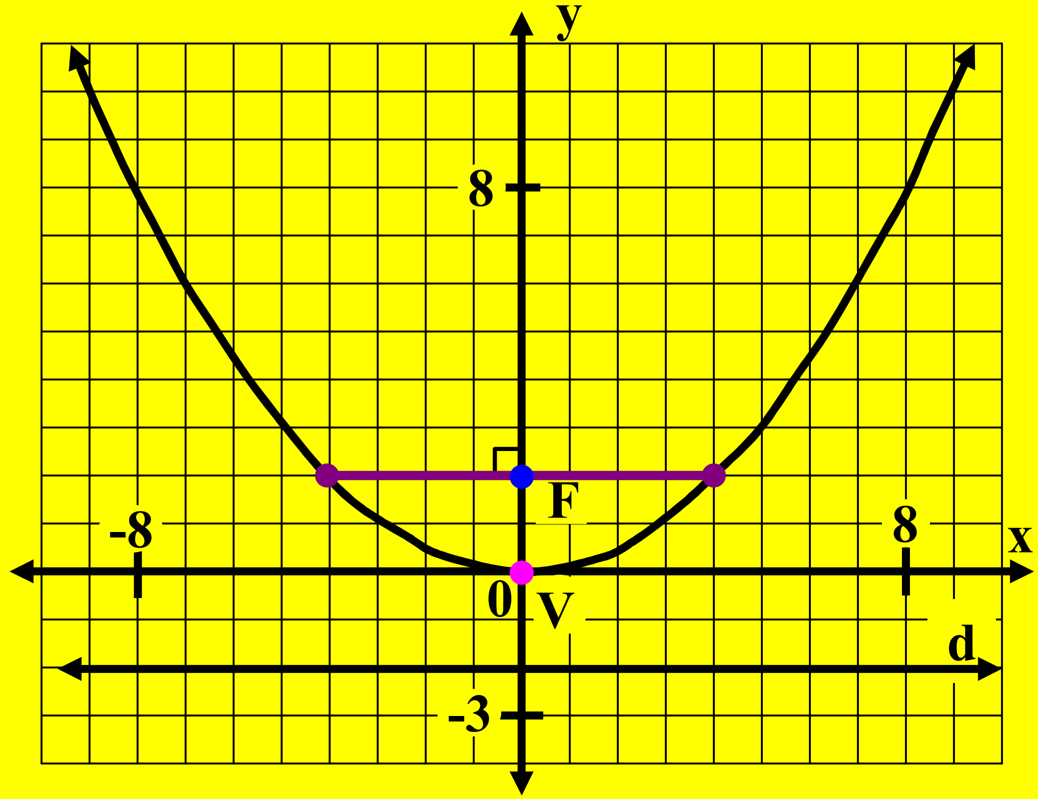

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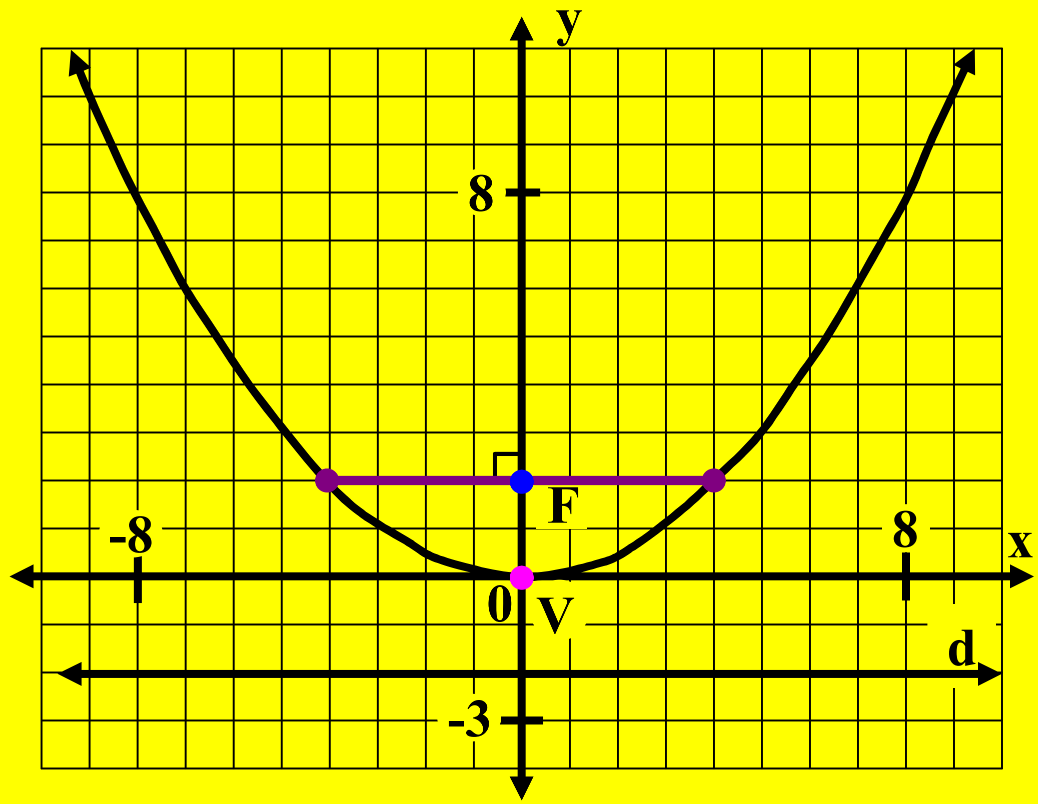

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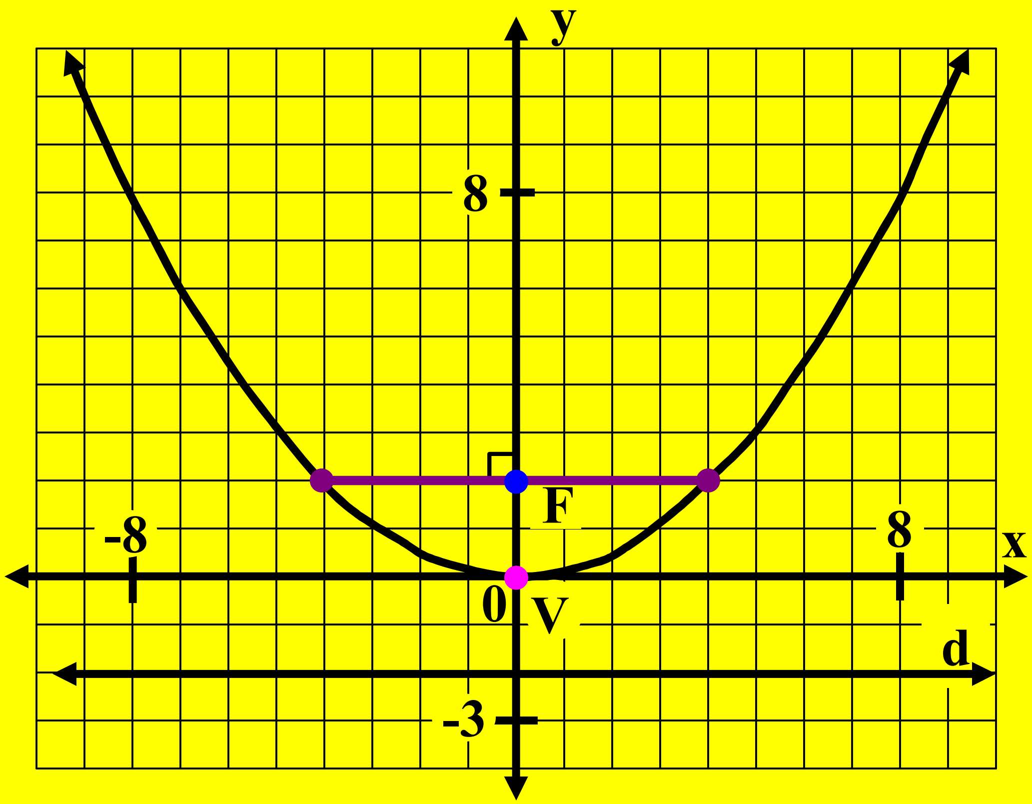

Type 1 Parabola
General Form Equation

The Equations of a Parabola.

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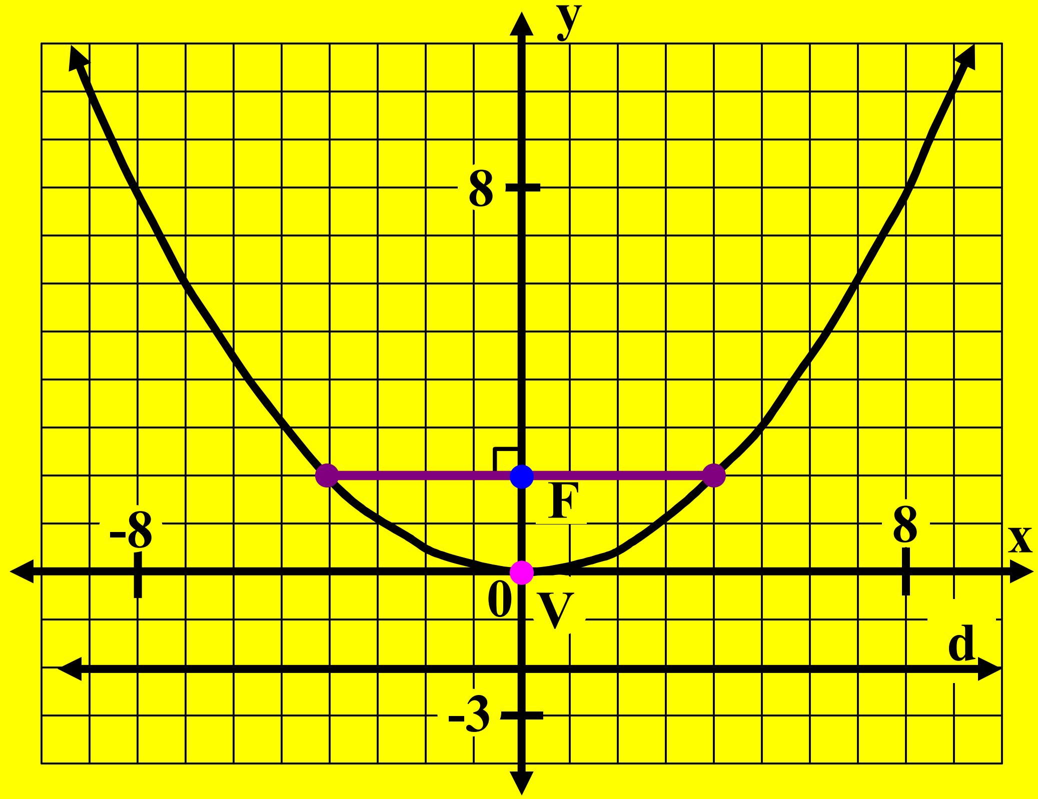
$$x^2 - 8y = 0$$

General Form Equation

Type 1 Parabola
General Form Equation

Ax^2



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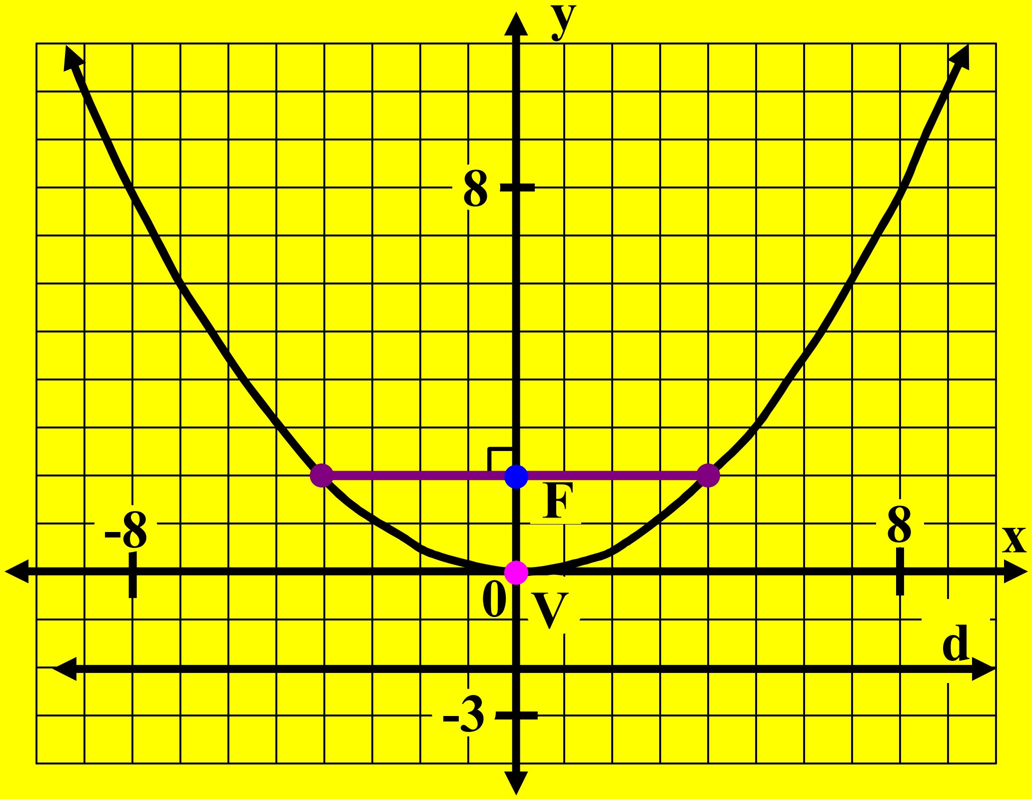

Type 1 Parabola
General Form Equation

$Ax^2 + Dx$

The Equations of a Parabola.

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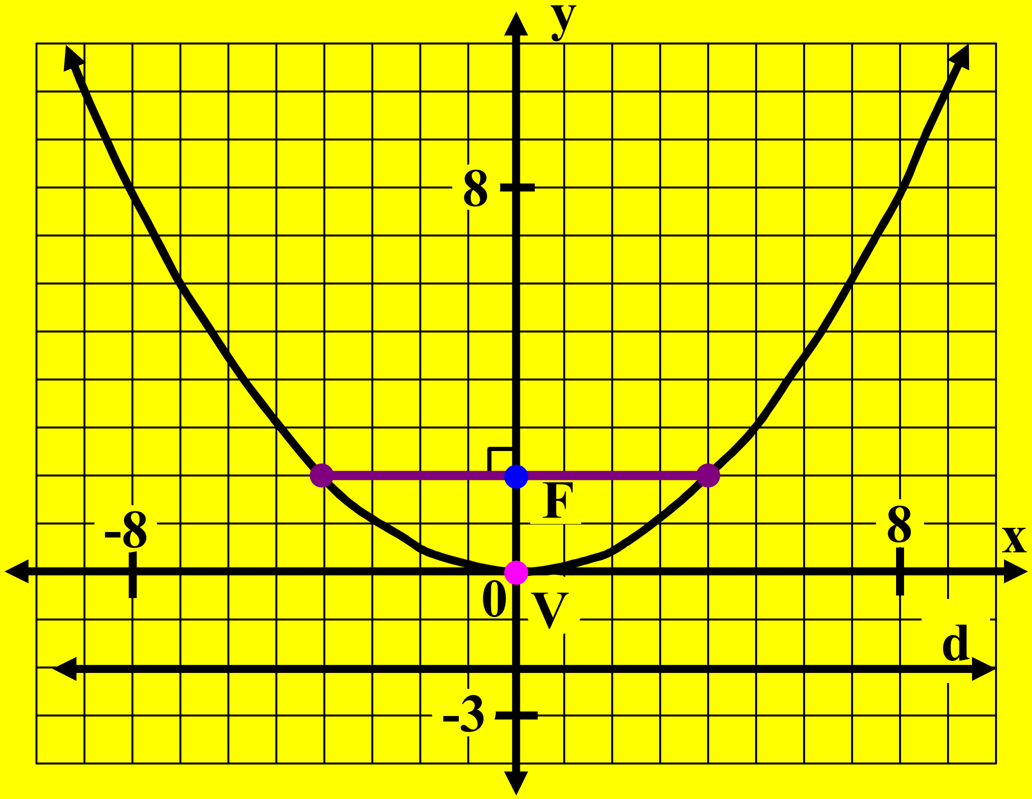
General Form Equation

Type 1 Parabola
General Form Equation

$Ax^2 + Dx + Ey$



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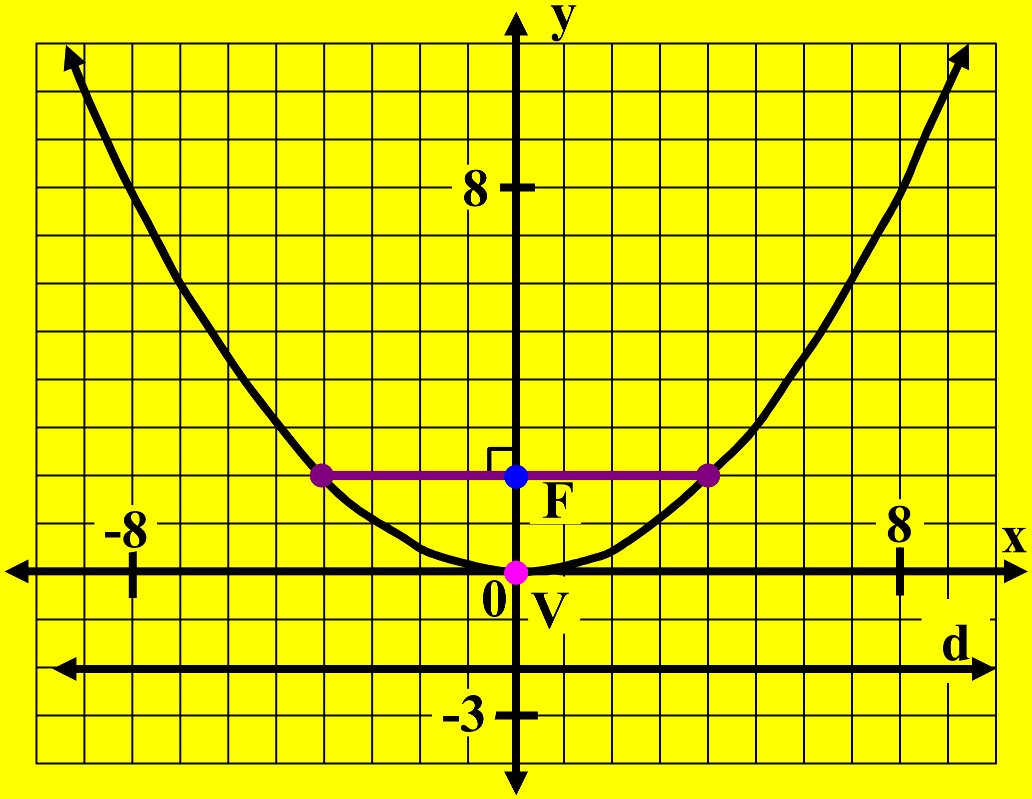
General Form Equation

Type 1 Parabola
General Form Equation

$$Ax^2 + Dx + Ey + F$$



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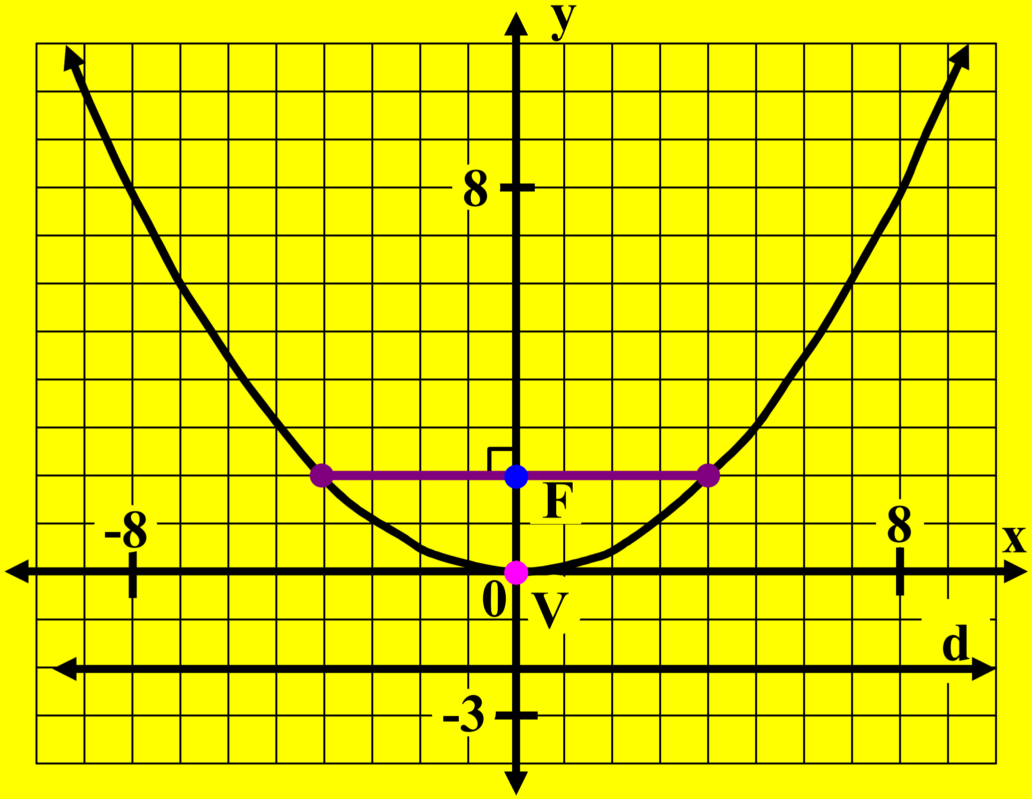

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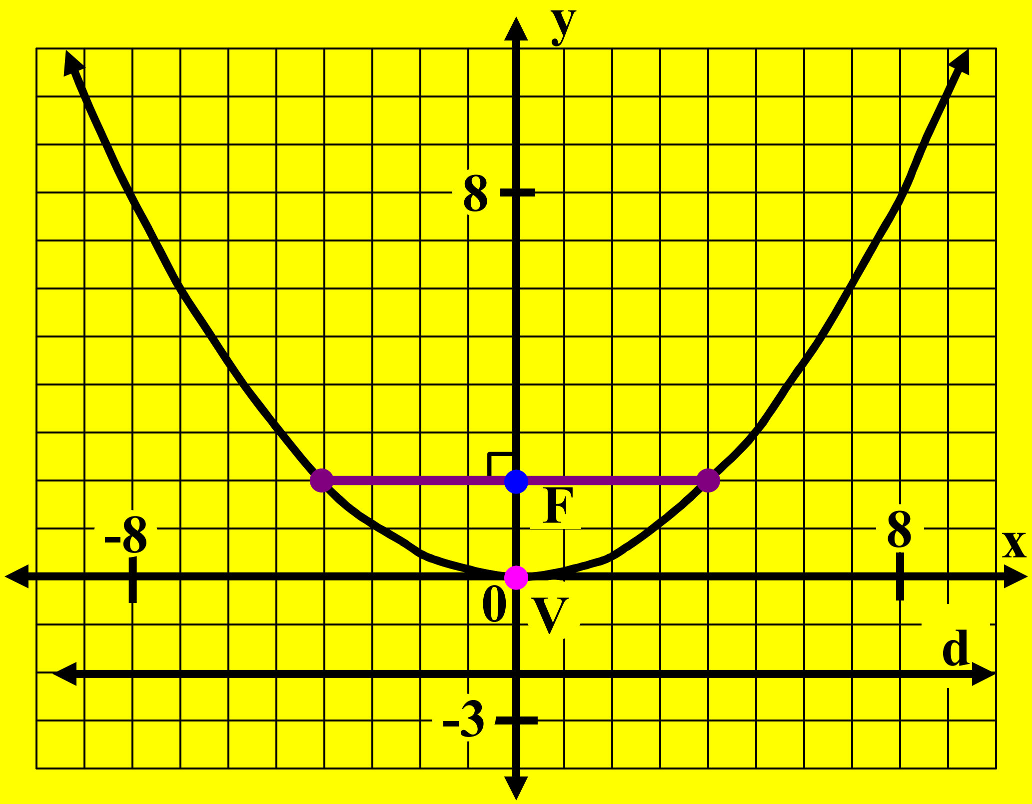

Type 1 Parabola
General Form Equation

$$Ax^2 + Dx + Ey + F = 0$$

$$A \neq 0$$

The Equations of a Parabola – Type 1

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Definition: A parabola is the set of all points in the plane that are equidistant from a given line, d, the directrix, and a given point, F, the focus, where F is not on line d.

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Type 1 Parabola
d is a horizontal line.

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Type 1 Parabola
d is a horizontal line.

Standard form equation

$$y - k = a(x - h)^2$$

Vertex: (h, k) $a = \frac{1}{4p}$

p is the directed distance from the vertex to the focus.

Latus Rectum: |4p| units long

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p is the <u>directed distance</u> from the vertex to the focus.

Latus Rectum: |4p| units long

If p is positive, F is above V, and the parabola opens in an upward direction.

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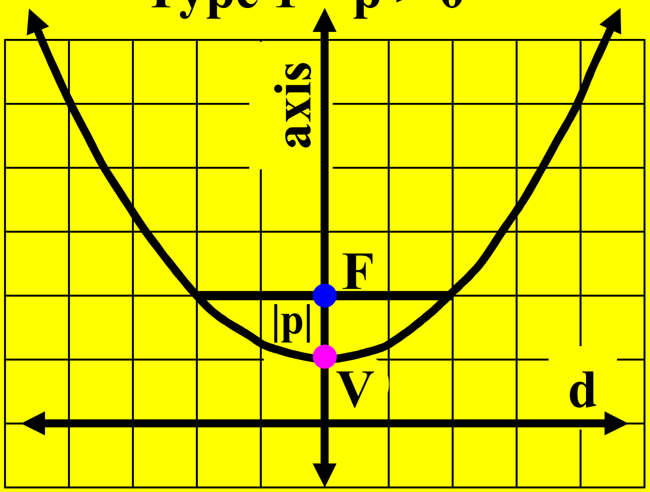

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If p is negative, F is below V

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Vertex: (h, k) $a = \frac{1}{4p}$

p is the <u>directed distance</u> from the vertex to the focus.

Latus Rectum: |4p| units long

If p is negative, F is below V, and the parabola opens in a downward direction.

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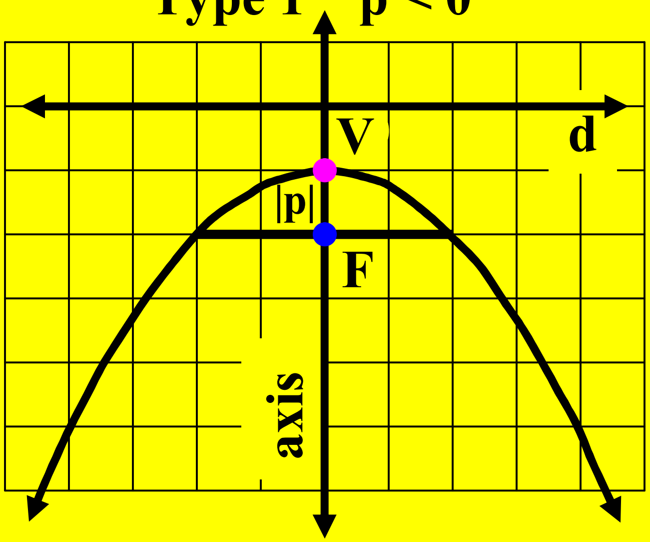

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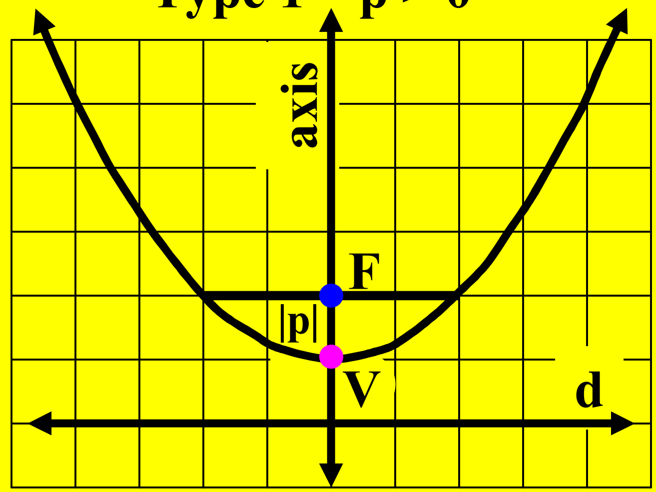
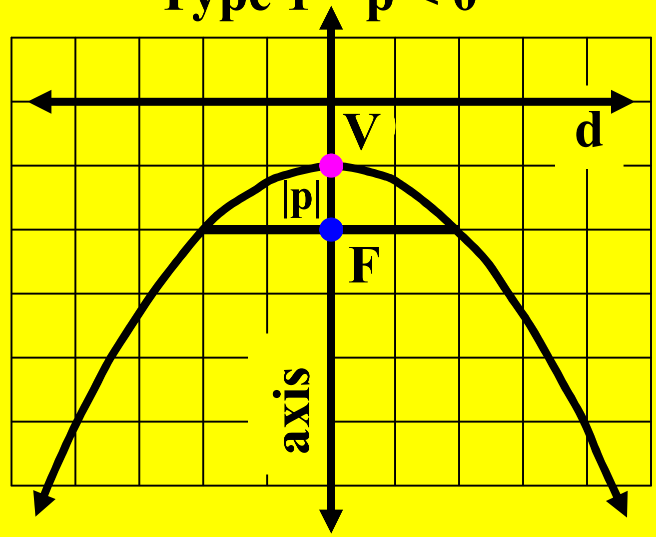


Type 1 p < 0



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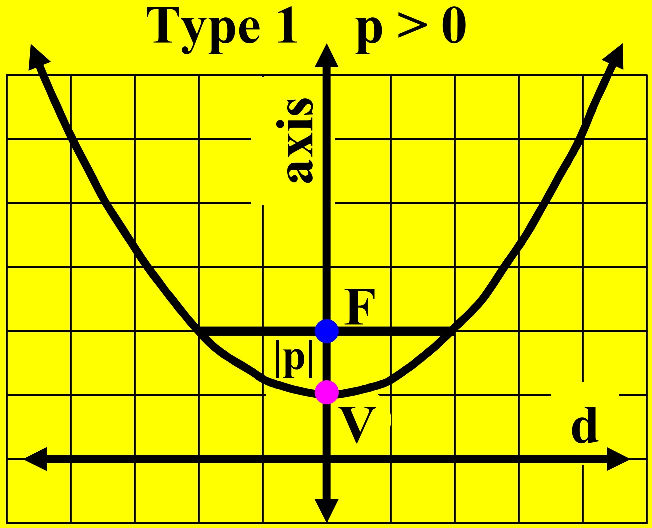

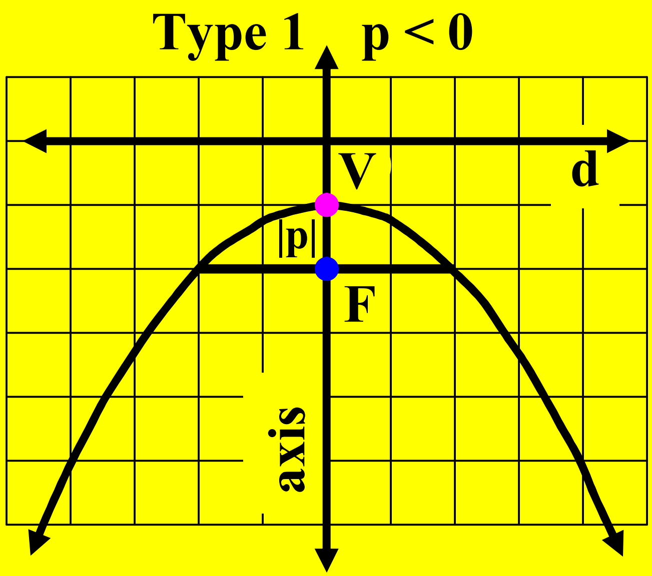

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The Equations of a Parabola – Type 2

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The Equations of a Parabola – Type 2

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Type 2 Parabola
d is a vertical line.

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Type 2 Parabola
d is a vertical line.

The definition of a parabola has not changed.

The Equations of a Parabola – Type 2

Definition: A parabola is the set of all points in the plane that are equidistant from a given line, d, the directrix, and a given point, F, the focus, where F is not on line d.

Type 2 Parabola
d is a vertical line.

The definition of a parabola has not changed. Now, however,

The Equations of a Parabola – Type 2

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d is a vertical line.

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Standard form equation

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If p is positive,

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Latus Rectum: |4p| units long

If p is positive, F is to the right of V,

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p is the <u>directed distance</u> from the vertex to the focus.

Latus Rectum: |4p| units long

If p is positive, F is to the right of V, and the parabola opens to the right.

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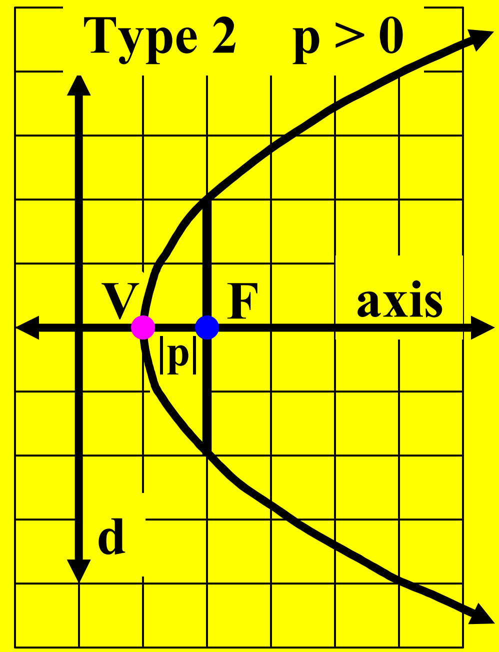

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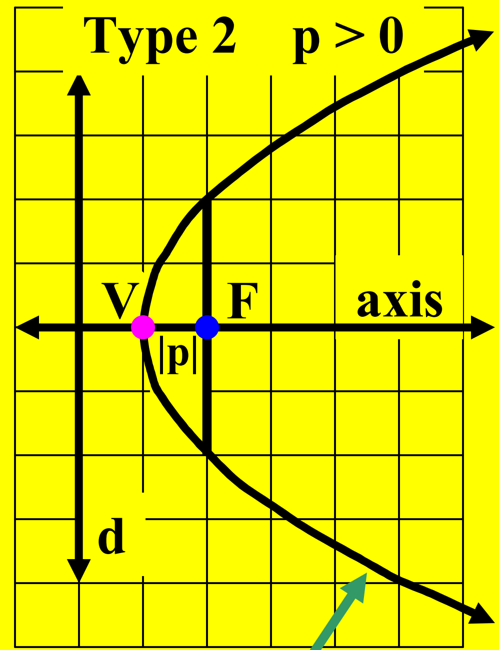

Type 2 Parabola
d is a vertical line.

Standard form equation

$$x - h = a(y - k)^2$$

Vertex: (h, k) $\quad a = \dfrac{1}{4p}$

p is the directed distance from the vertex to the focus.

Latus Rectum: |4p| units long

Every point on this curve is equidistant from the focus and the directrix.

If p is positive, F is to the right of V, and the parabola opens to the right.

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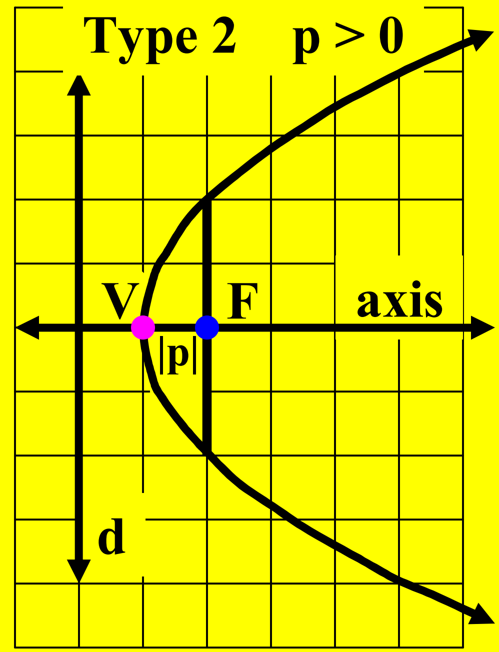

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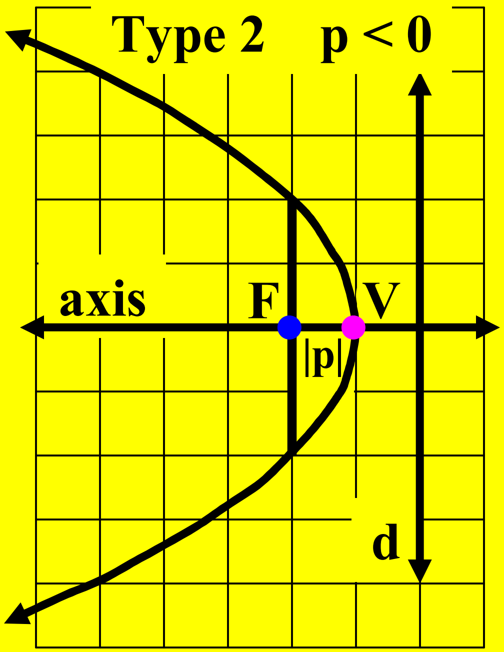

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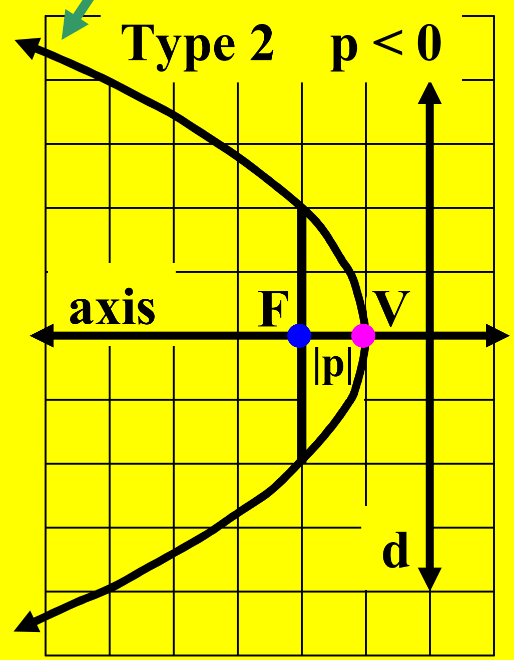

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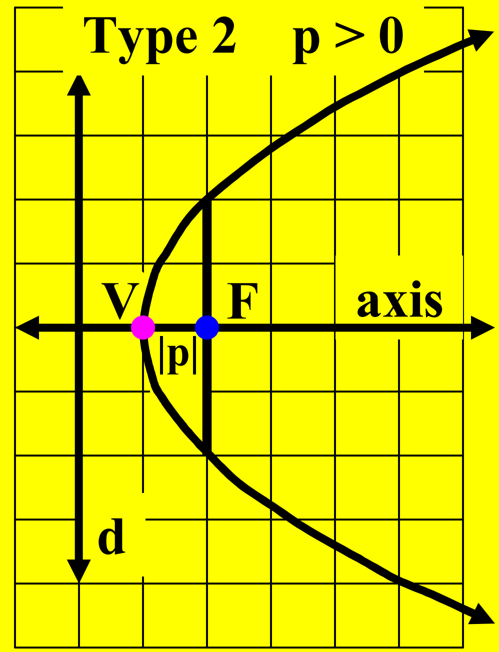

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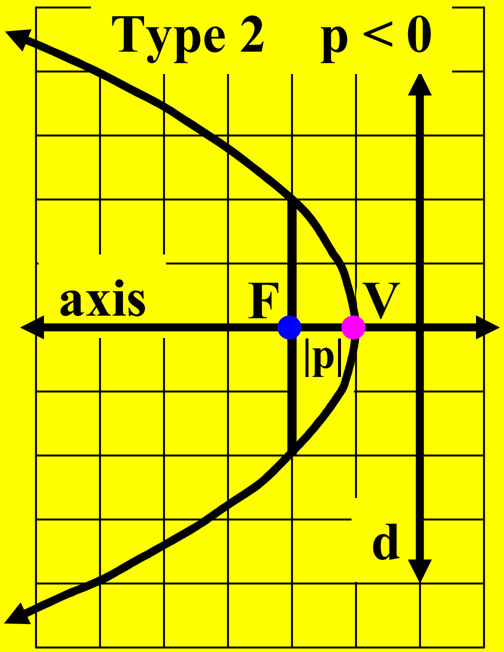

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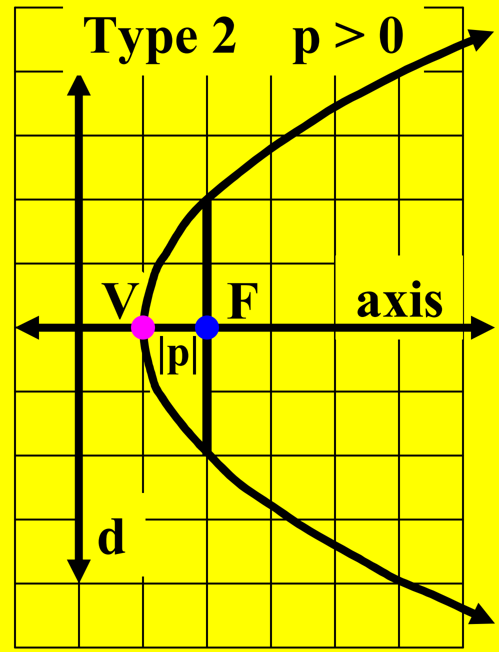

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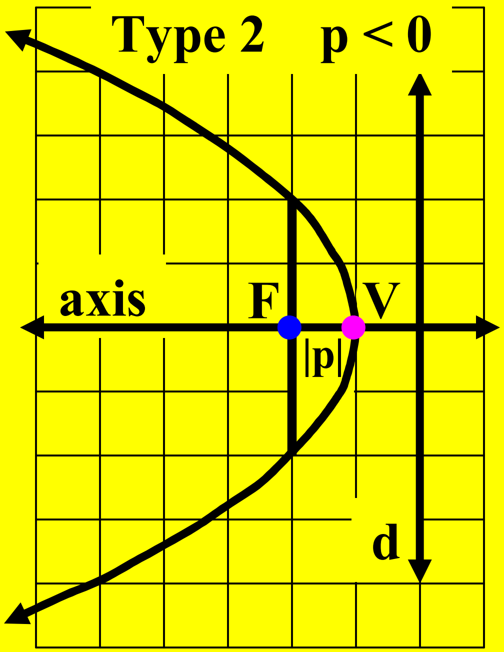

General Form Equation

$$Cy^2 + Dx + Ey + F = 0$$

$$C \neq 0$$

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Write the equation in standard form and the equation in general form for each parabola.

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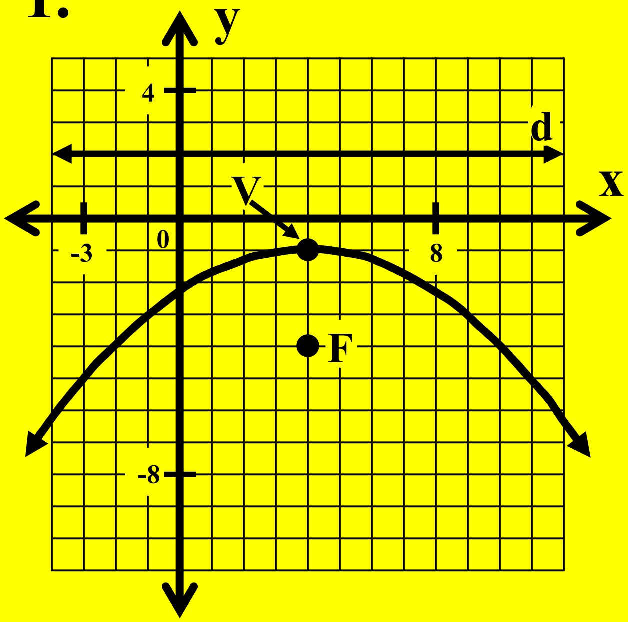

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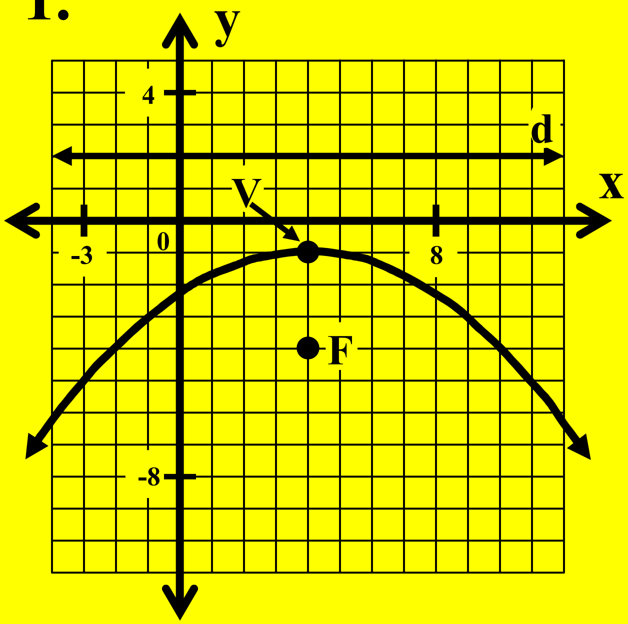

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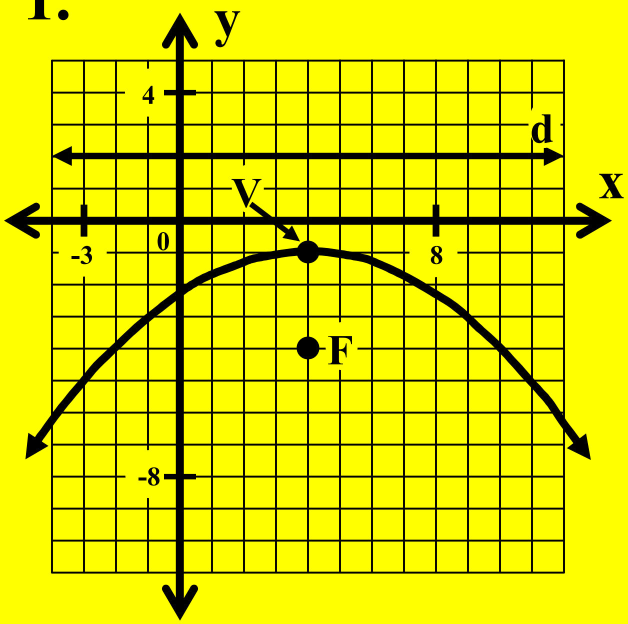

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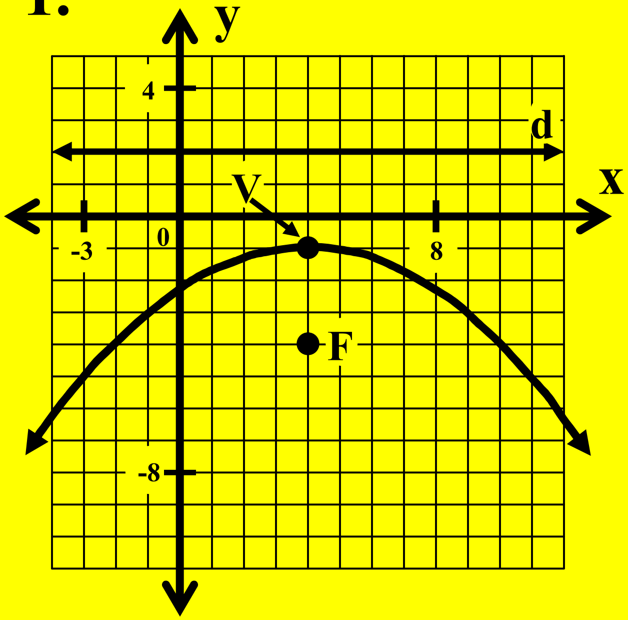

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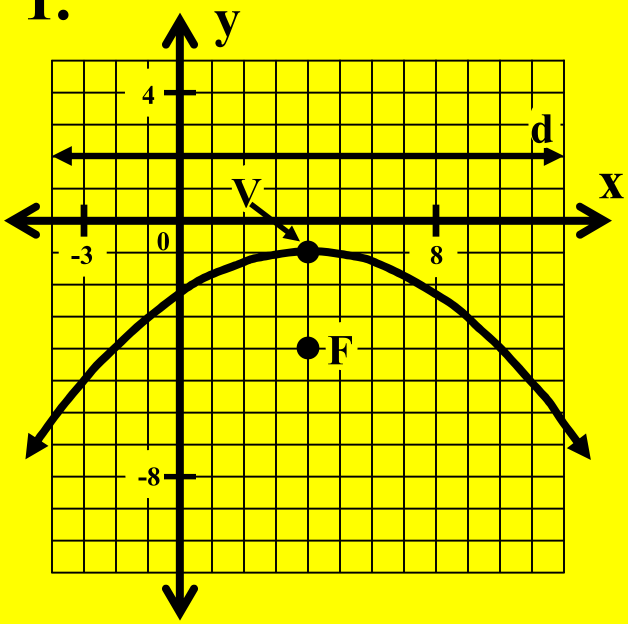

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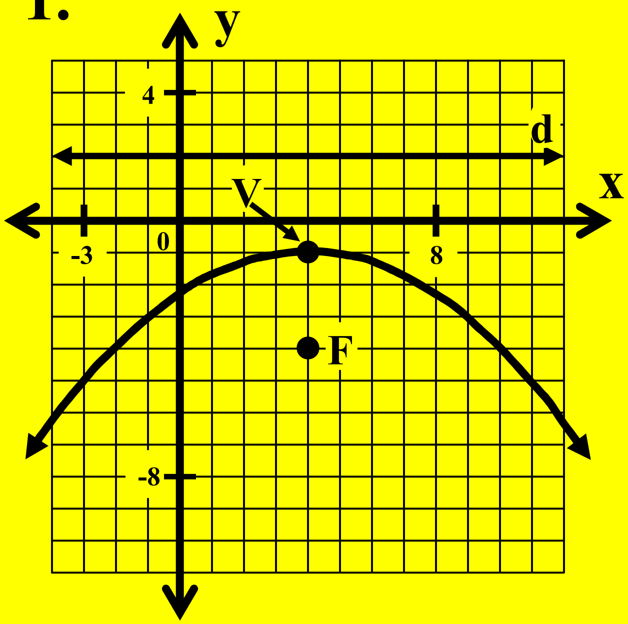

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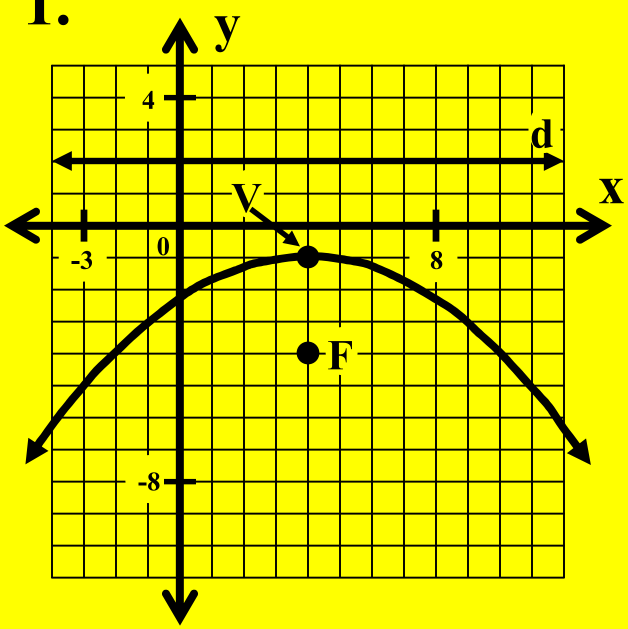

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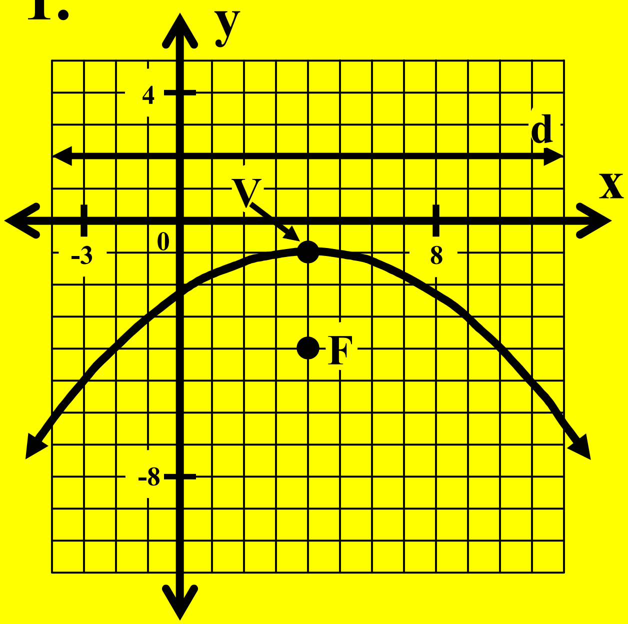

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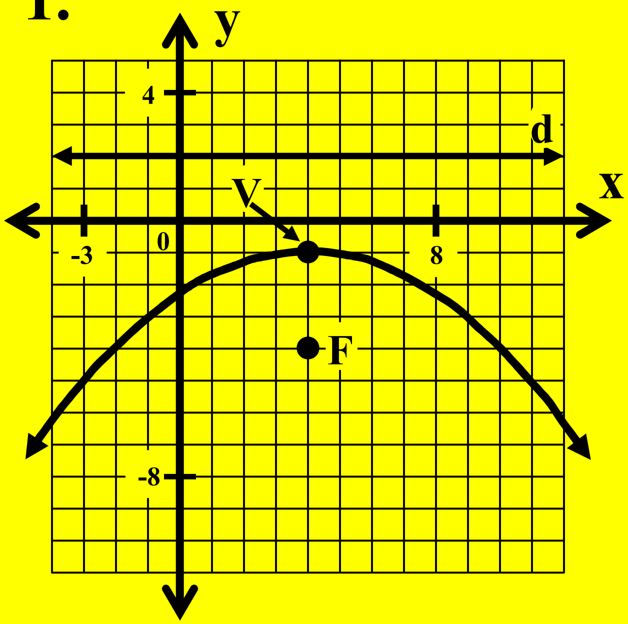

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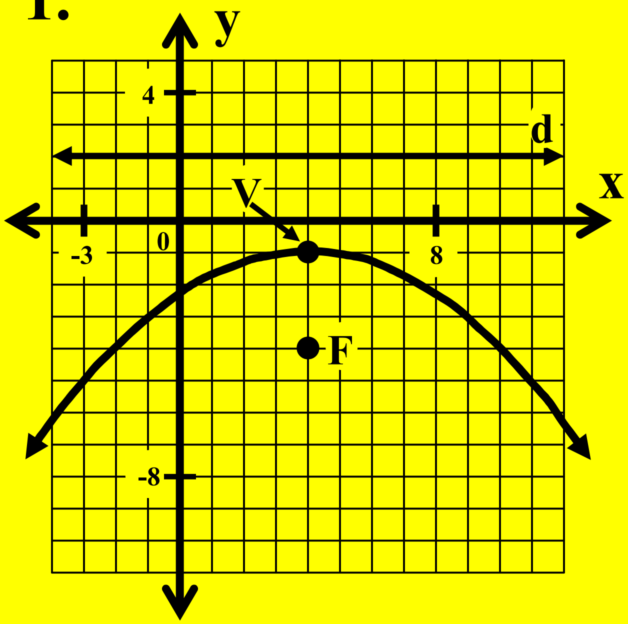

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V(h, k)

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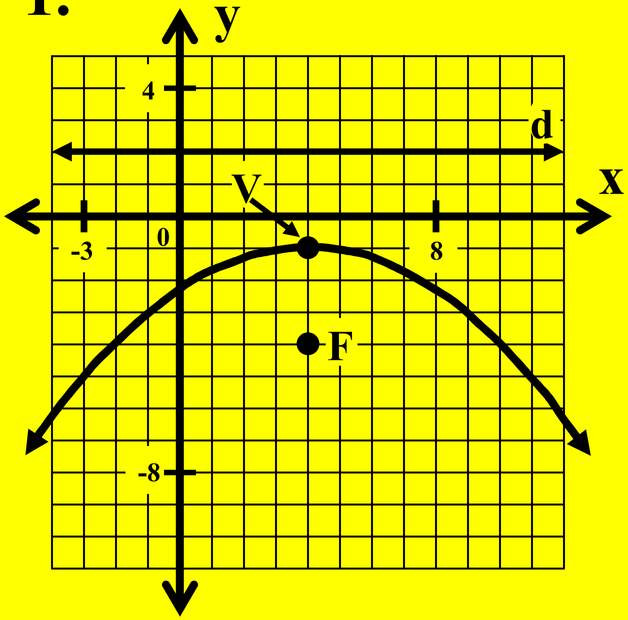

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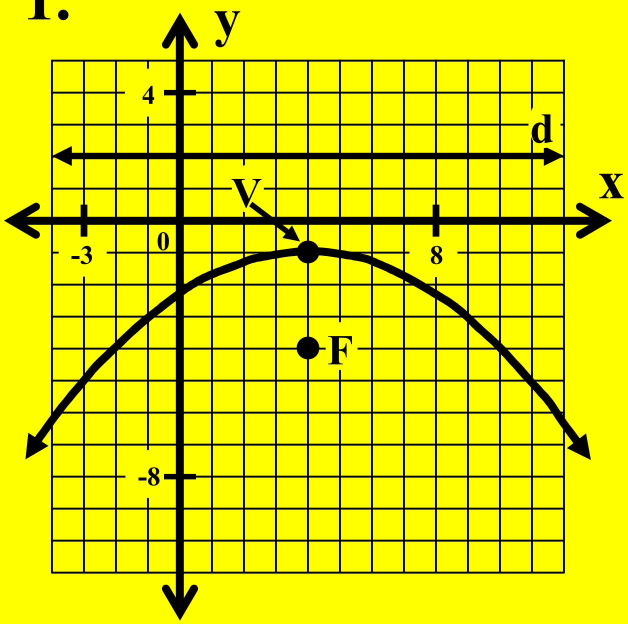

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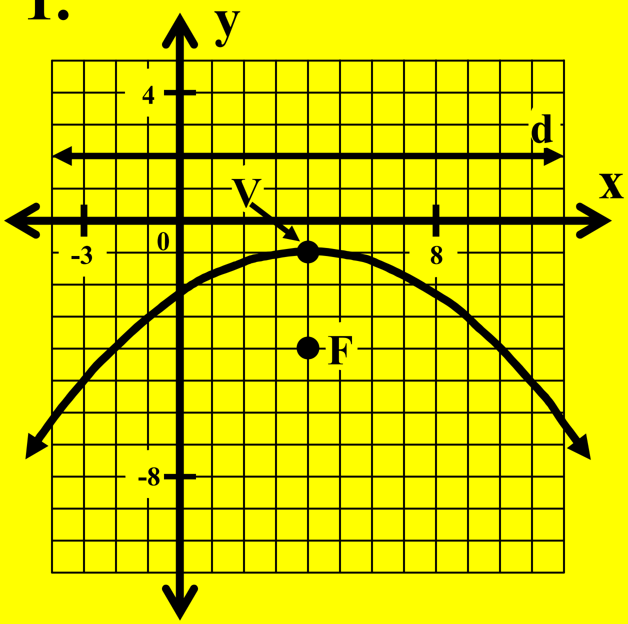

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In this case, the vertex is the point (4, -1)

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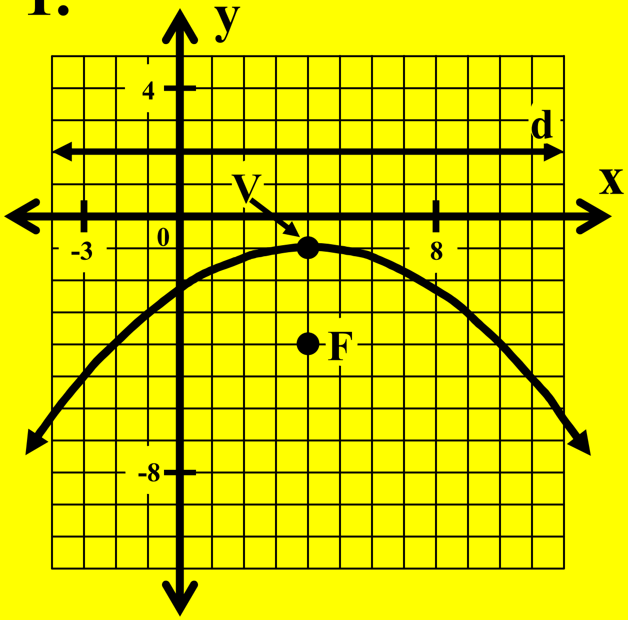

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$$h = 4$$

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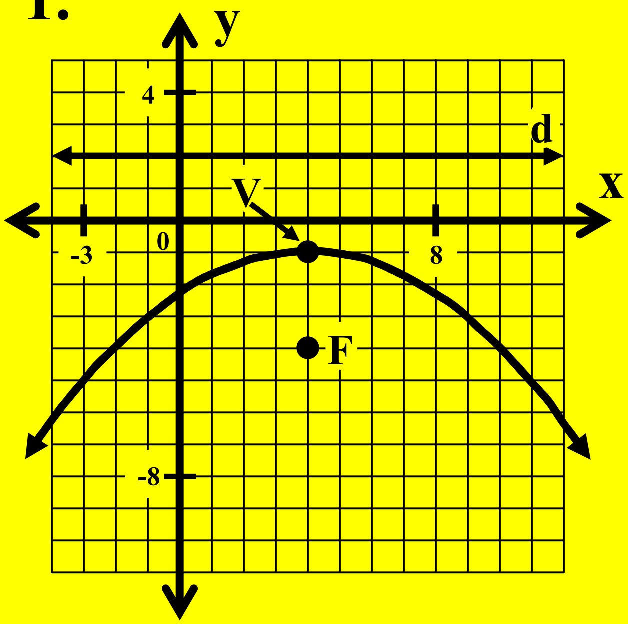

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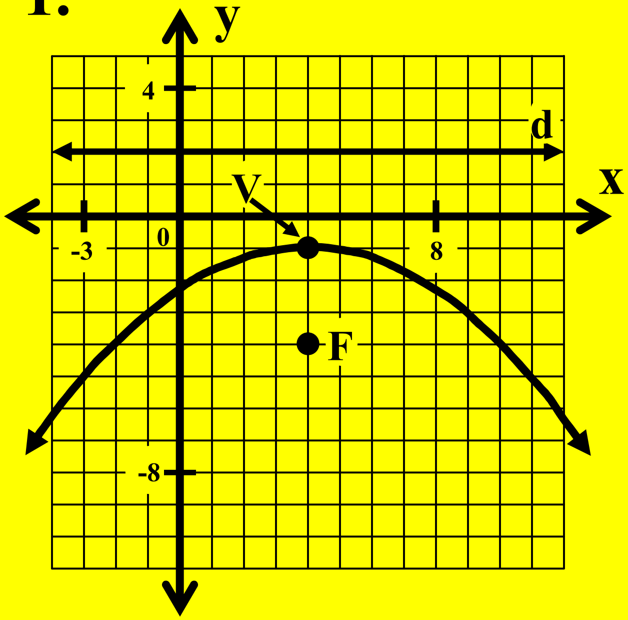

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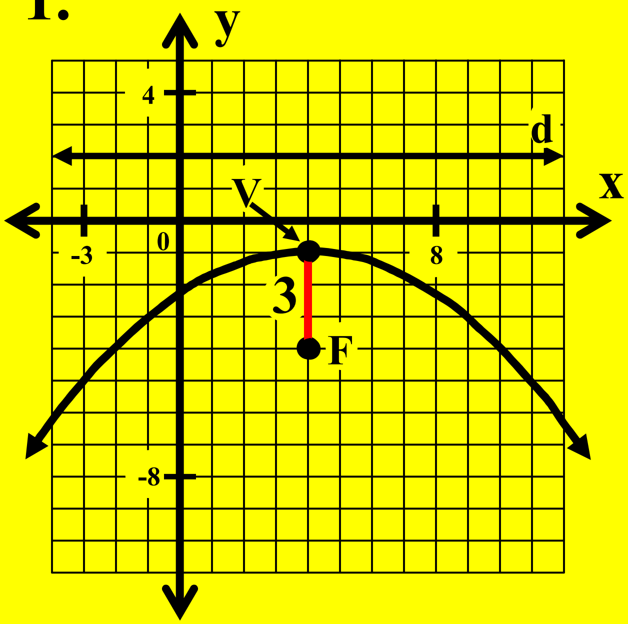

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Since the focus is 3 units below the vertex,

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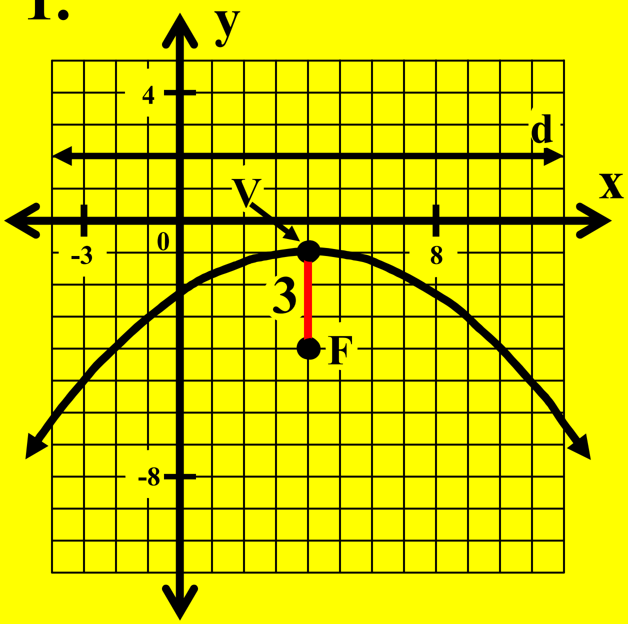

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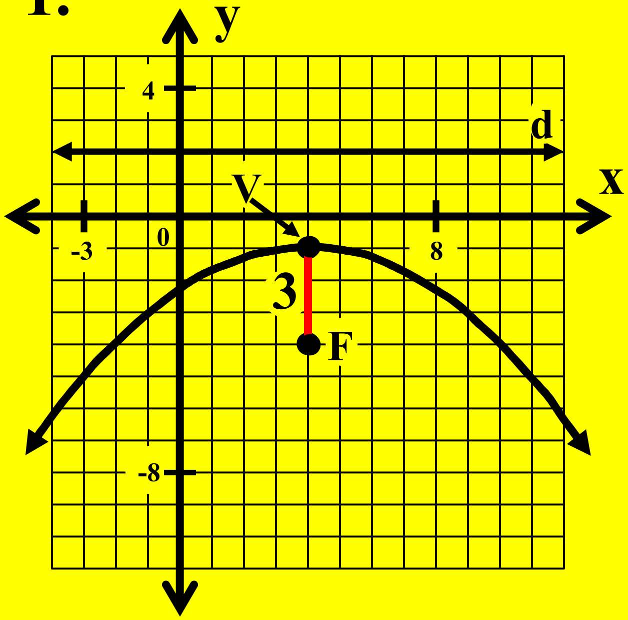

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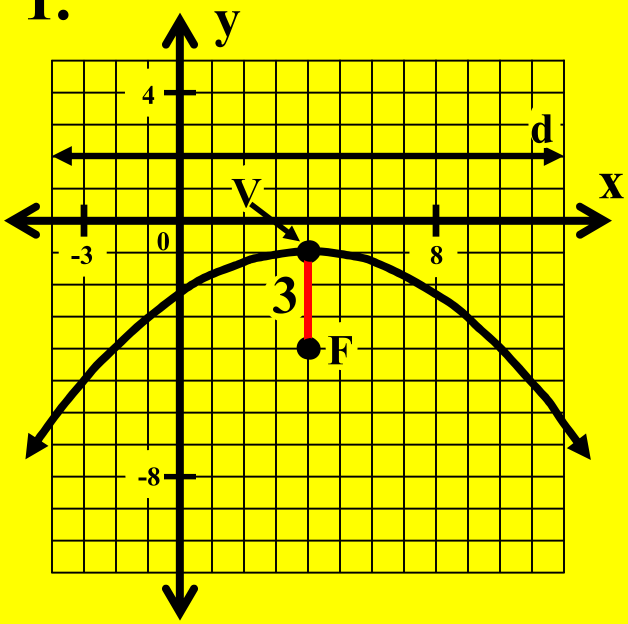

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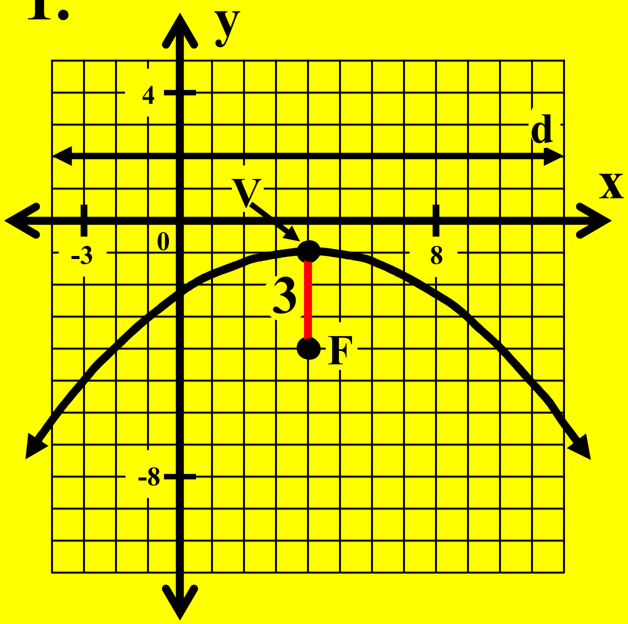

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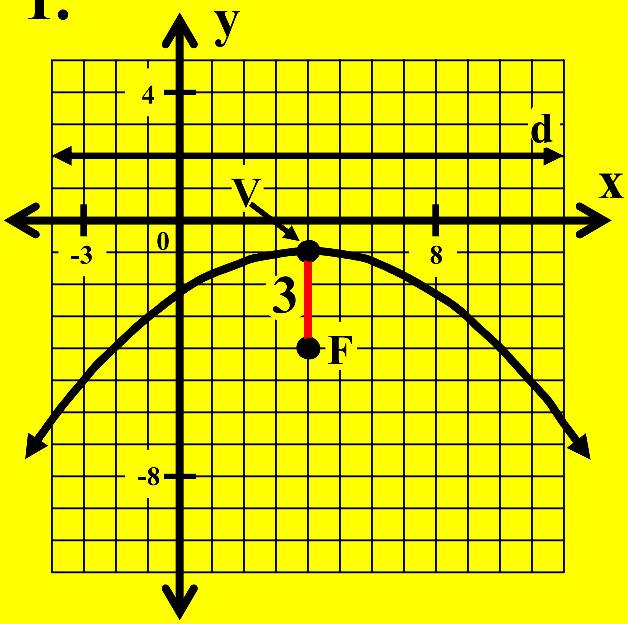

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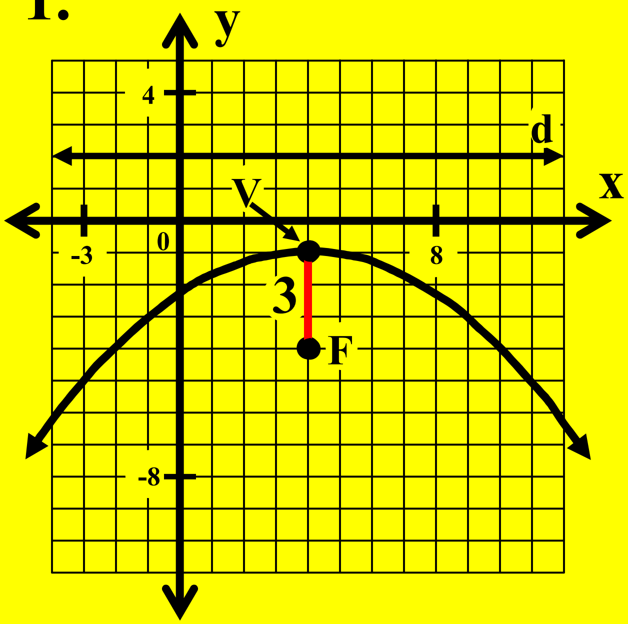

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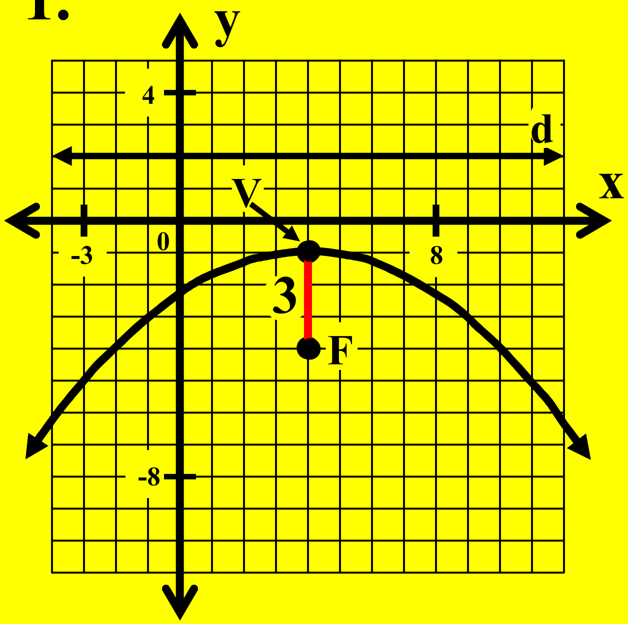

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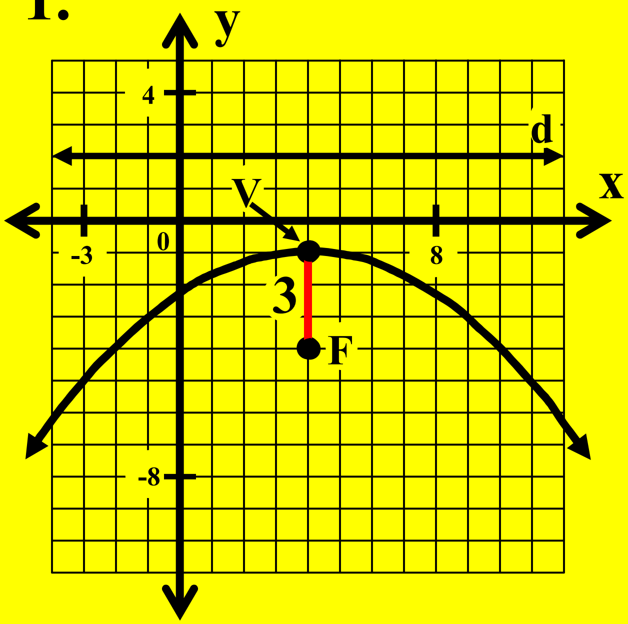

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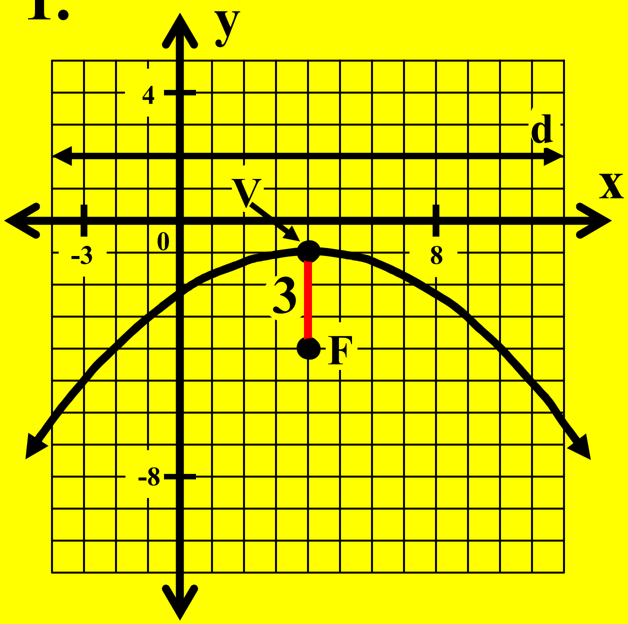

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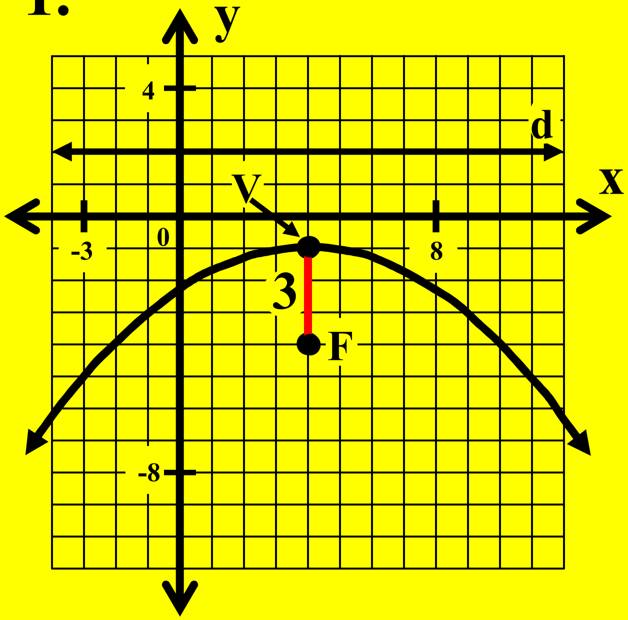

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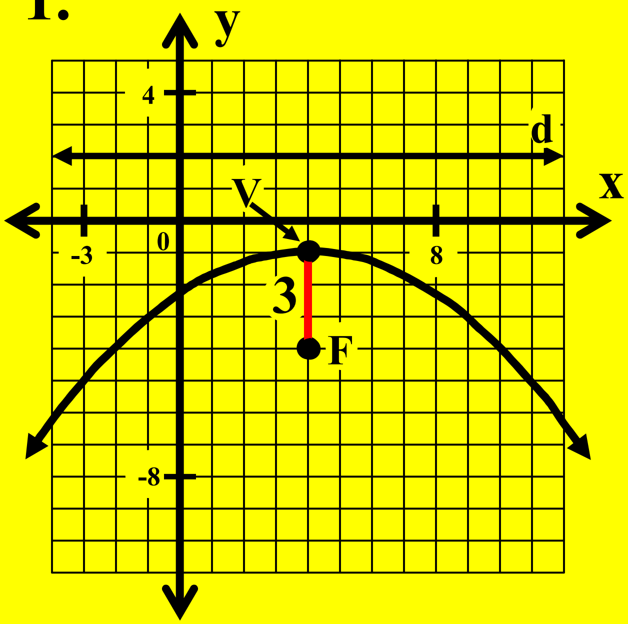

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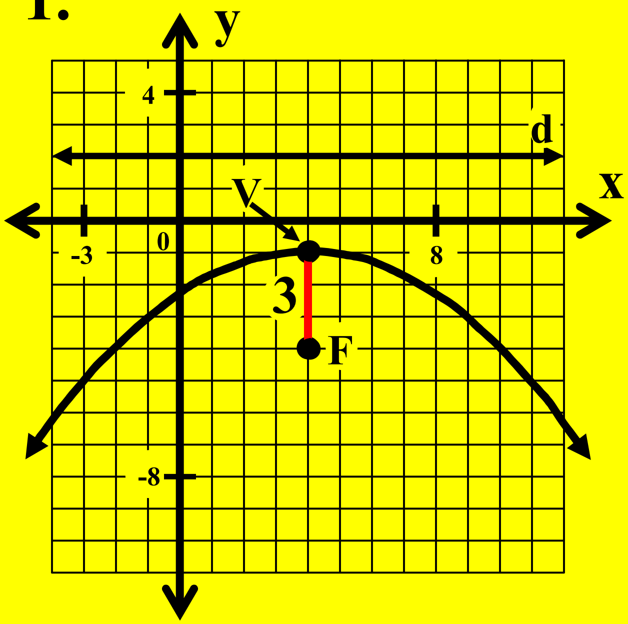

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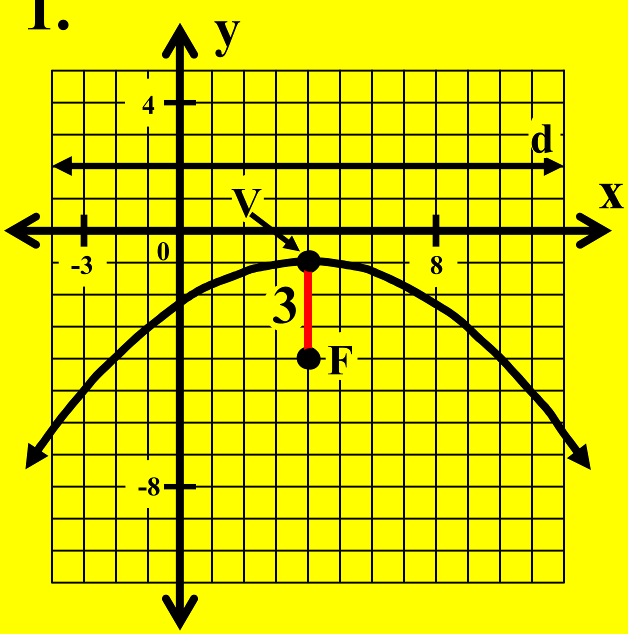

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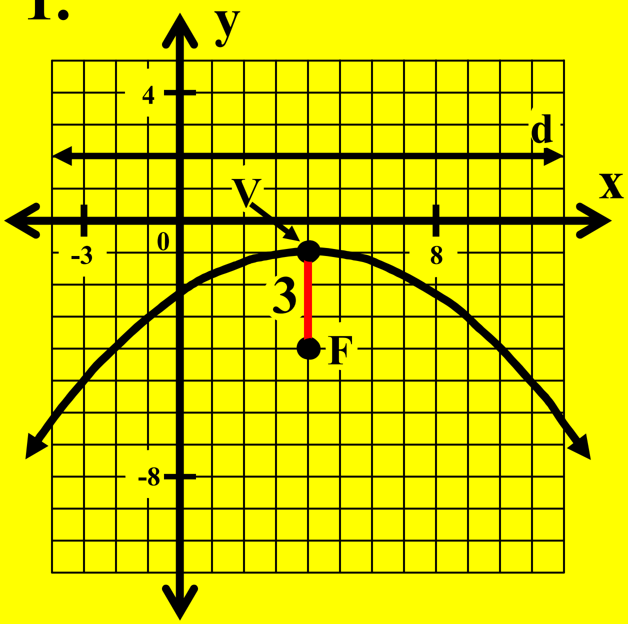

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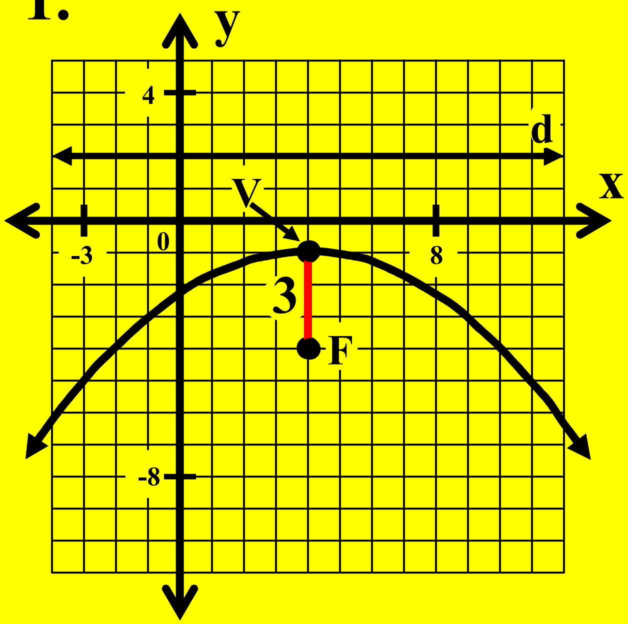

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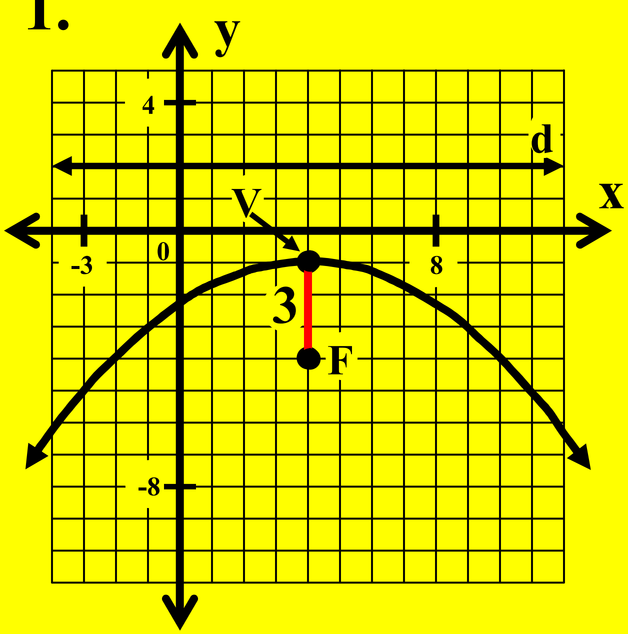

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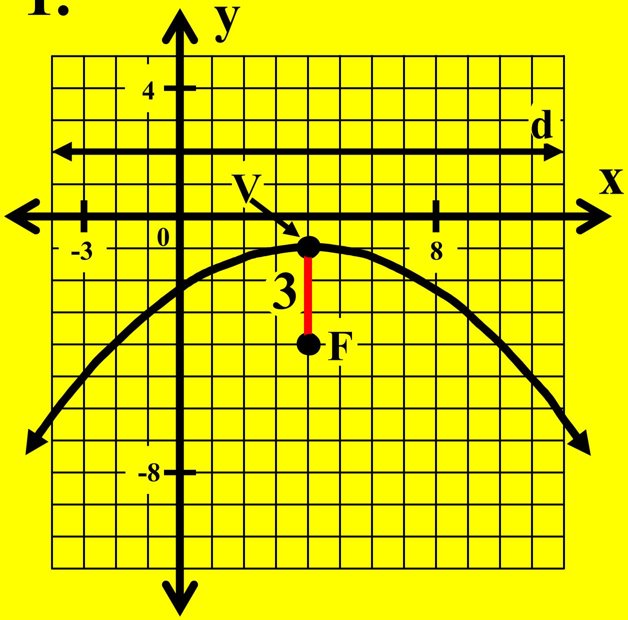

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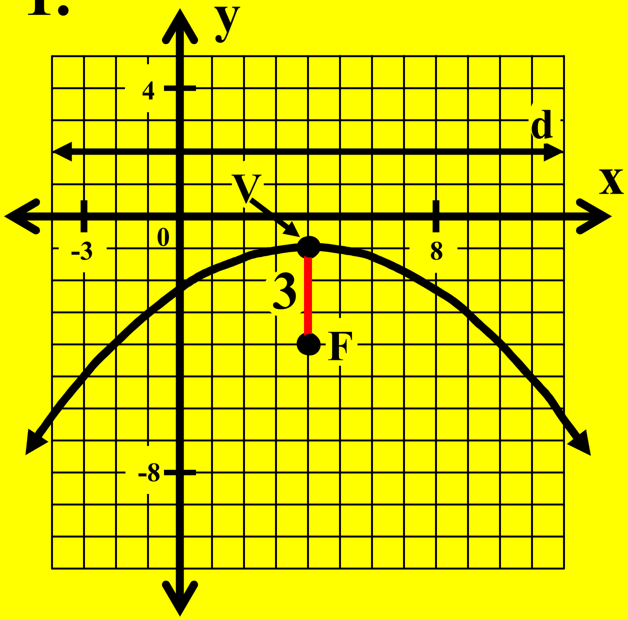

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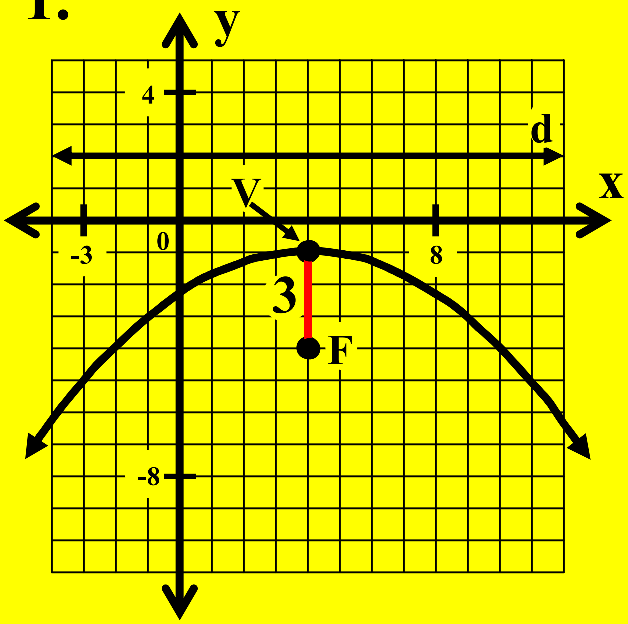

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Standard Form Equation

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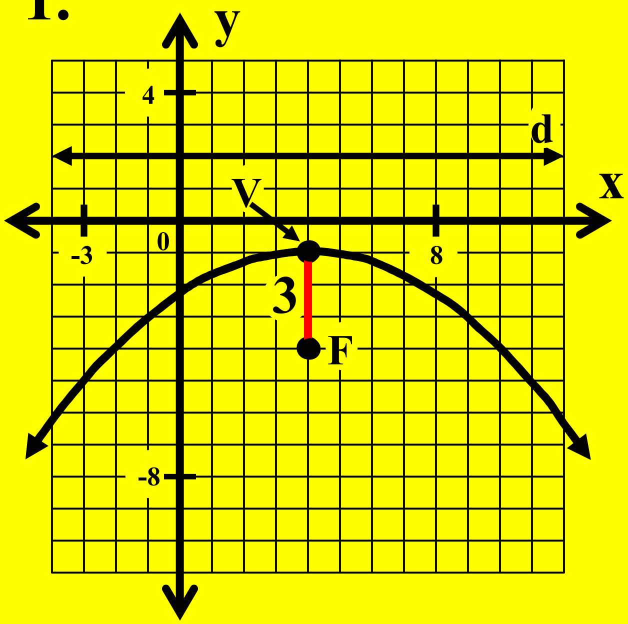

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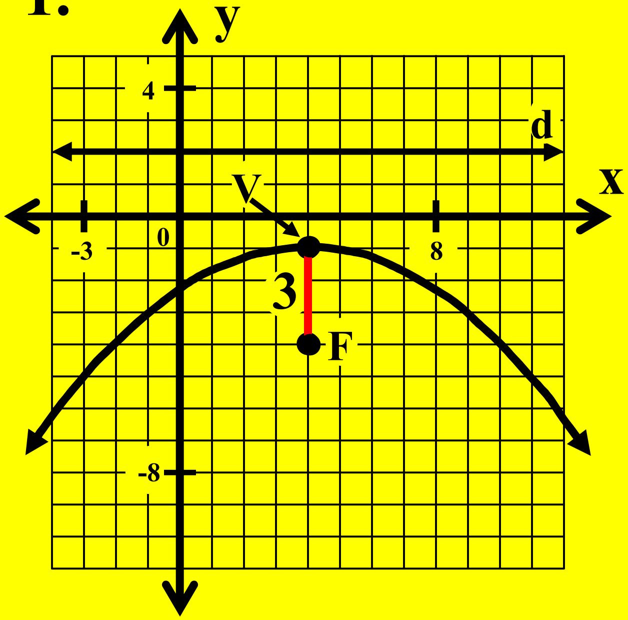

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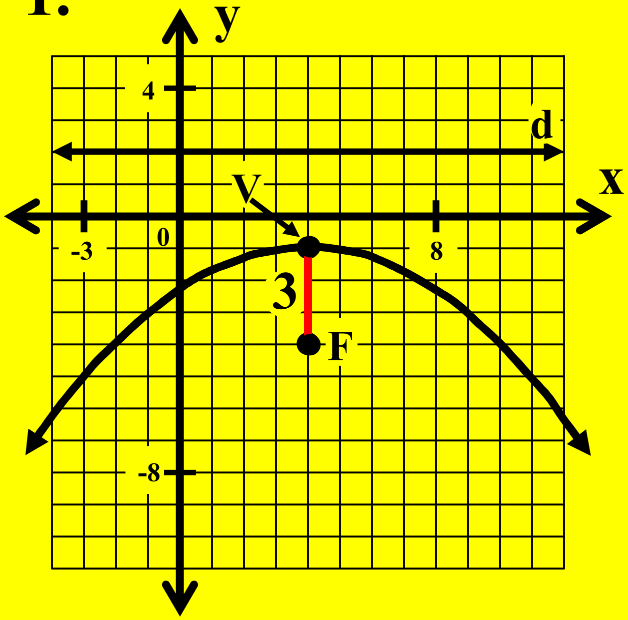

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Standard Form Equation

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Class Worksheet #4

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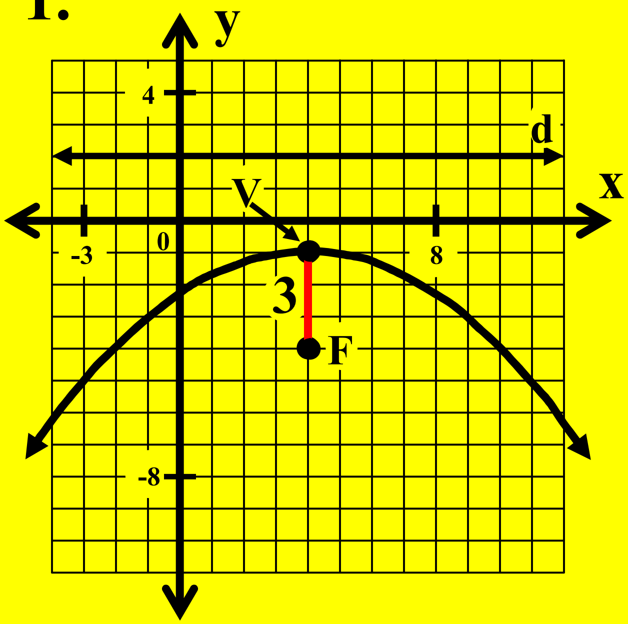

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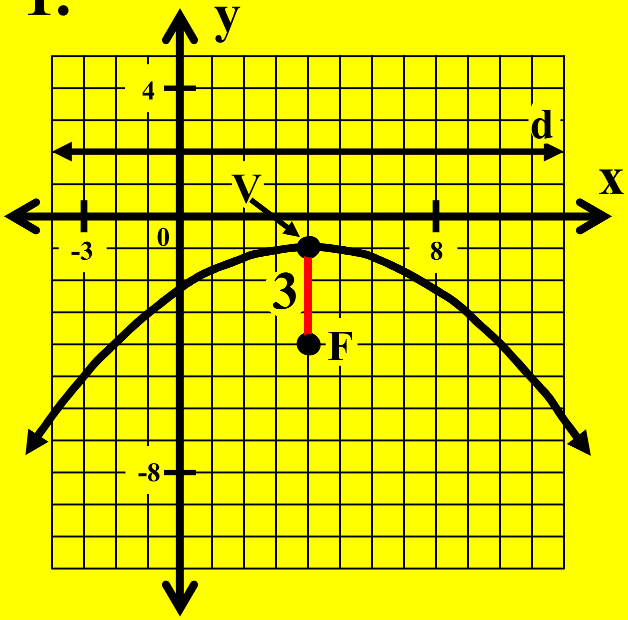

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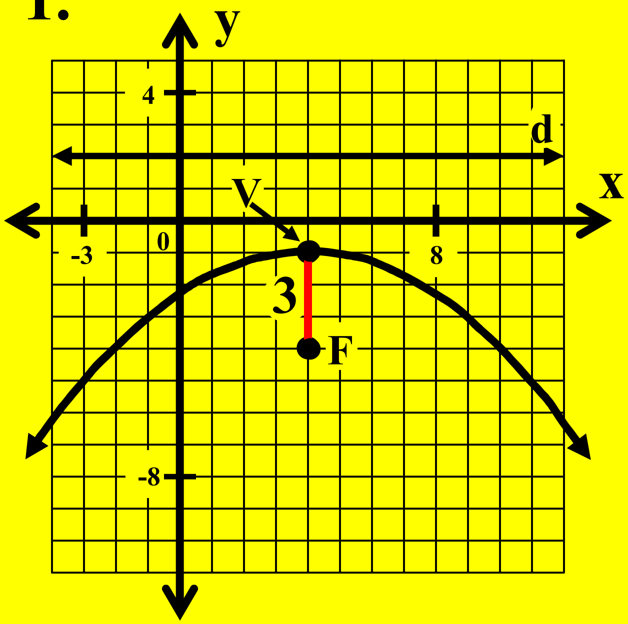

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Standard Form Equation

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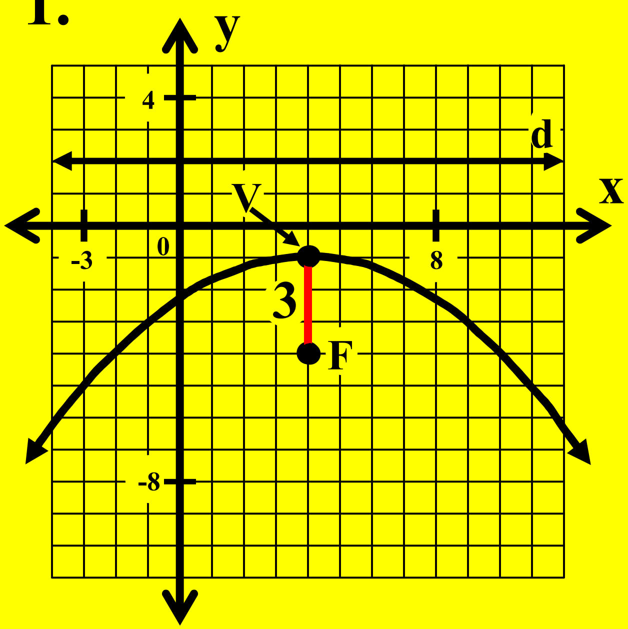

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Standard Form Equation

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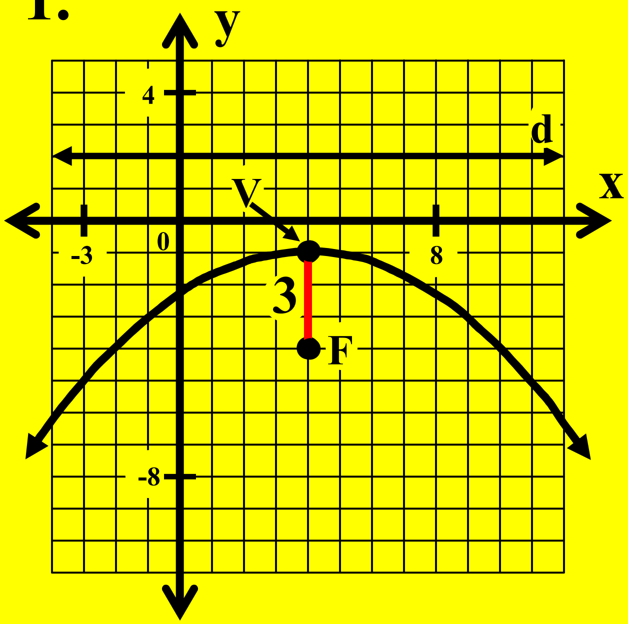

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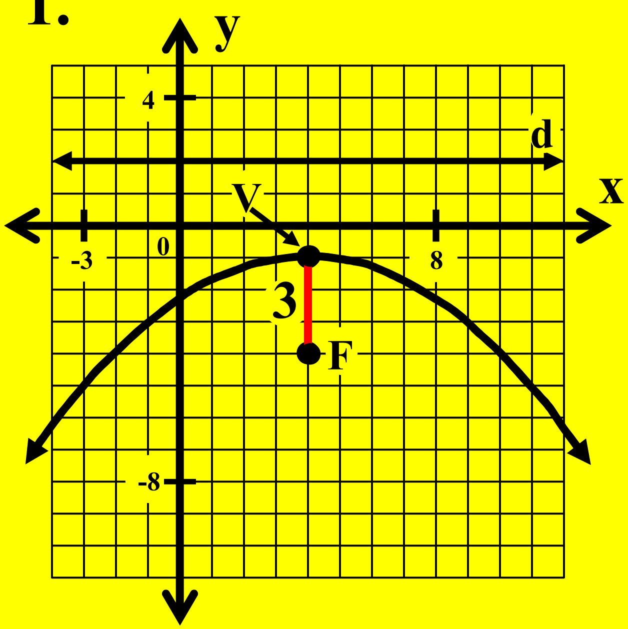

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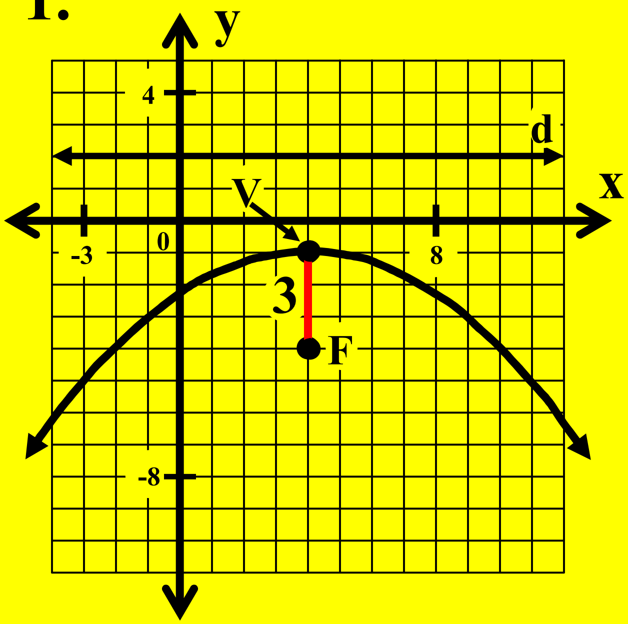

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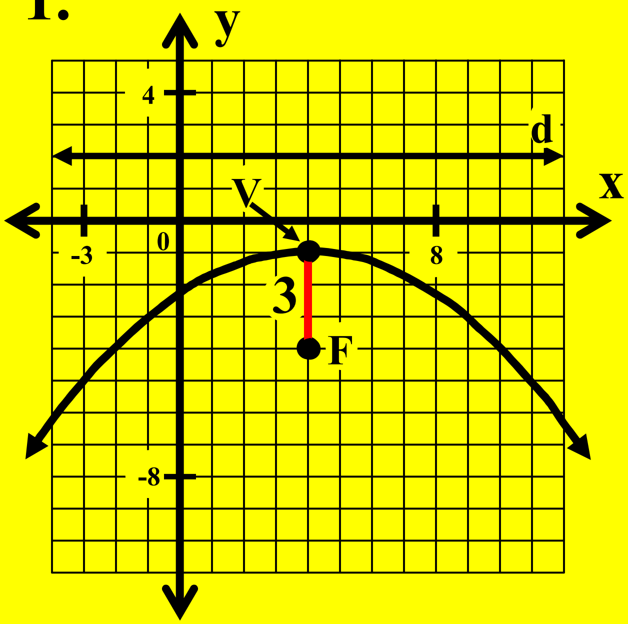

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Standard Form Equation

$$-12(y + 1) = 1(x - 4)^2$$

Perform the indicated operations.

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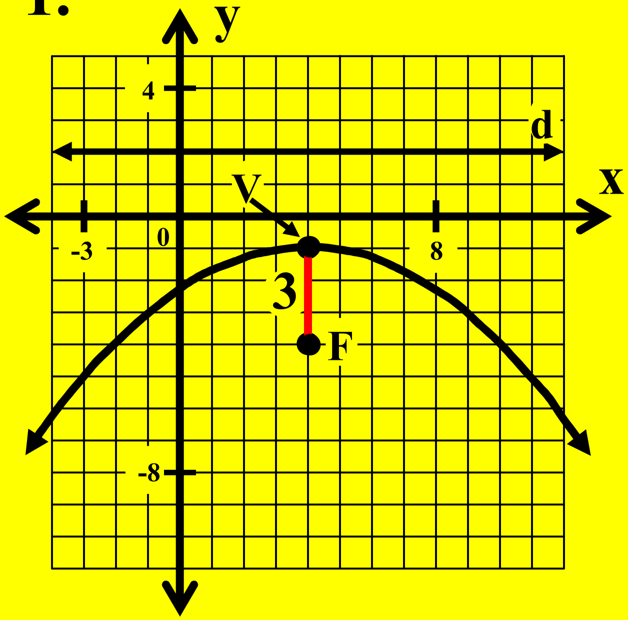

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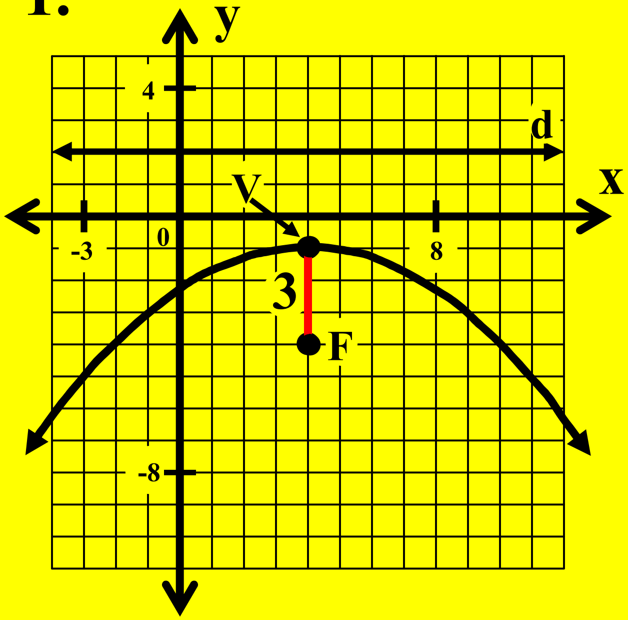

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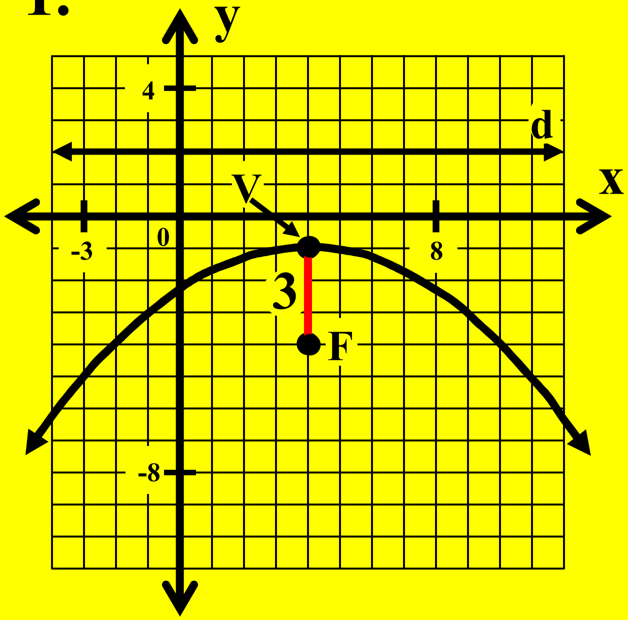

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Standard Form Equation

$$-12(y + 1) = 1(x - 4)^2$$

$$-12y -$$

Perform the indicated operations.

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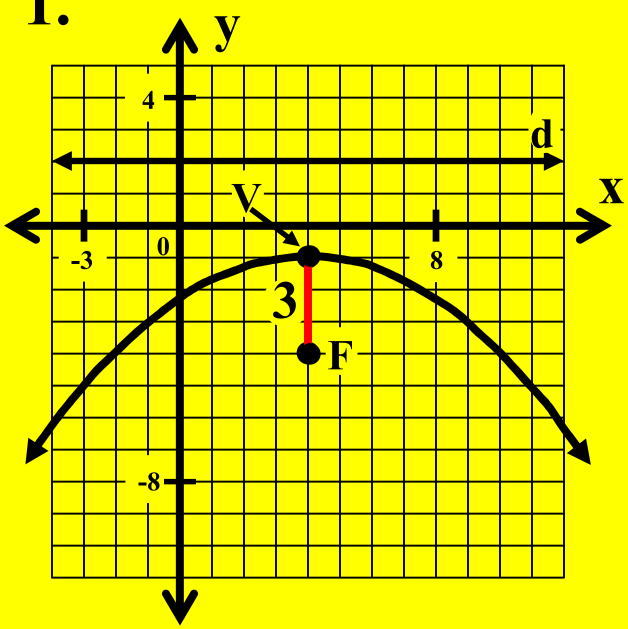

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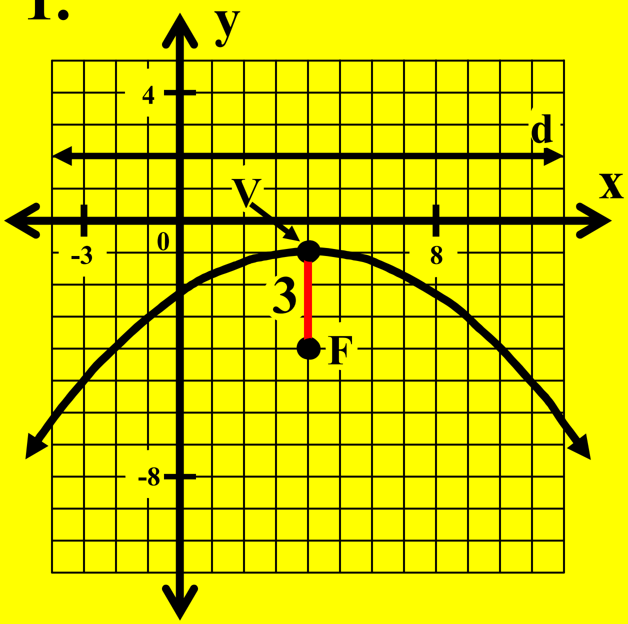

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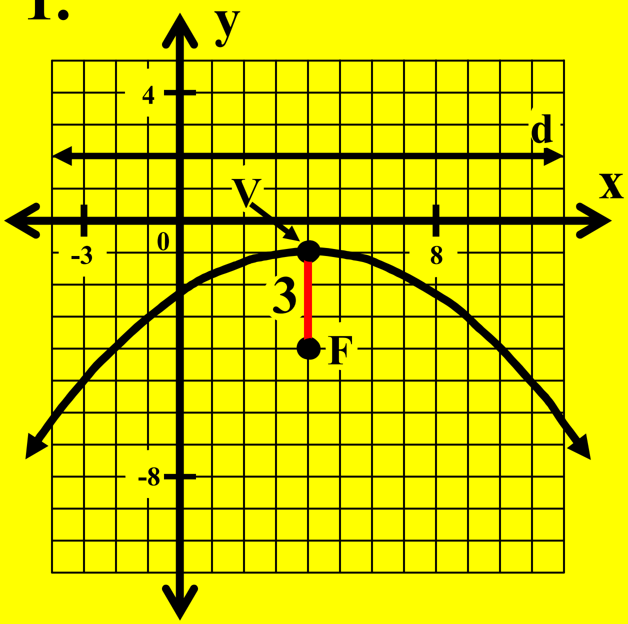

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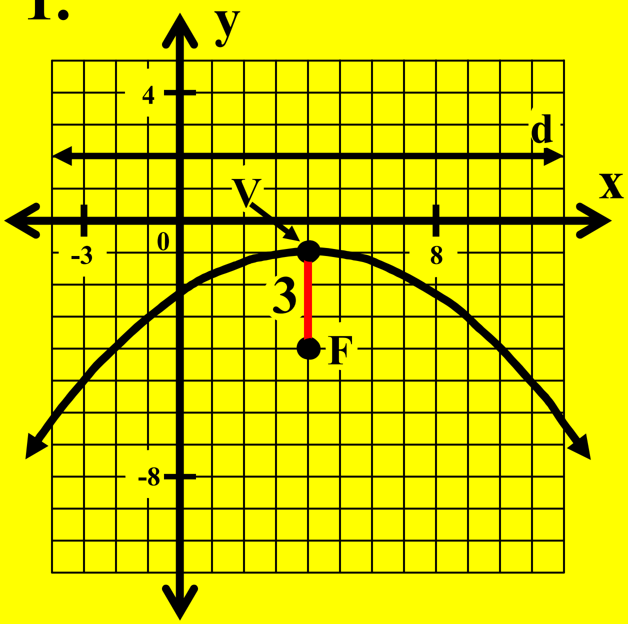

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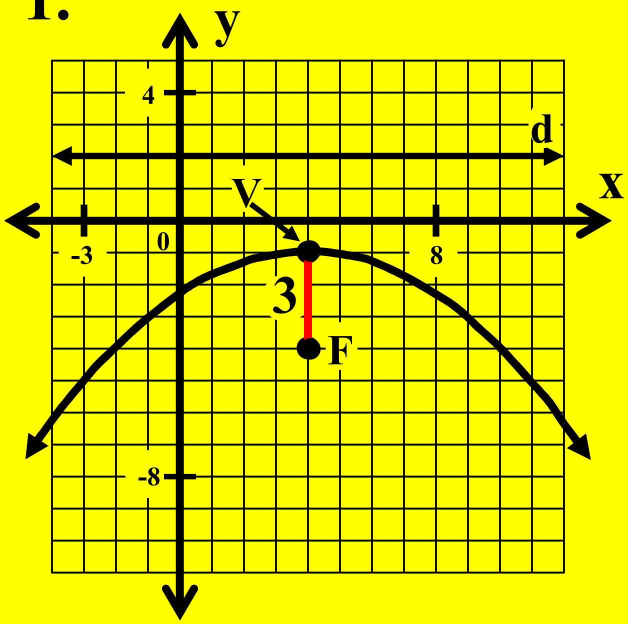

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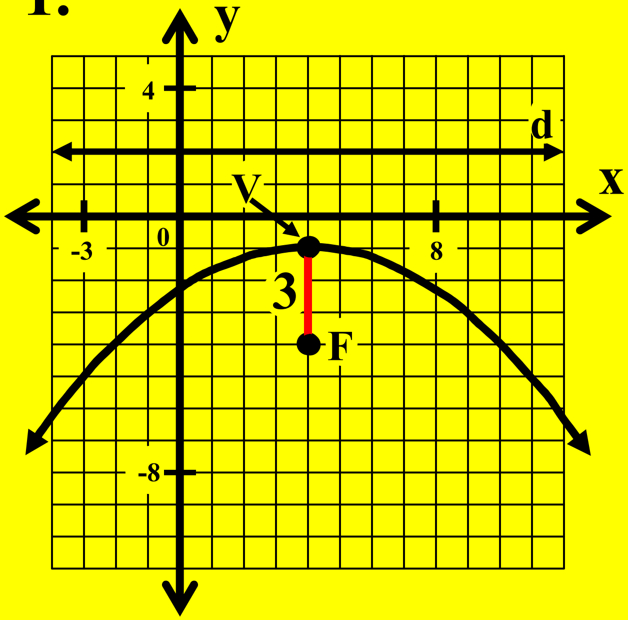

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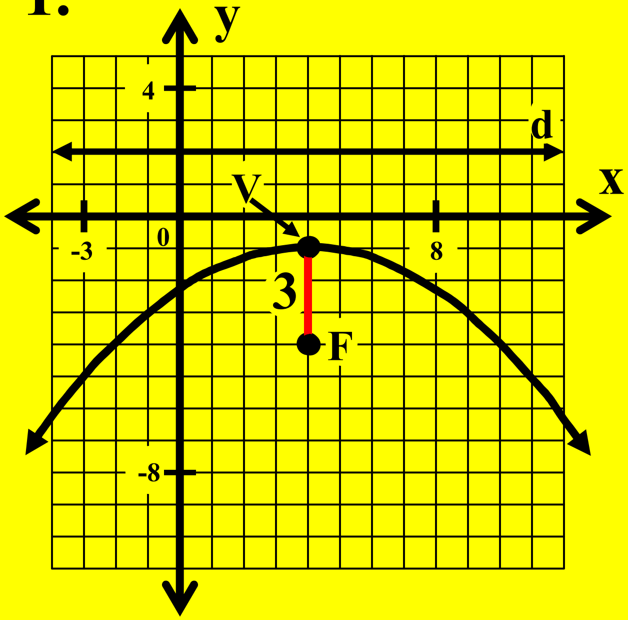

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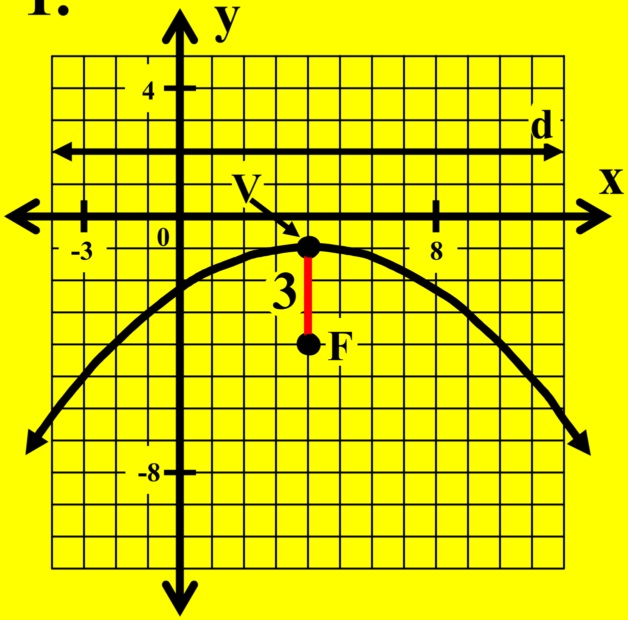

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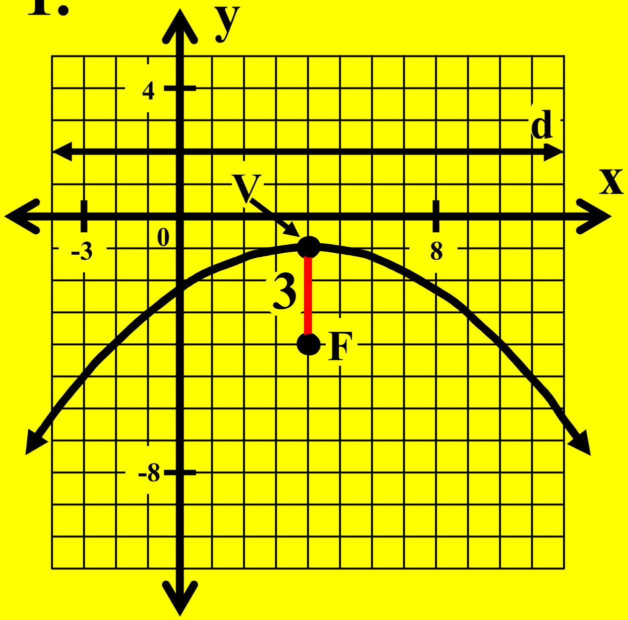

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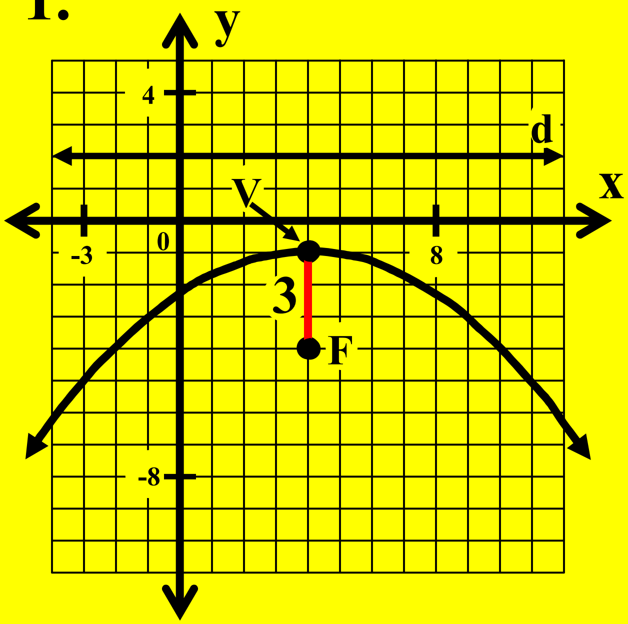

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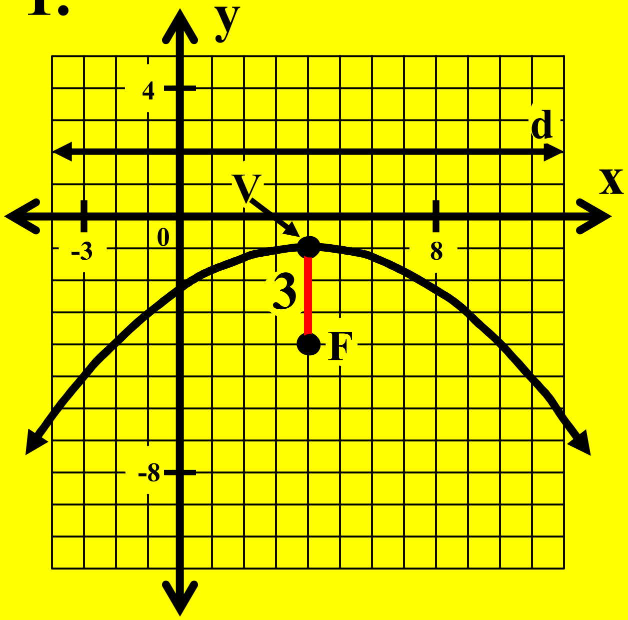

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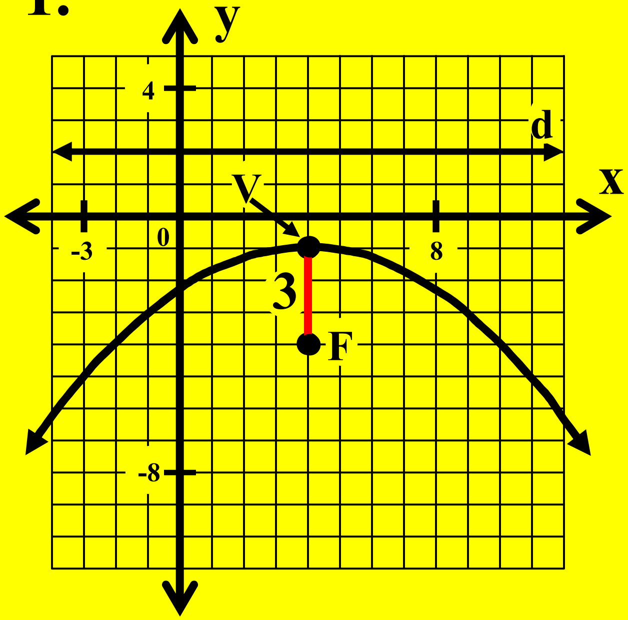

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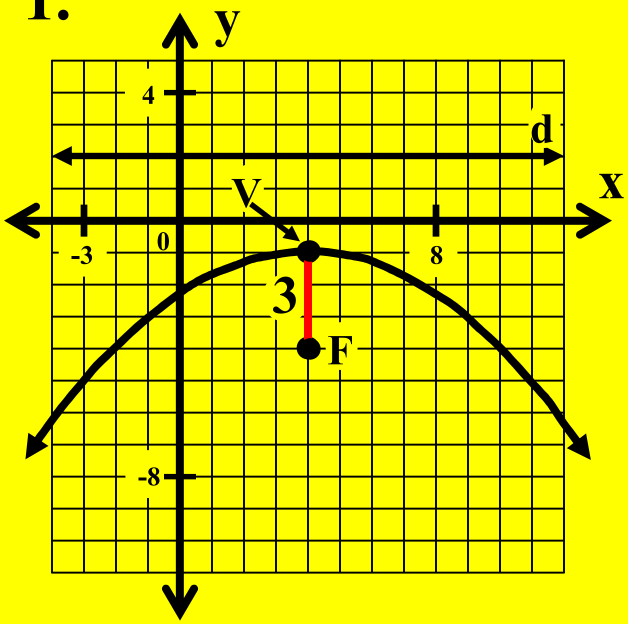

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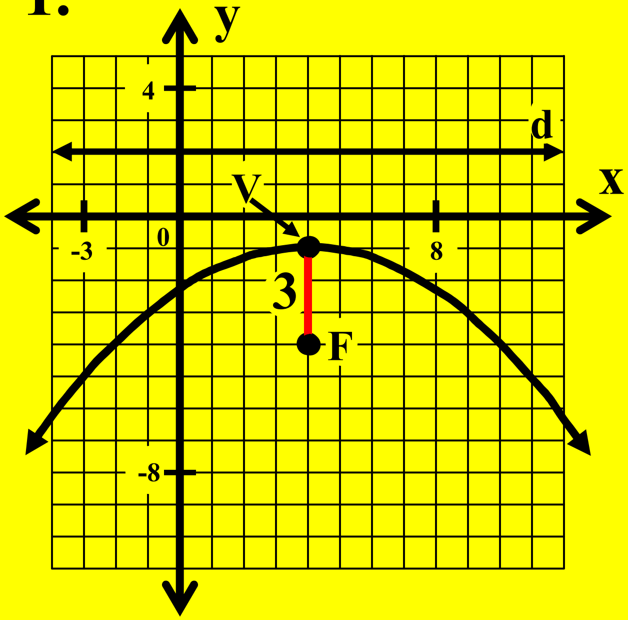

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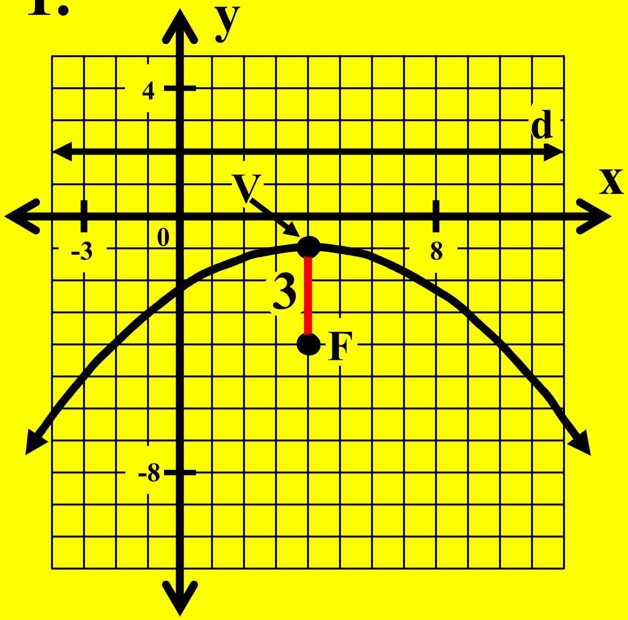

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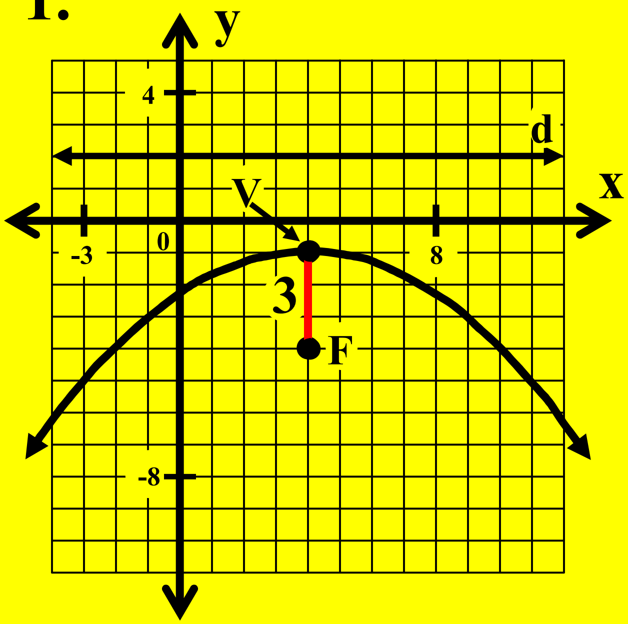

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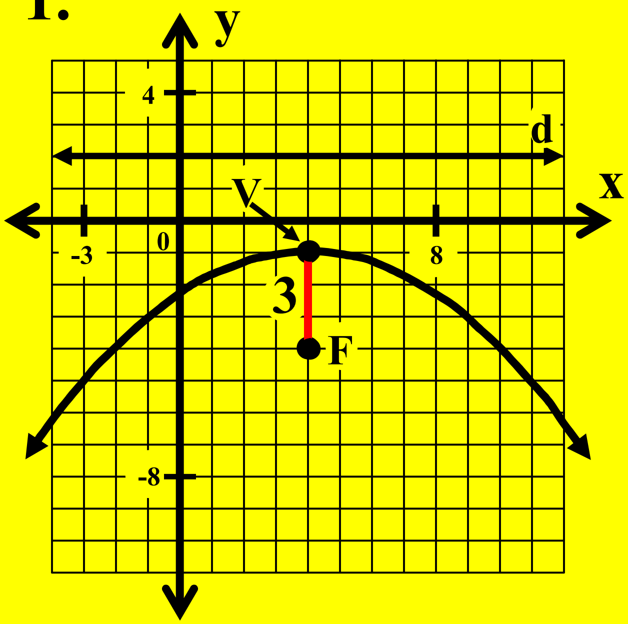

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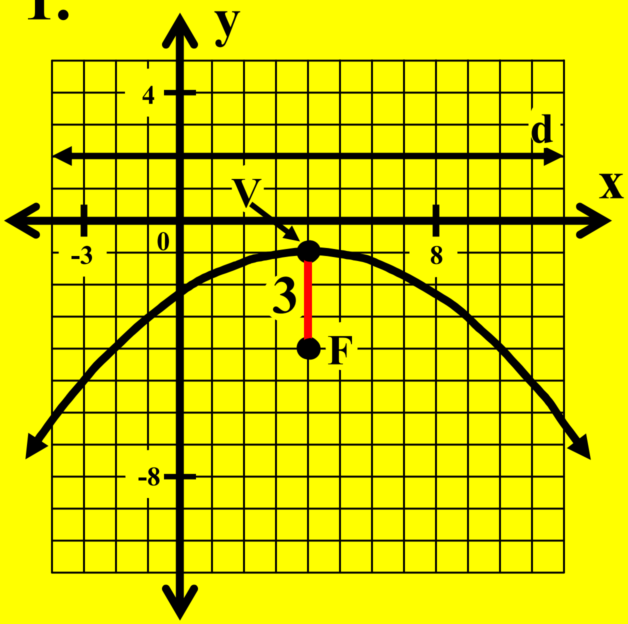

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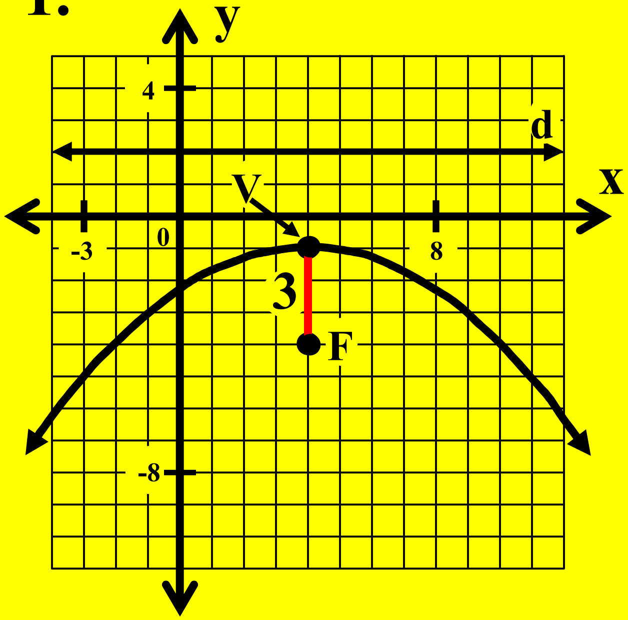

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Standard Form Equation

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$$-12y - 12 = x^2 - 8x + 16$$

$$0 = x^2 - 8x + 12y + 28$$

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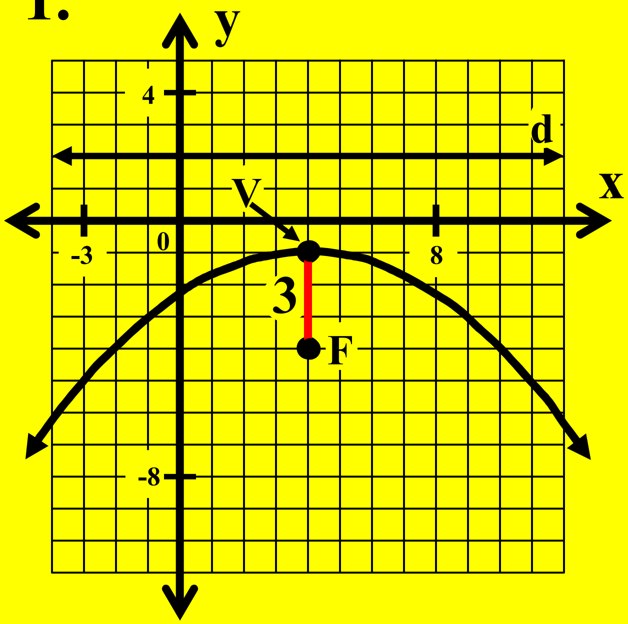

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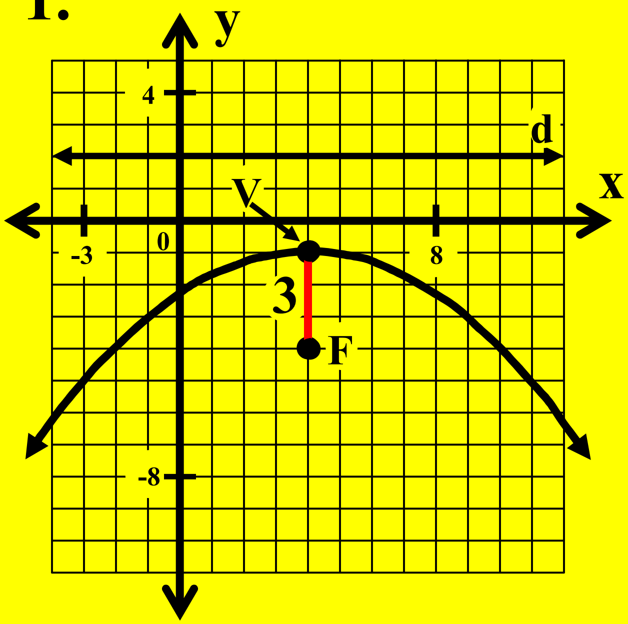

This is a 'type 1' parabola. (The directrix, d, is a horizontal line.) The standard form equation for a type 1 parabola is

$$y - k = a(x - h)^2$$

V(h, k) represents the vertex of the parabola.

In this case, the vertex is the point (4, -1) so

$$h = 4 \text{ and } k = -1.$$

Since the focus is 3 units below the vertex, p = -3.

$$a = \frac{1}{4p} = \frac{-1}{12}$$

$$y - k = a(x - h)^2$$

$$y - -1 = \frac{-1}{12}(x - 4)^2$$

$$-12(y + 1) = 1(x - 4)^2$$

$$-12y - 12 = x^2 - 8x + 16$$

$$0 = x^2 - 8x + 12y + 28$$

$$y + 1 = \frac{-1}{12}(x - 4)^2$$

Standard Form Equation

$$x^2 - 8x + 12y + 28 = 0$$

General Form Equation

Class Worksheet #4

Write the equation in standard form and the equation in general form for each parabola.

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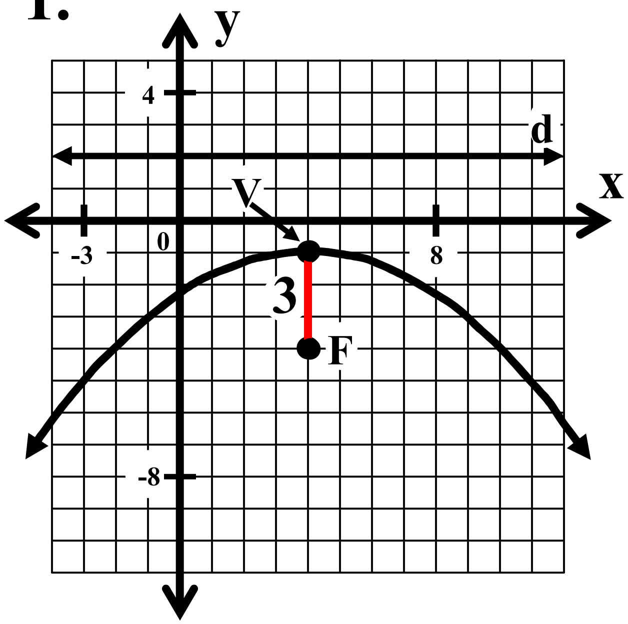

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General Form Equation

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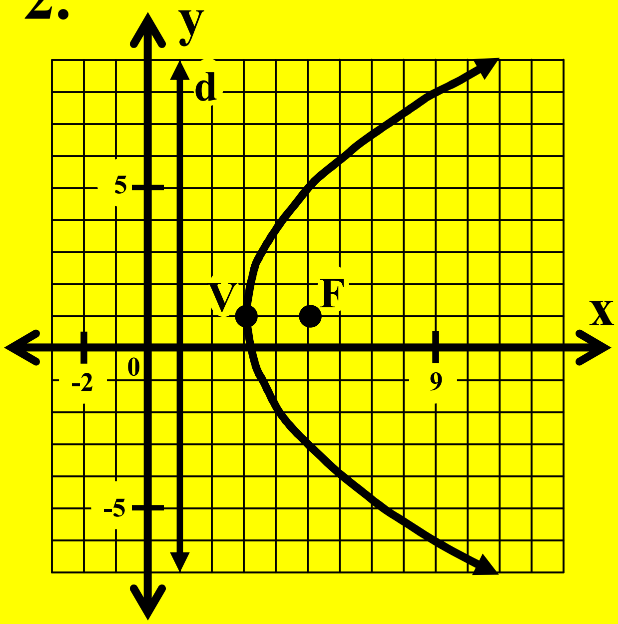

Class Worksheet #4

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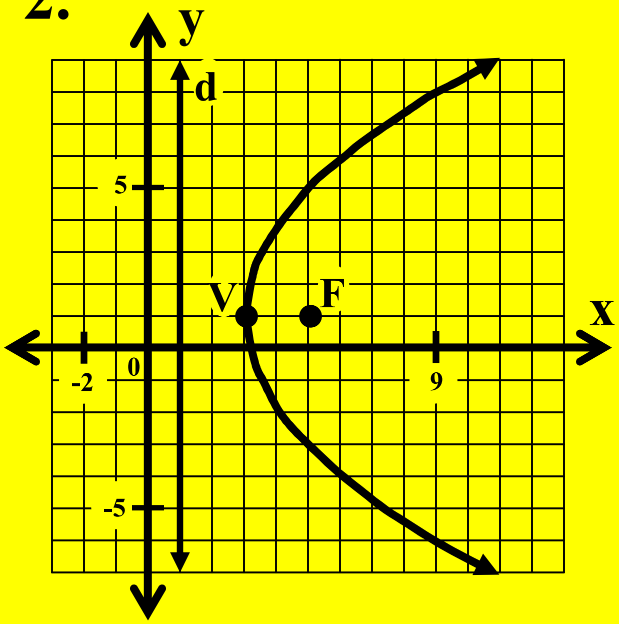

Class Worksheet #4

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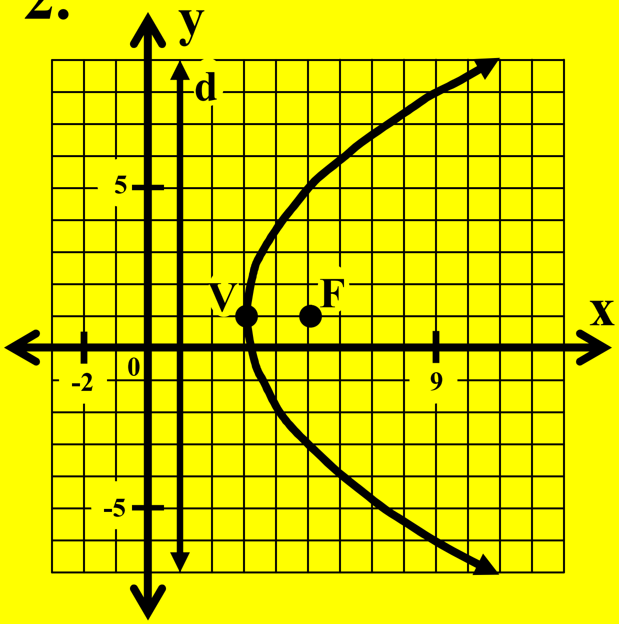
This is a 'type 2' parabola.

2.



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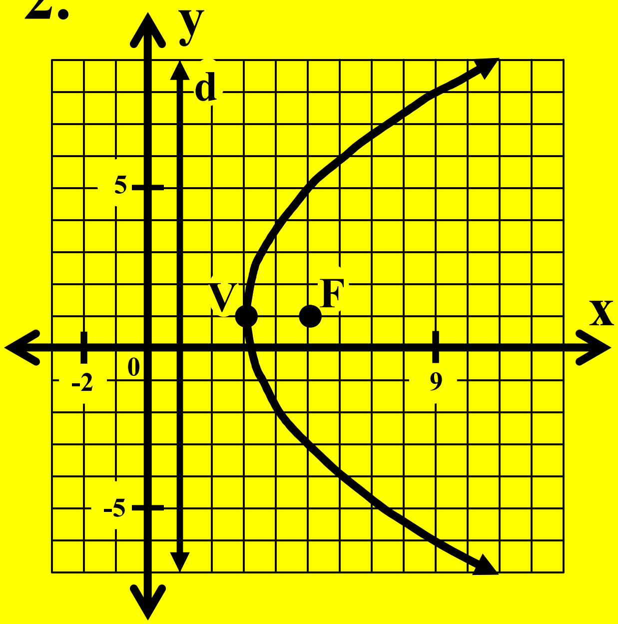

This is a 'type 2' parabola. (The directrix, d, is a vertical line.)

Class Worksheet #4

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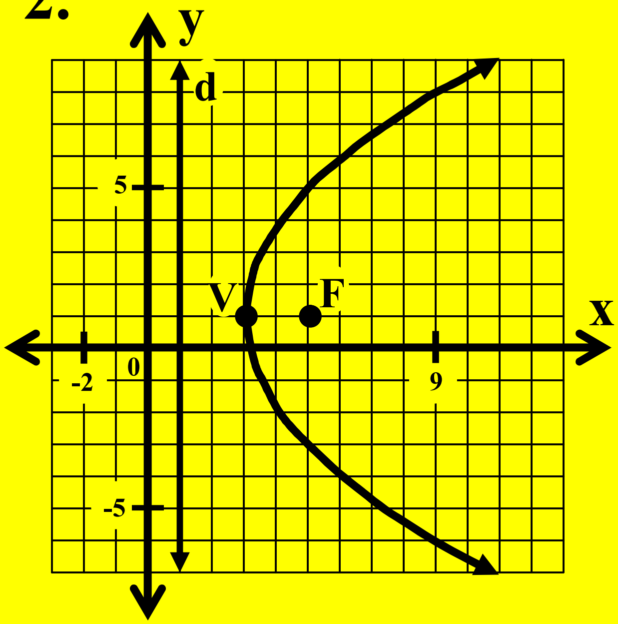

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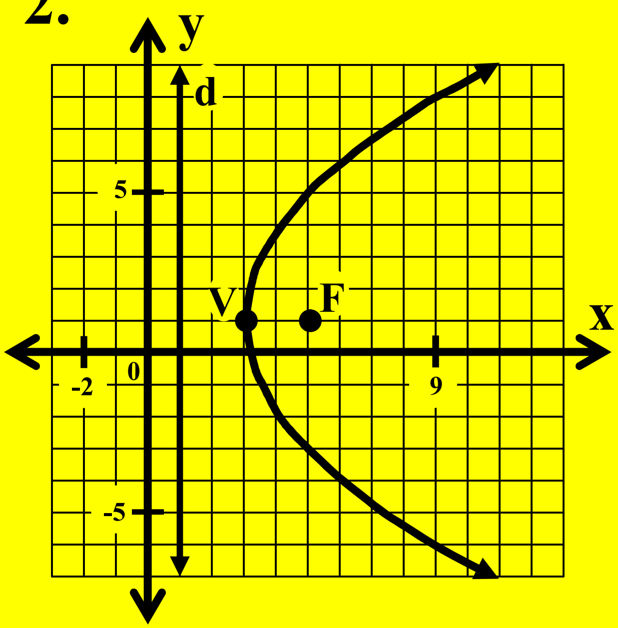

This is a 'type 2' parabola. (The directrix, d, is a vertical line.) The standard form equation for a type 2 parabola is

x

Class Worksheet #4

Write the equation in standard form and the equation in general form for each parabola.

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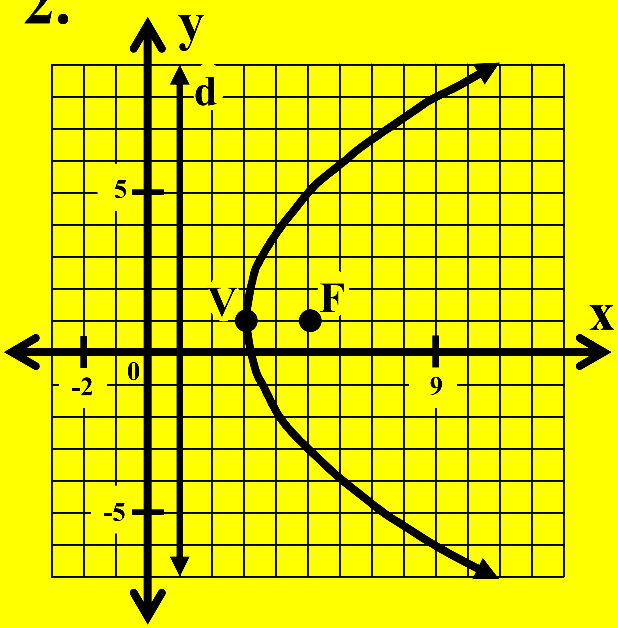

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Class Worksheet #4

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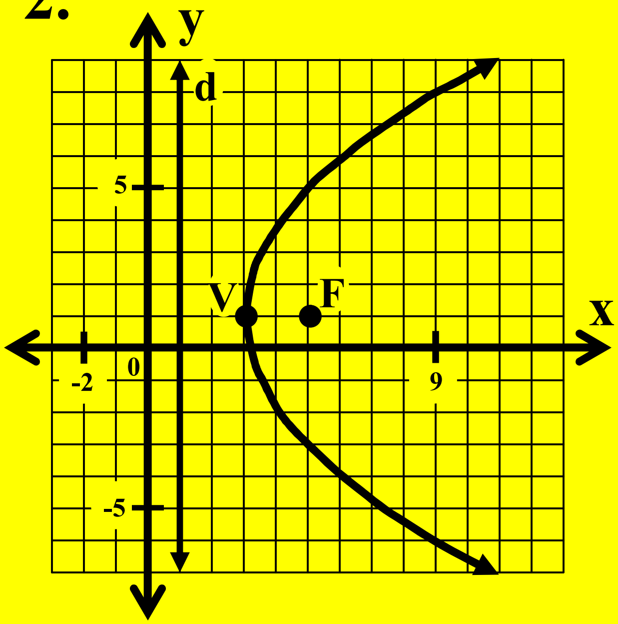

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$x - h$

Class Worksheet #4

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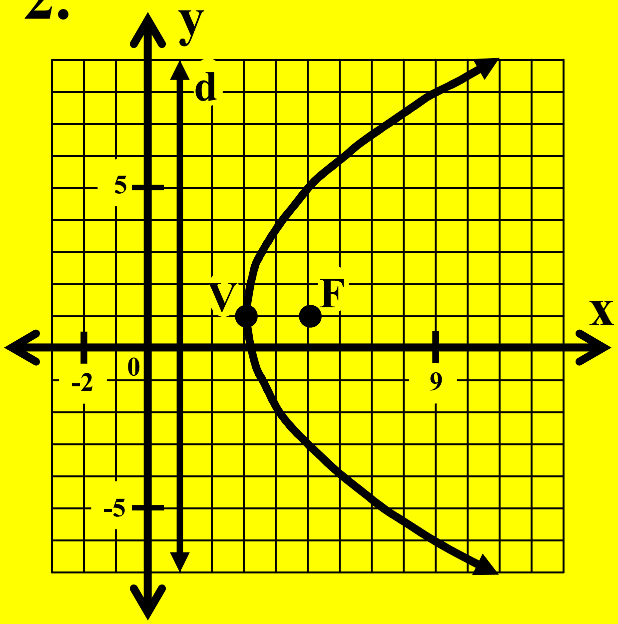

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$$x - h =$$

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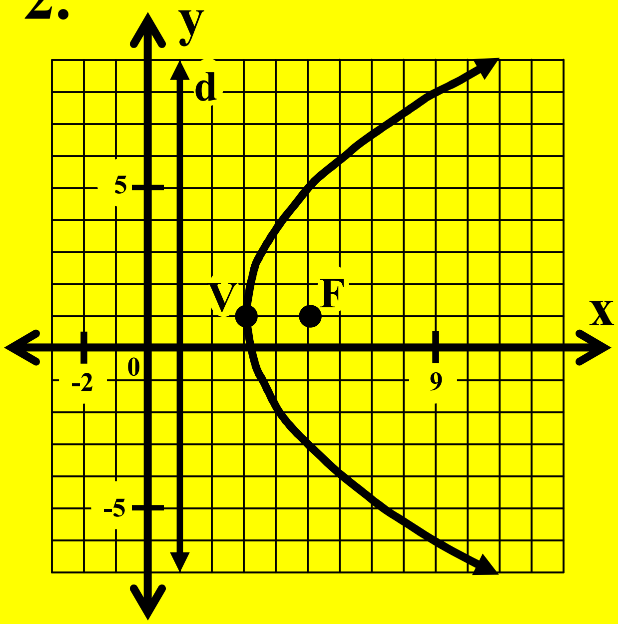

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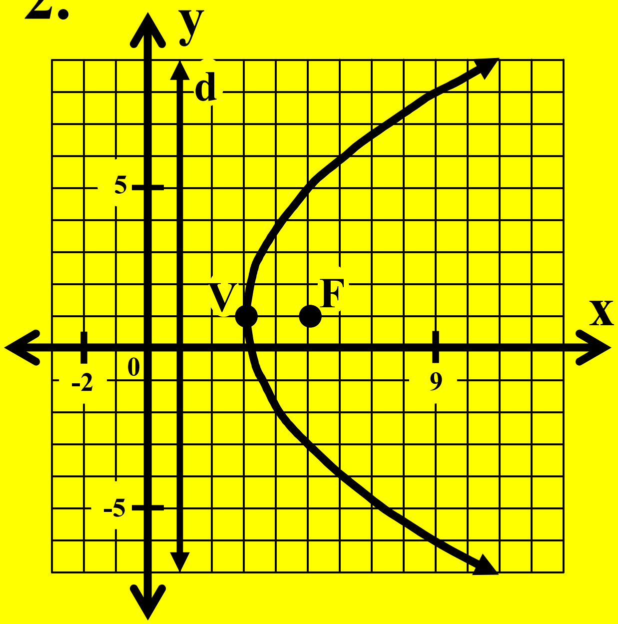

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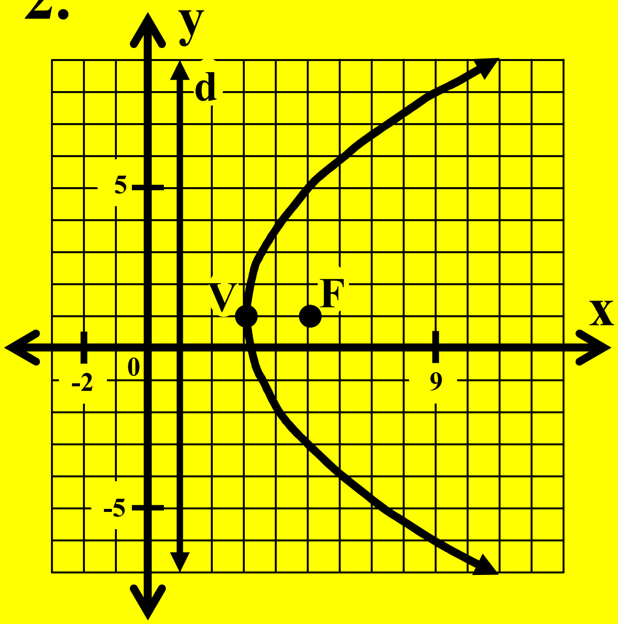

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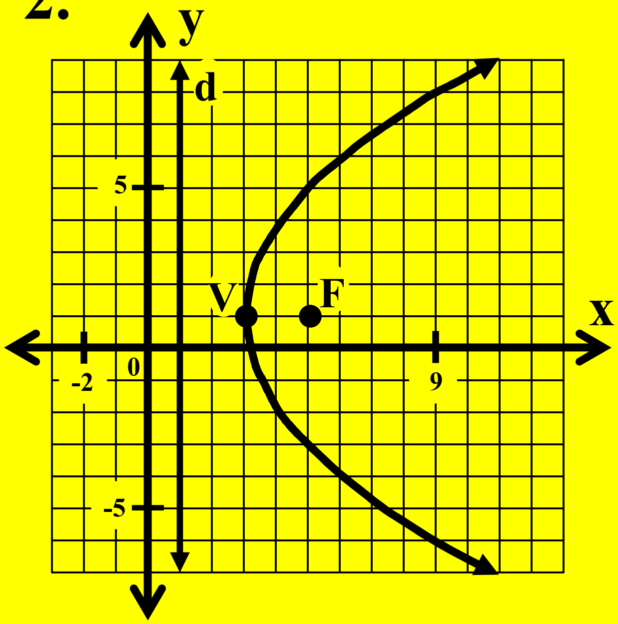

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Class Worksheet #4

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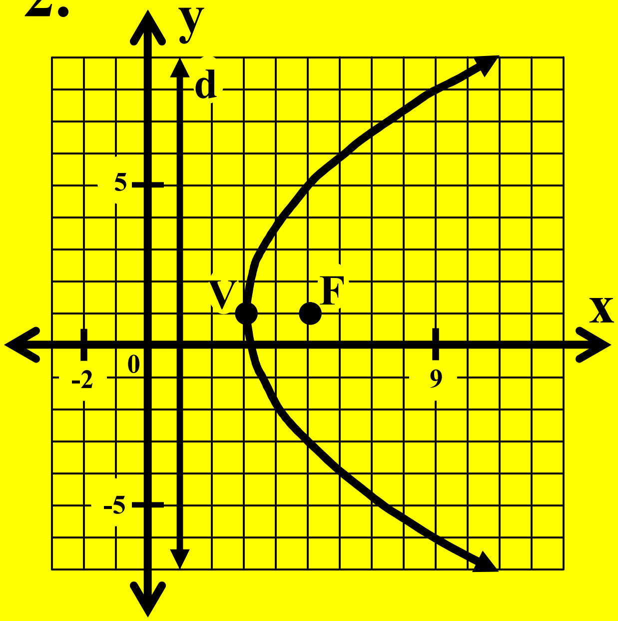

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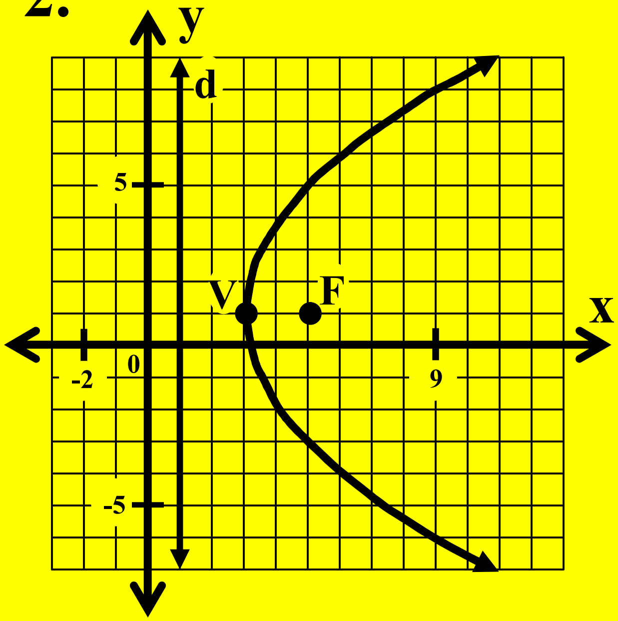

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V(h, k)

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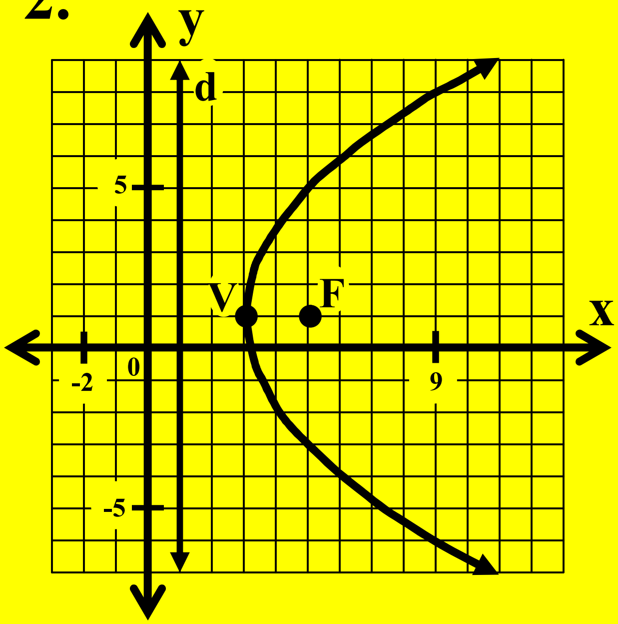

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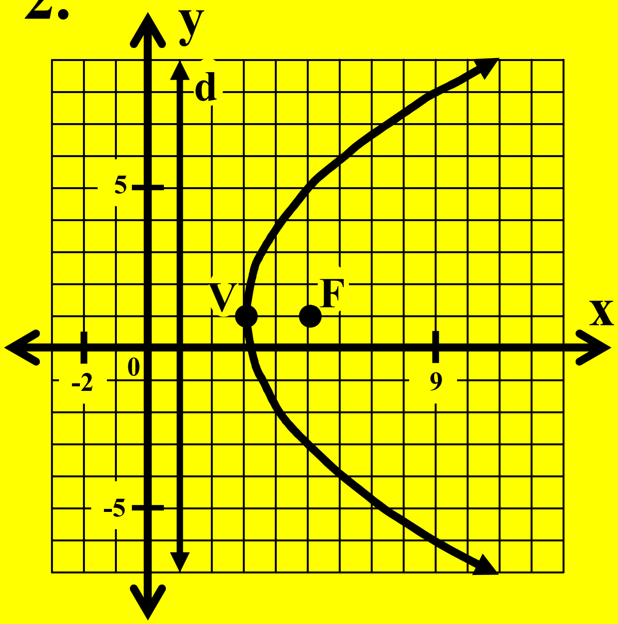

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Class Worksheet #4

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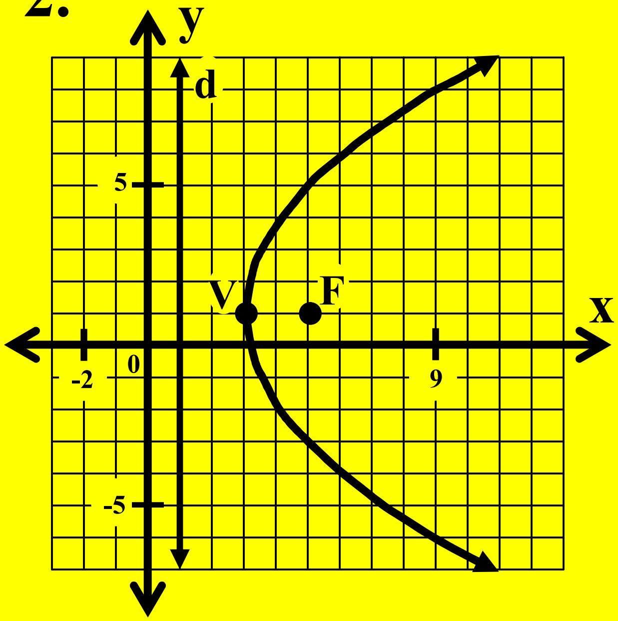

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In this case, the vertex is the point (3, 1)

Class Worksheet #4

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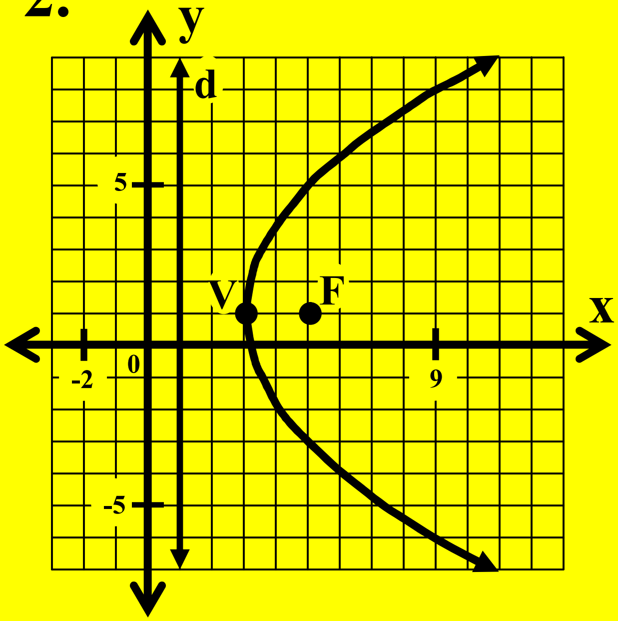

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In this case, the vertex is the point (3, 1) so

$$h = 3$$

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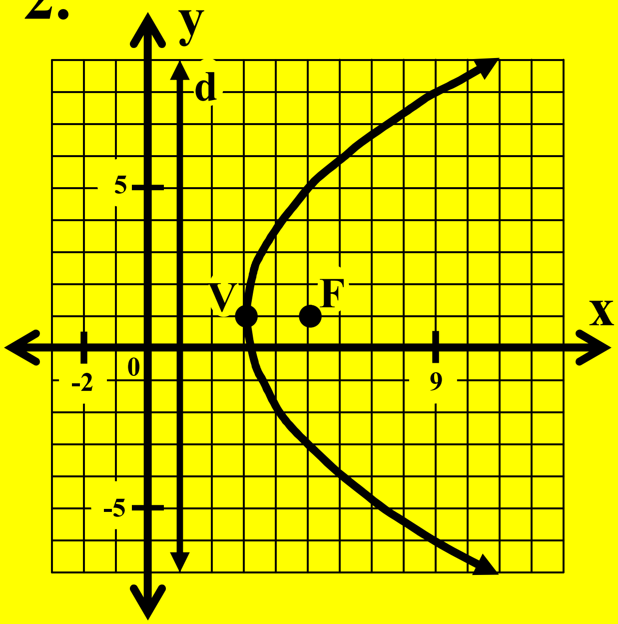

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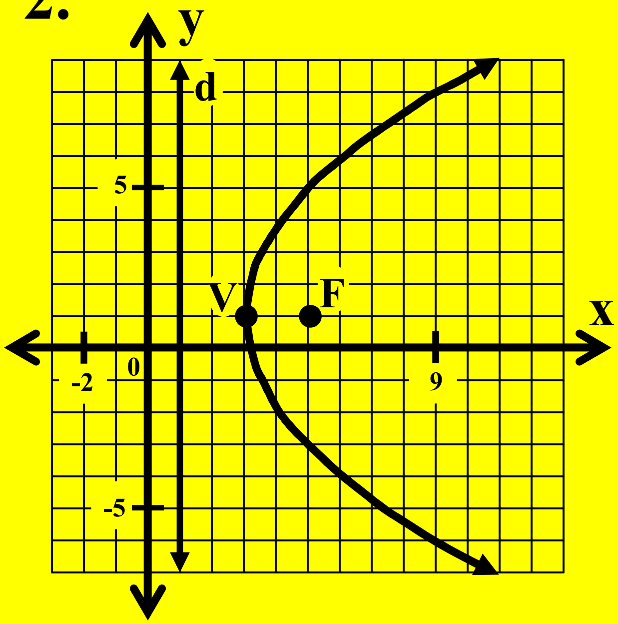

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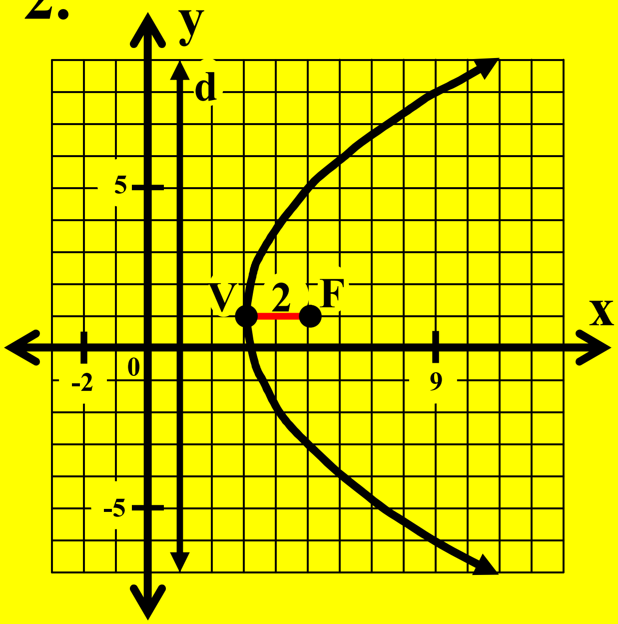

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Since the focus is 2 units right of the vertex,

Class Worksheet #4

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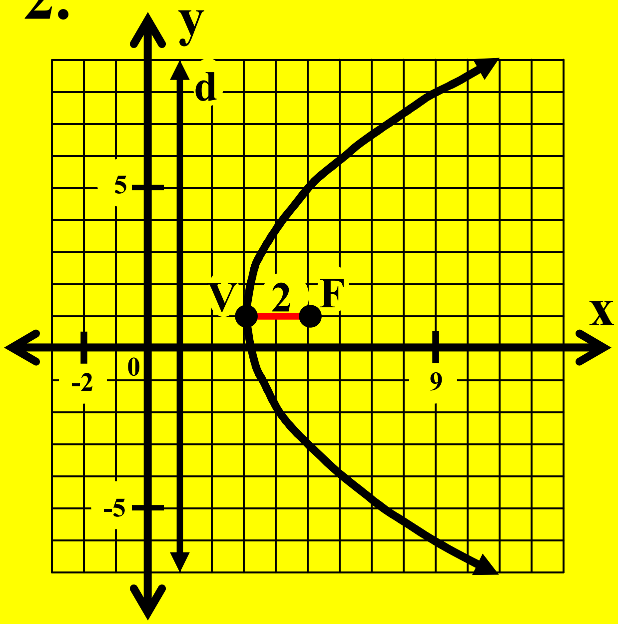

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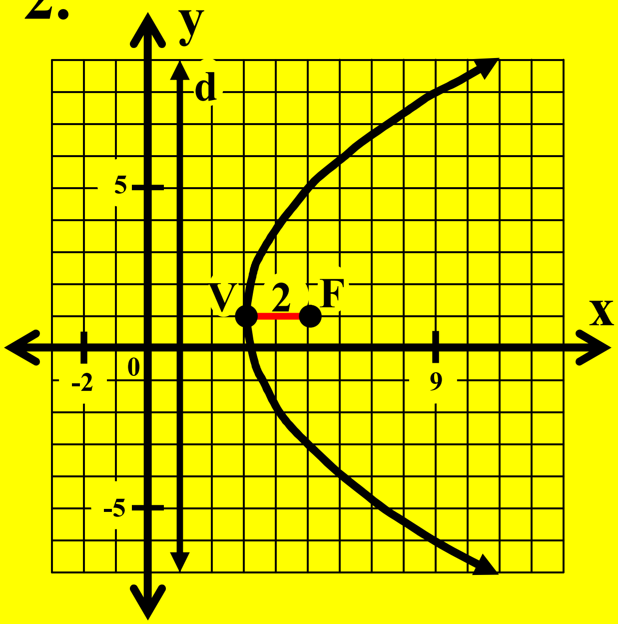

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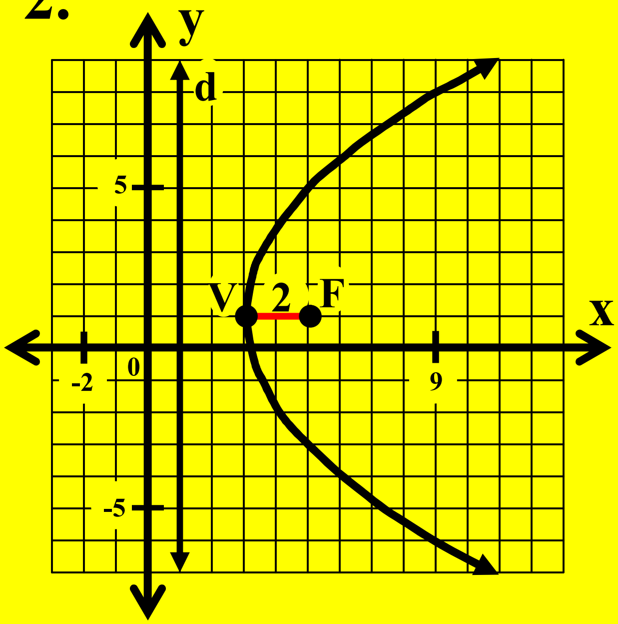

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In this case, the vertex is the point (3, 1) so

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Since the focus is 2 units right of the vertex, p = +2.

Class Worksheet #4

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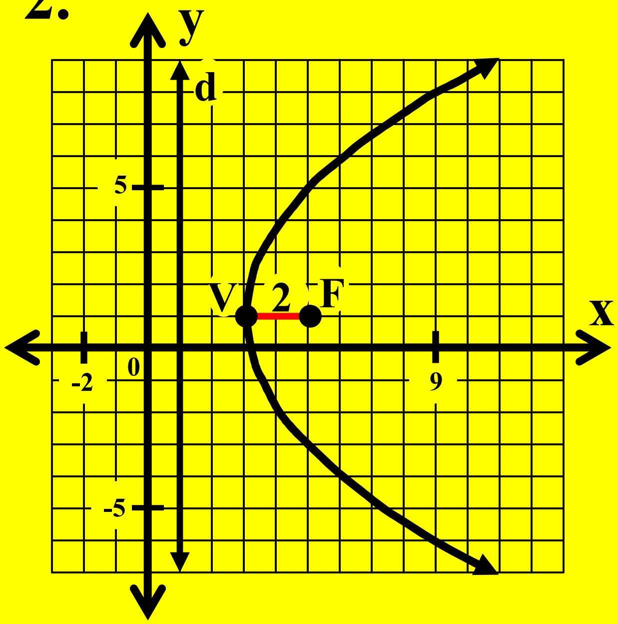

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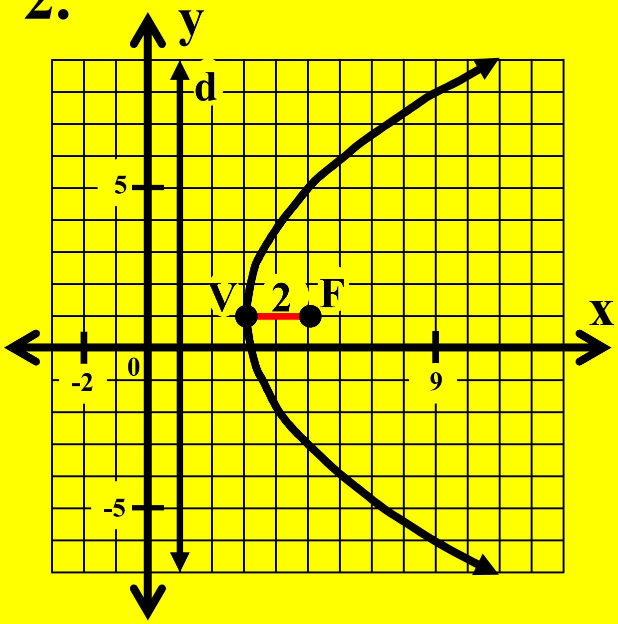

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$$a = \frac{1}{4p}$$

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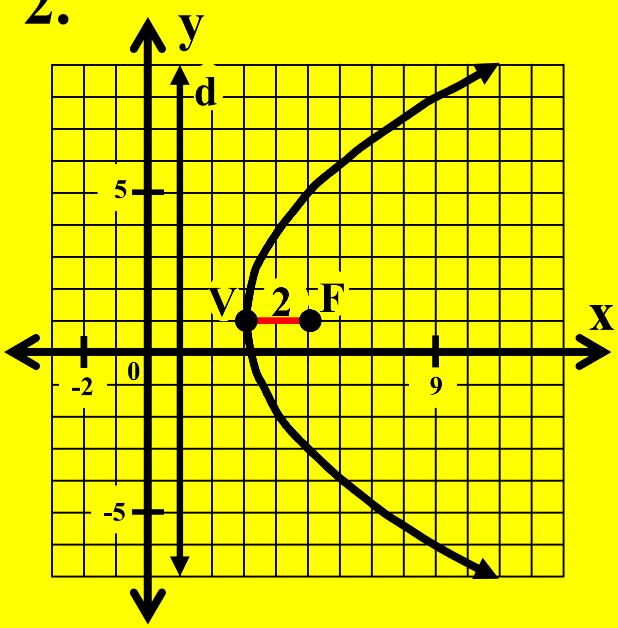

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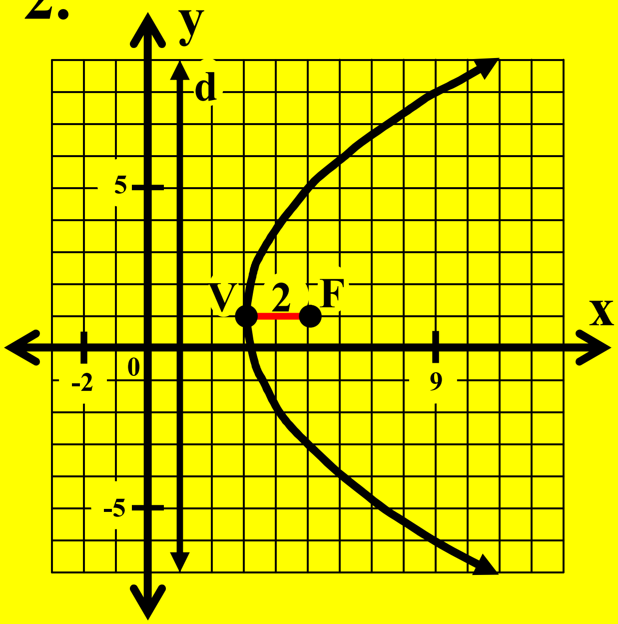

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Since the focus is 2 units right of the vertex, p = +2.

$$a = \frac{1}{4p} = \frac{1}{8}$$

Class Worksheet #4

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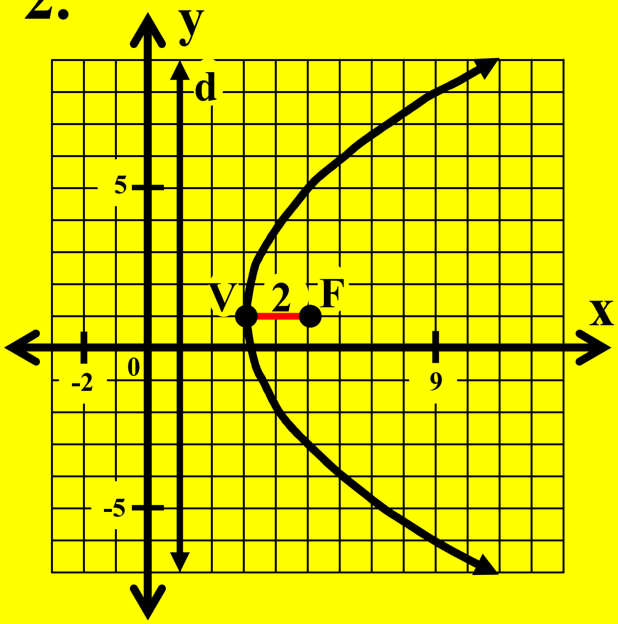

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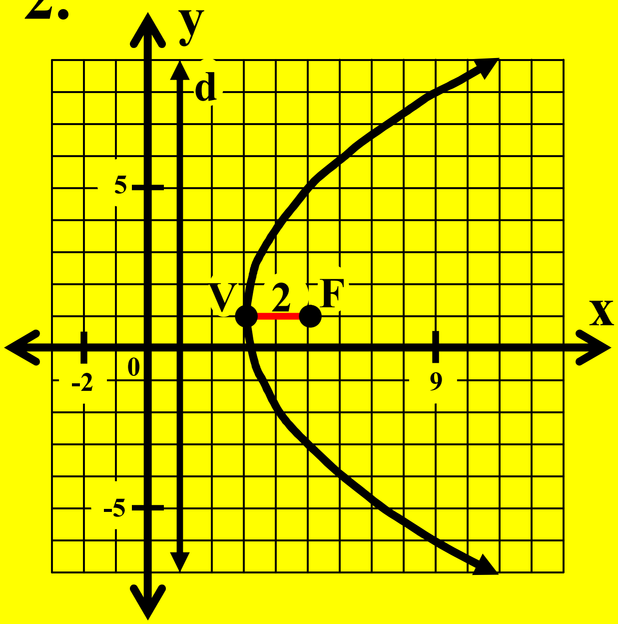

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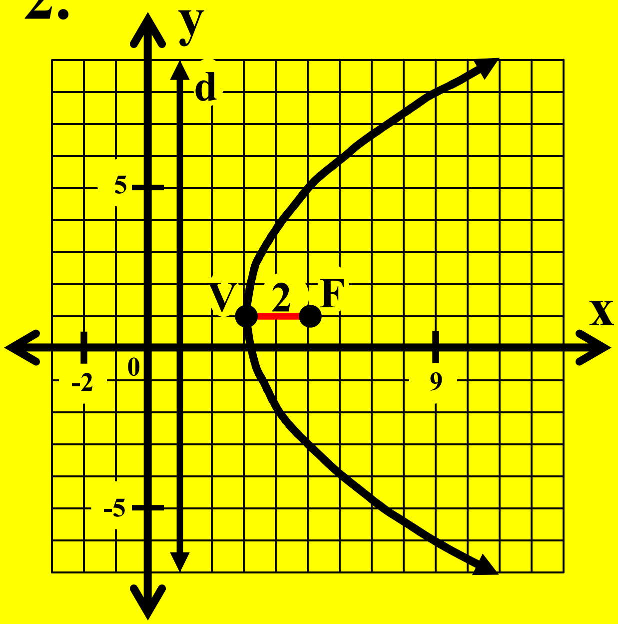

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$$x -$$

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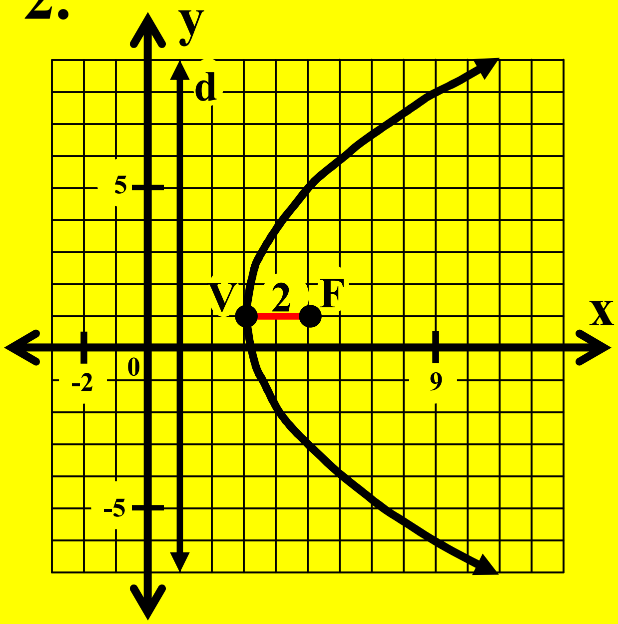

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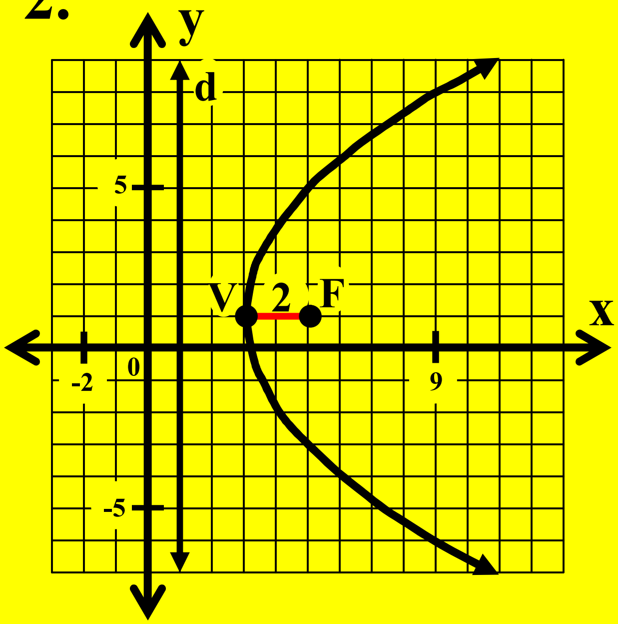

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Class Worksheet #4

Write the equation in standard form and the equation in general form for each parabola.

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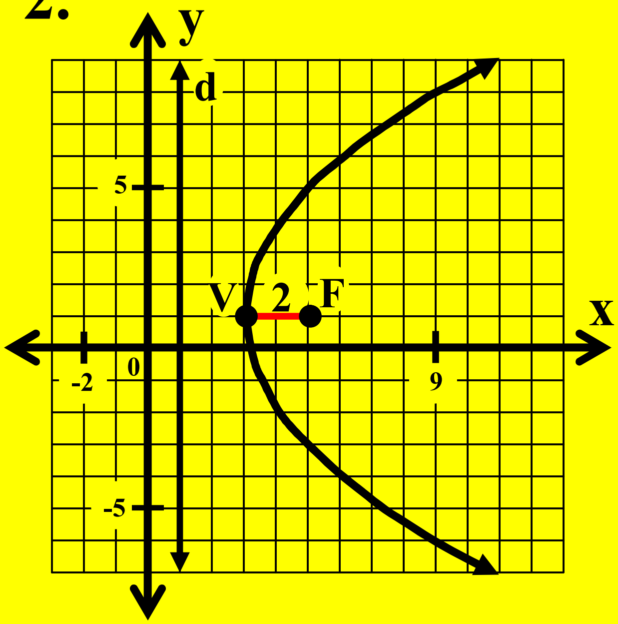

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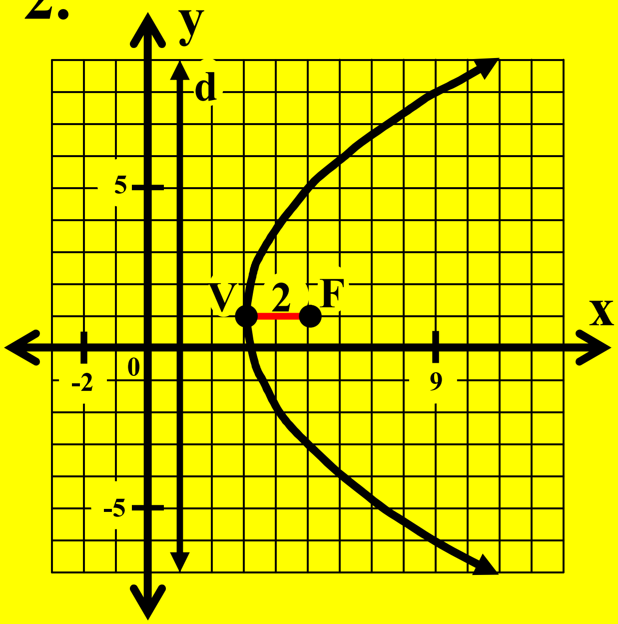

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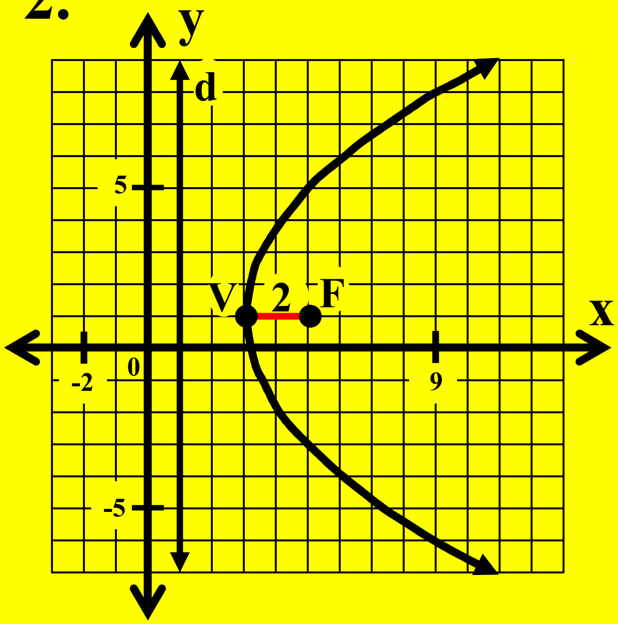

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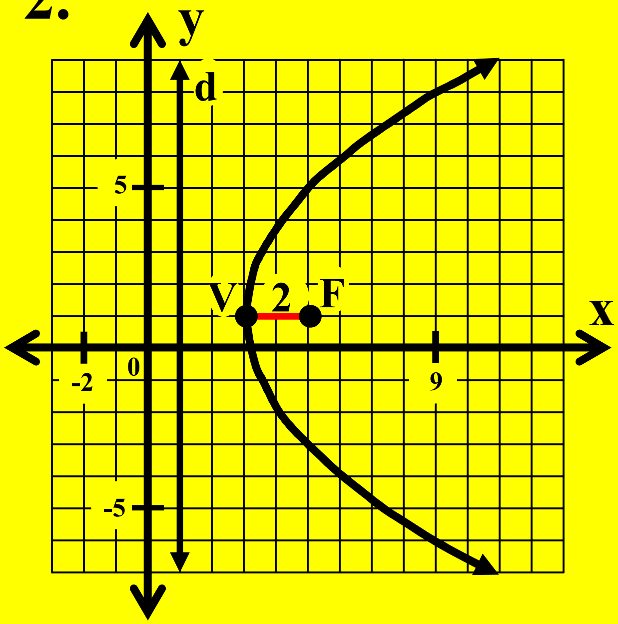

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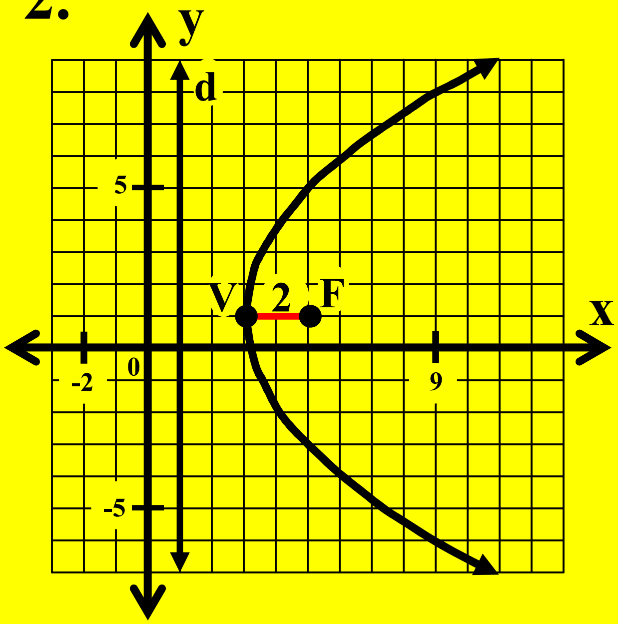

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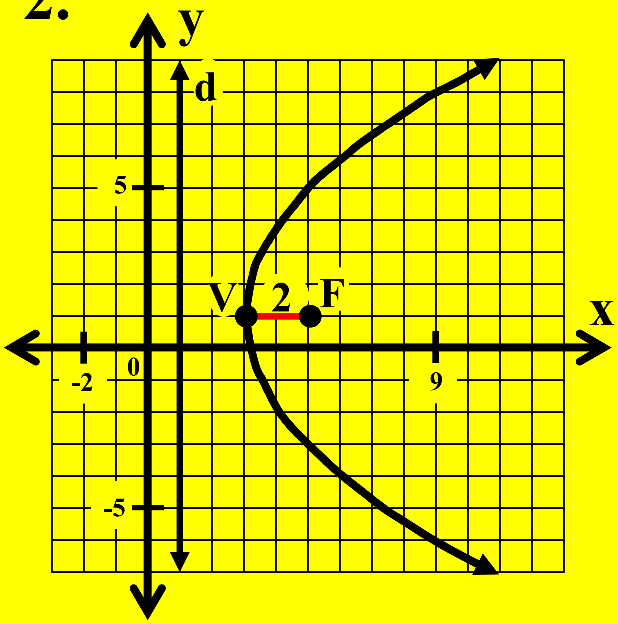

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Standard Form Equation

Class Worksheet #4

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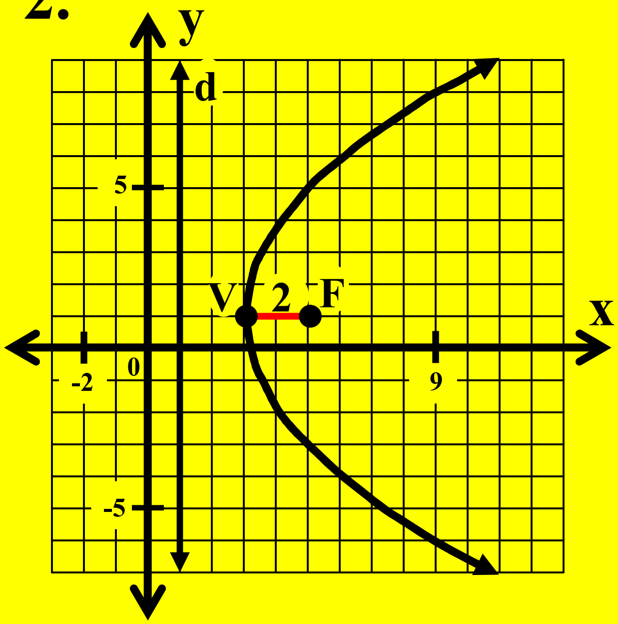

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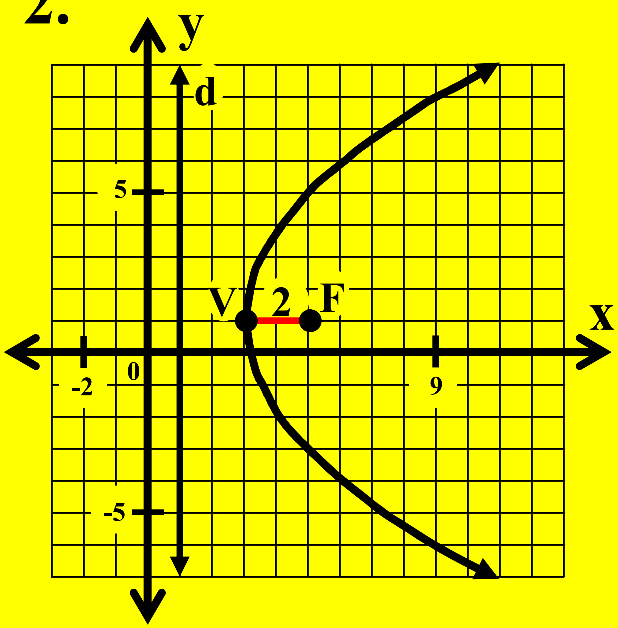

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Standard Form Equation

Multiply both sides by 8.

Class Worksheet #4

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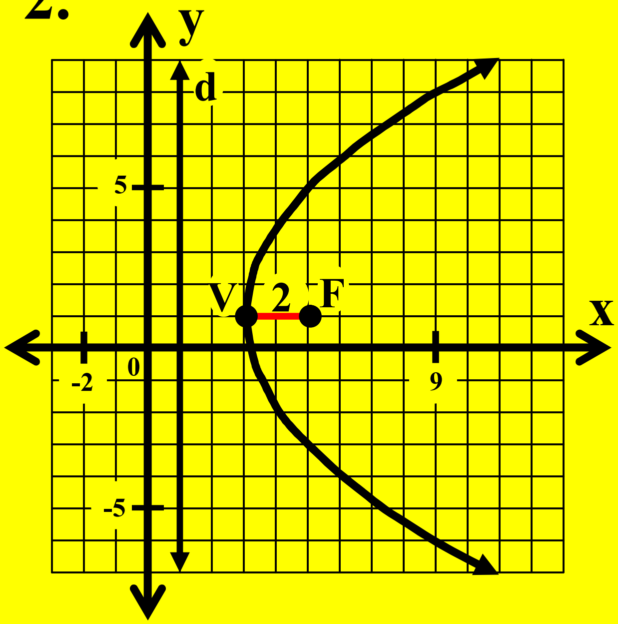

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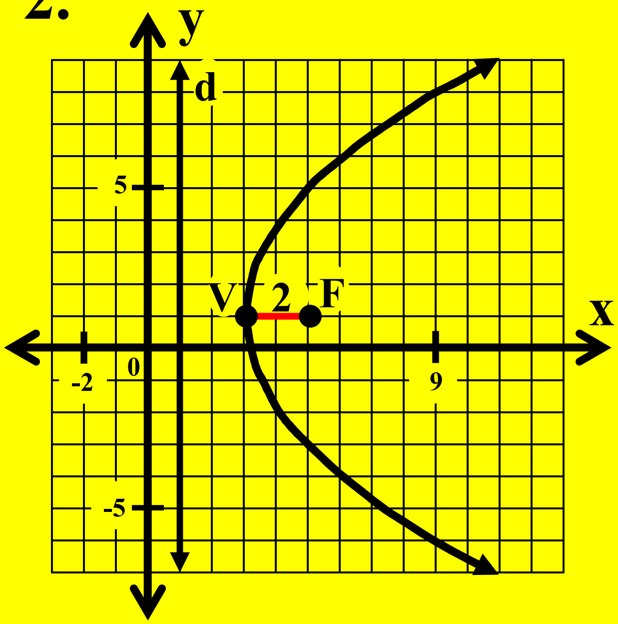

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Standard Form Equation

$$8(x - 3)$$

Multiply both sides by 8.

Class Worksheet #4

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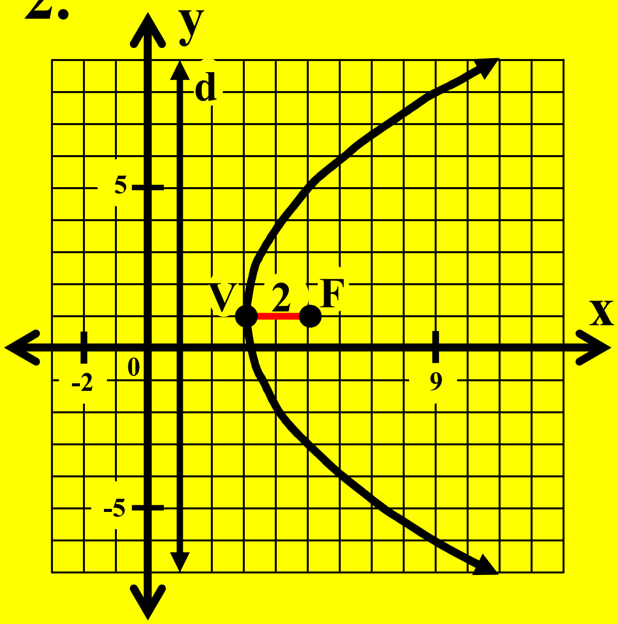

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$$x - 3 = \frac{1}{8}(y - 1)^2$$

Standard Form Equation

$$8(x - 3) =$$

Multiply both sides by 8.

Class Worksheet #4

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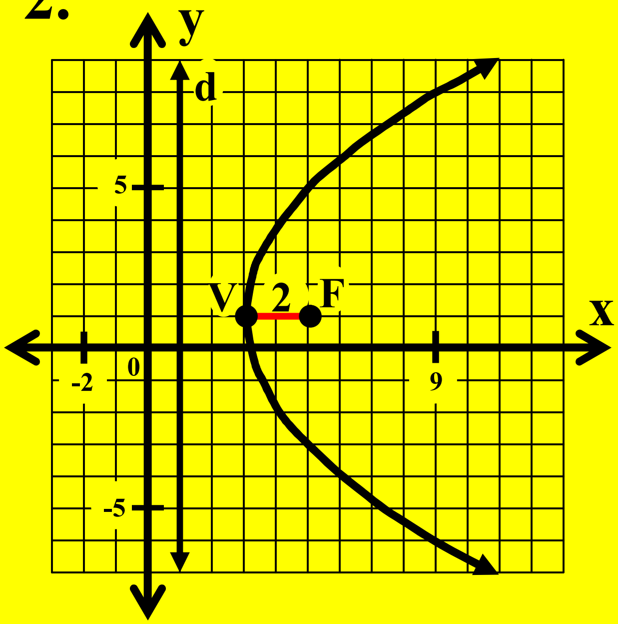

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$$x - 3 = \frac{1}{8}(y - 1)^2$$

Standard Form Equation

$$8(x - 3) = 1($$

Multiply both sides by 8.

Class Worksheet #4

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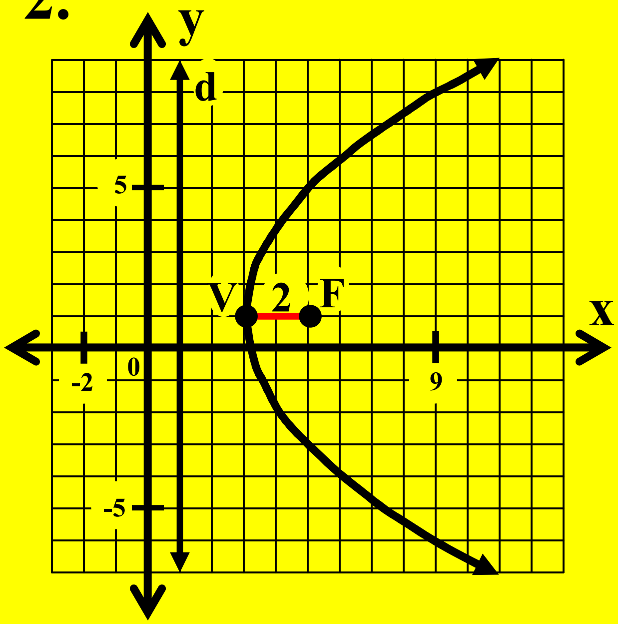

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Standard Form Equation

$$8(x - 3) = 1(y - 1)^2$$

Multiply both sides by 8.

Class Worksheet #4

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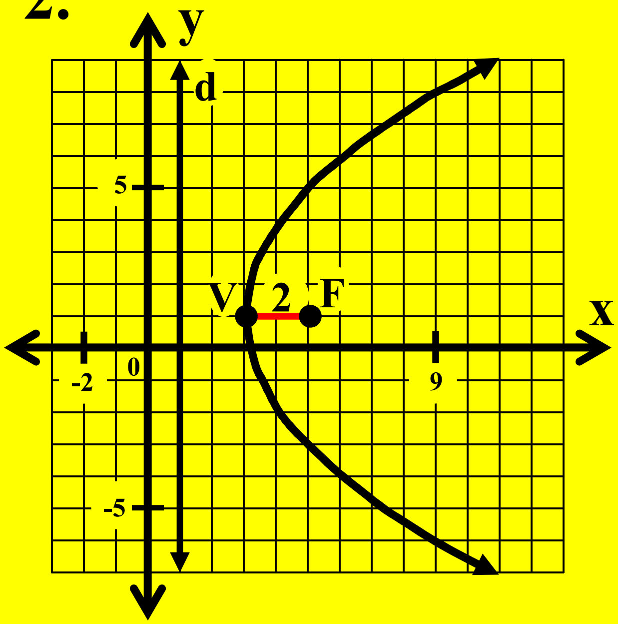

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Standard Form Equation

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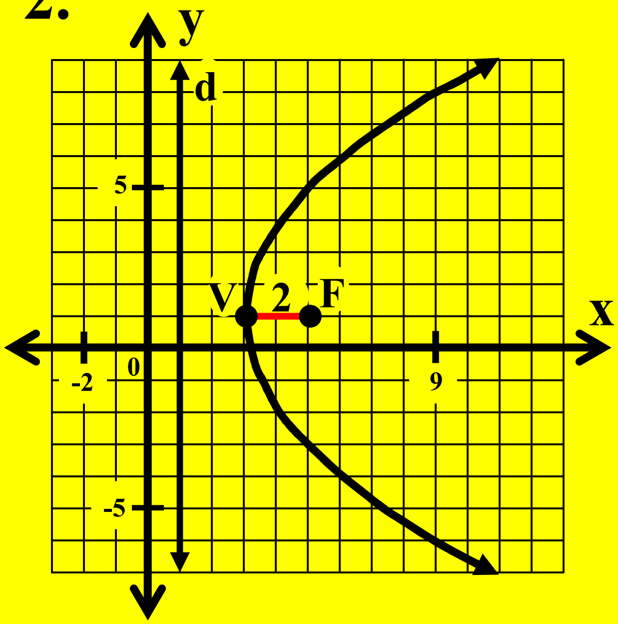

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Standard Form Equation

Perform the indicated operations.

Class Worksheet #4

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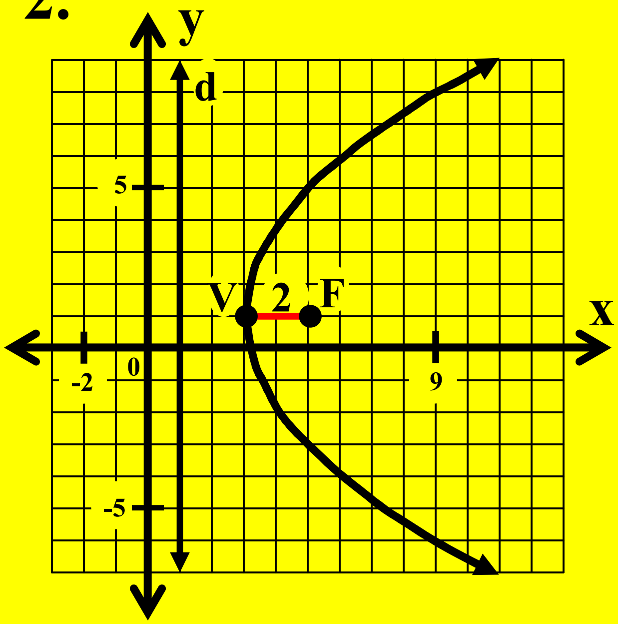

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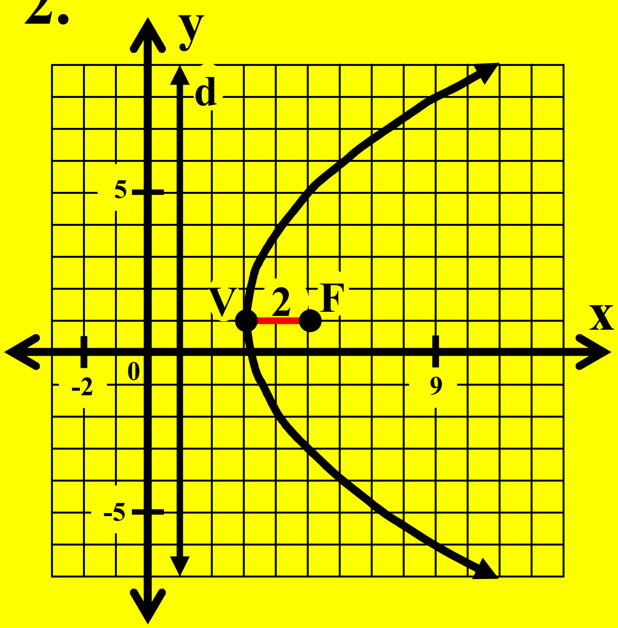

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Standard Form Equation

$$8(x - 3) = 1(y - 1)^2$$

$$8x$$

Perform the indicated operations.

Class Worksheet #4

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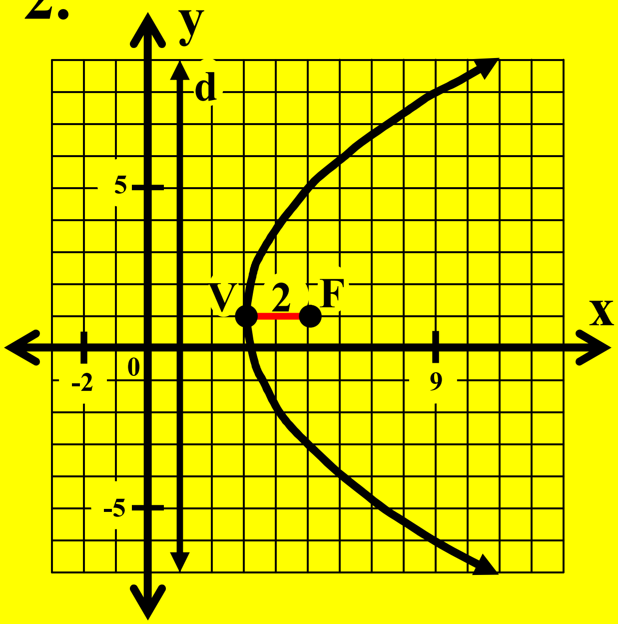

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Standard Form Equation

$$8(x - 3) = 1(y - 1)^2$$

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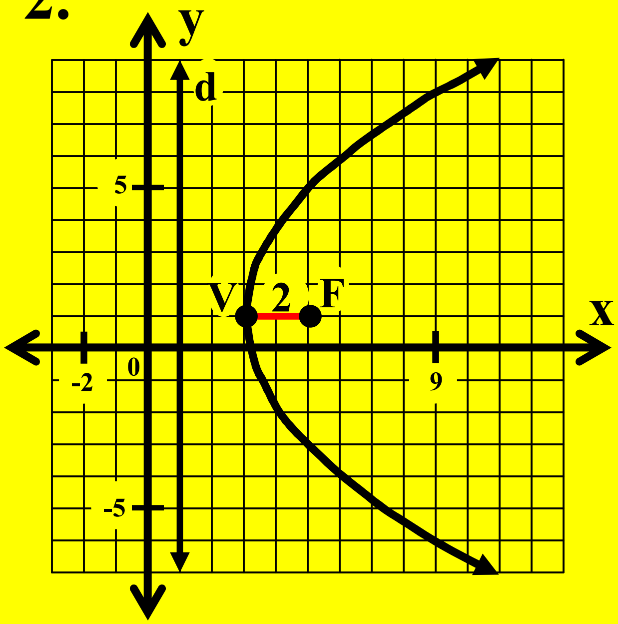

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Standard Form Equation

$$8(x - 3) = 1(y - 1)^2$$

$$8x - 24$$

Perform the indicated operations.

Class Worksheet #4

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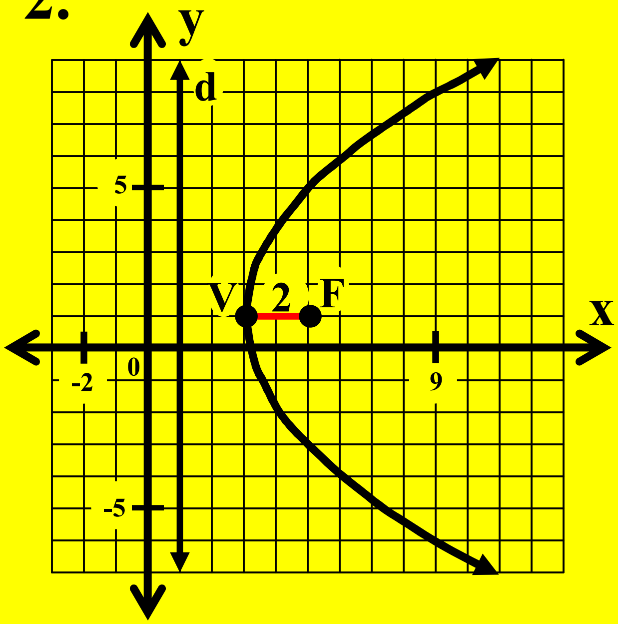

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Standard Form Equation

$$8(x - 3) = 1(y - 1)^2$$

$$8x - 24 =$$

Perform the indicated operations.

Class Worksheet #4

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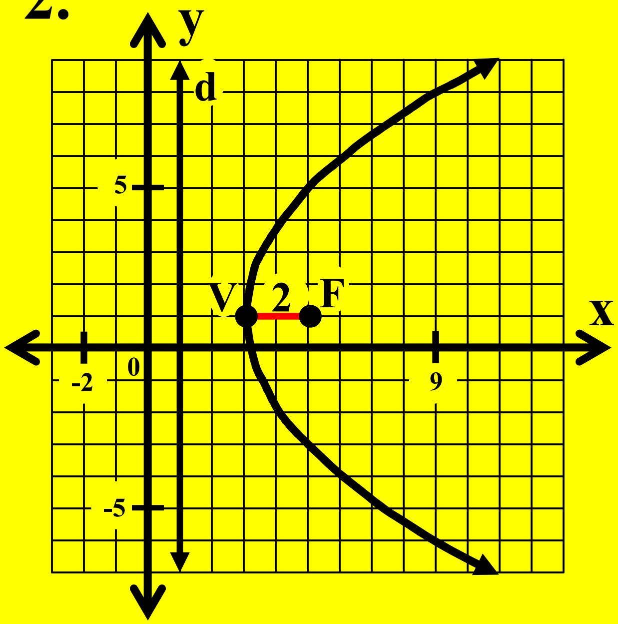

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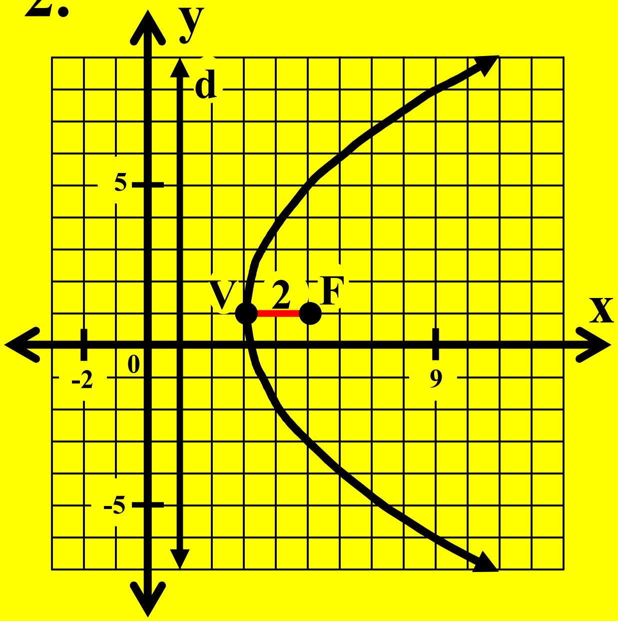

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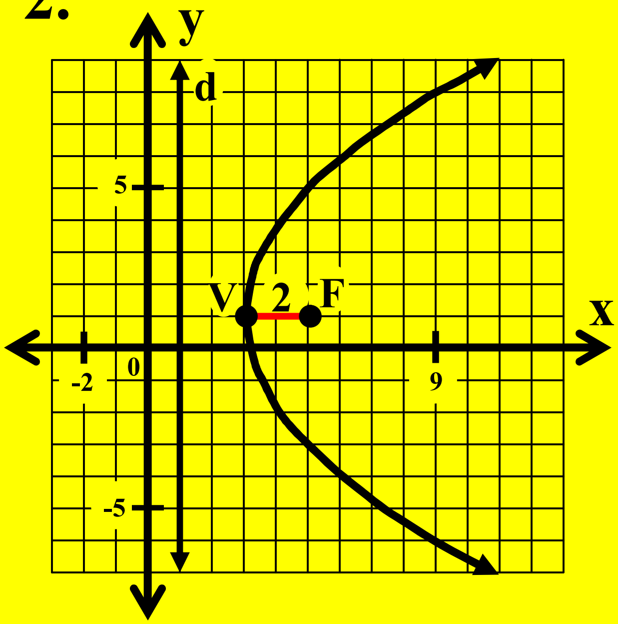

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Standard Form Equation

$$8(x - 3) = 1(y - 1)^2$$

$$8x - 24 = y^2 -$$

Perform the indicated operations.

Class Worksheet #4

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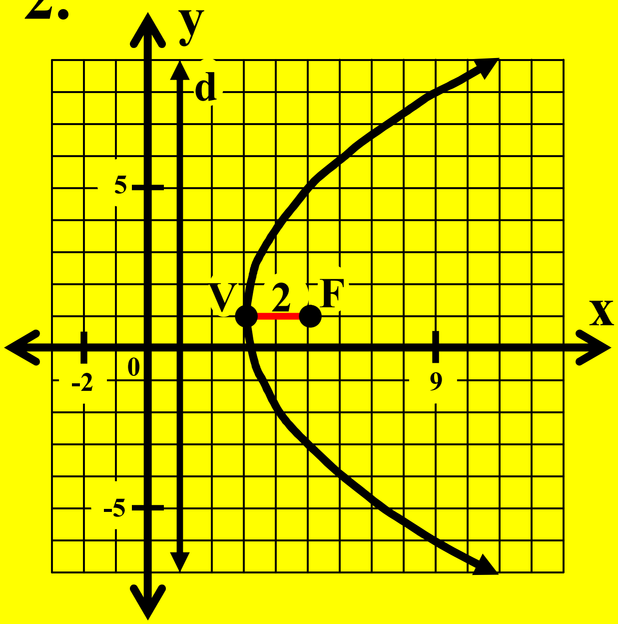

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Standard Form Equation

$$8(x - 3) = 1(y - 1)^2$$

$$8x - 24 = y^2 - 2y$$

Perform the indicated operations.

Class Worksheet #4

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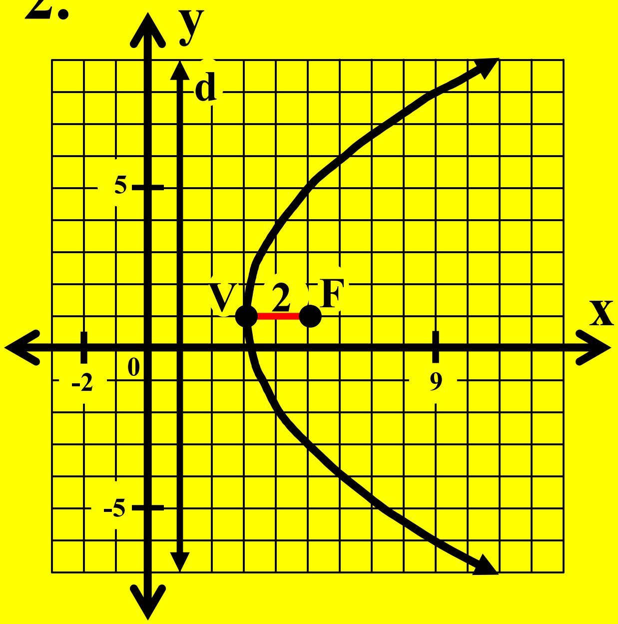

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Standard Form Equation

$$8(x - 3) = 1(y - 1)^2$$

$$8x - 24 = y^2 - 2y +$$

Perform the indicated operations.

Class Worksheet #4

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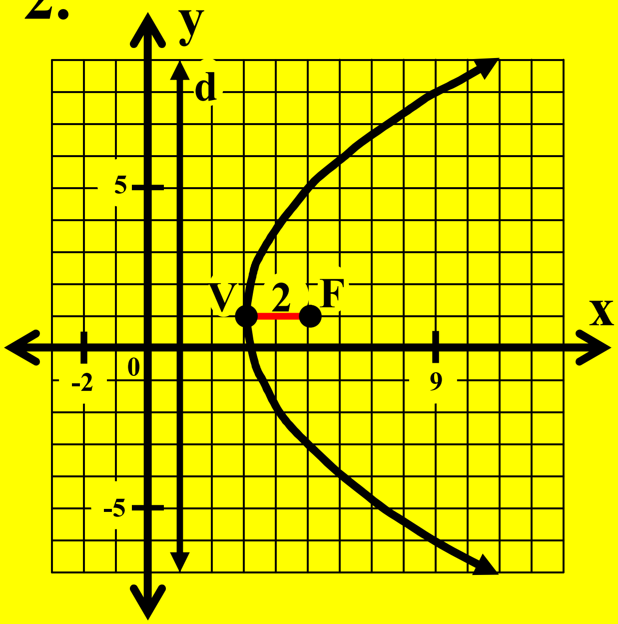

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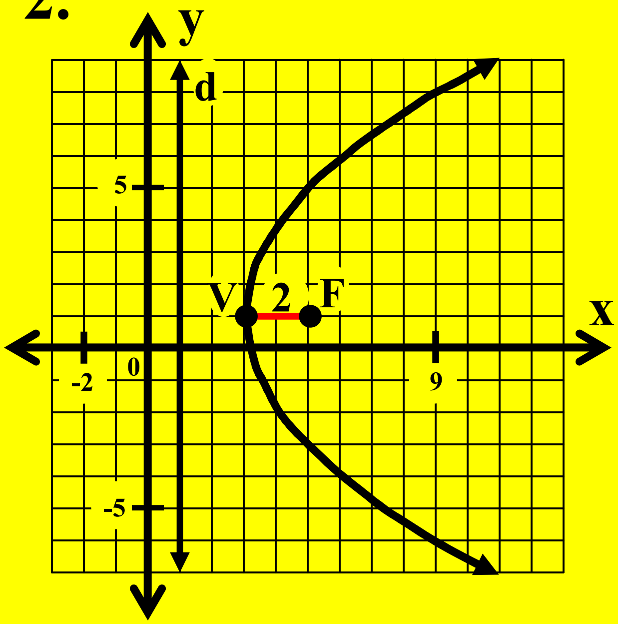

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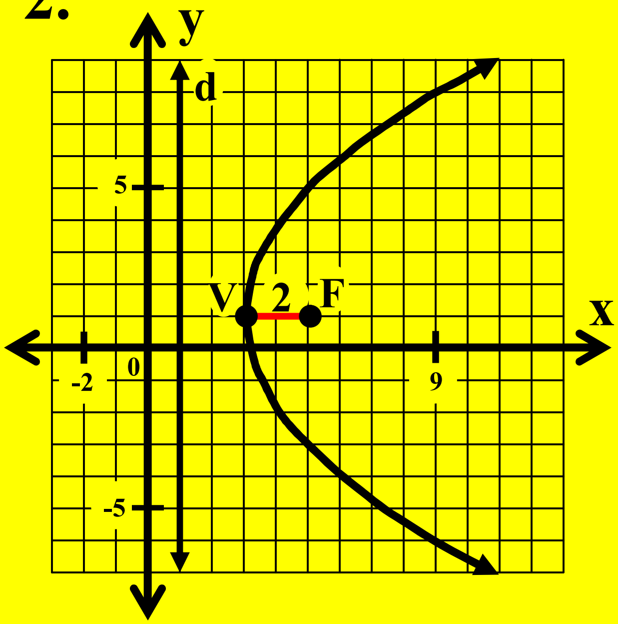

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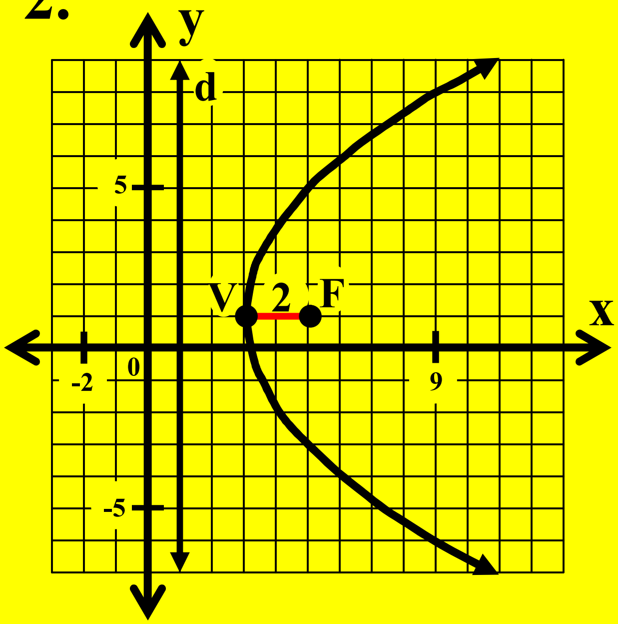

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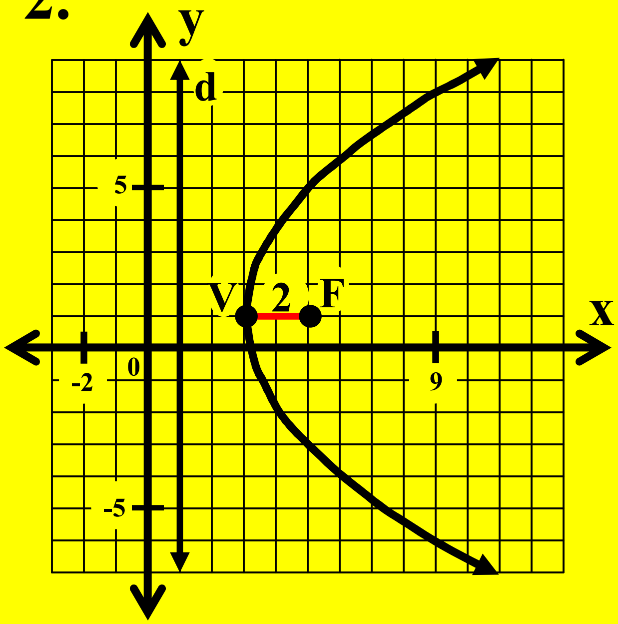

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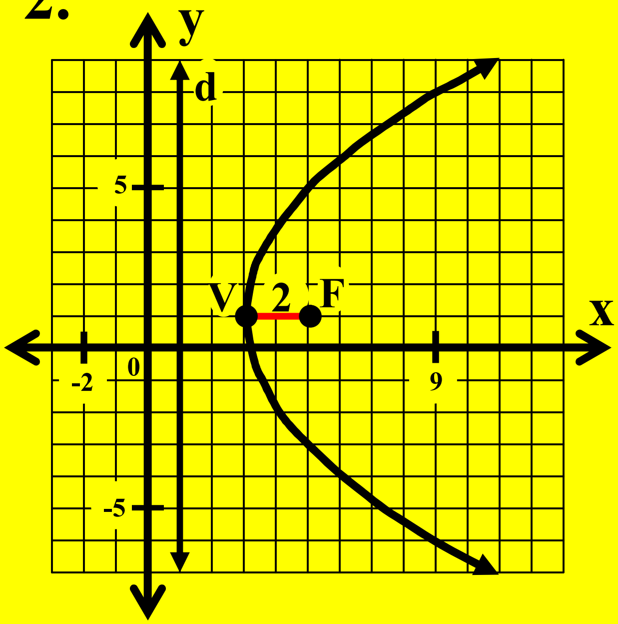

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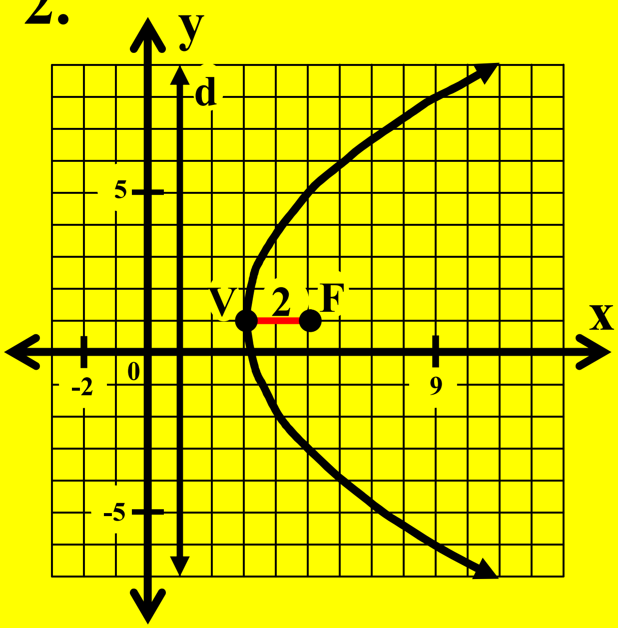

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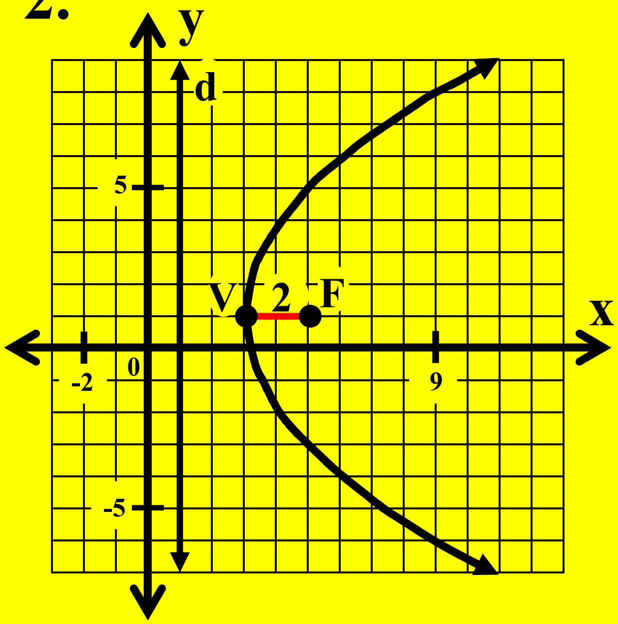

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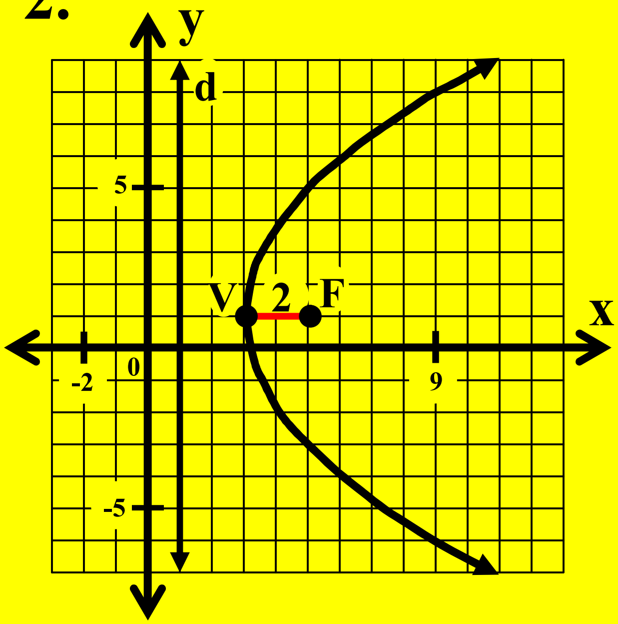

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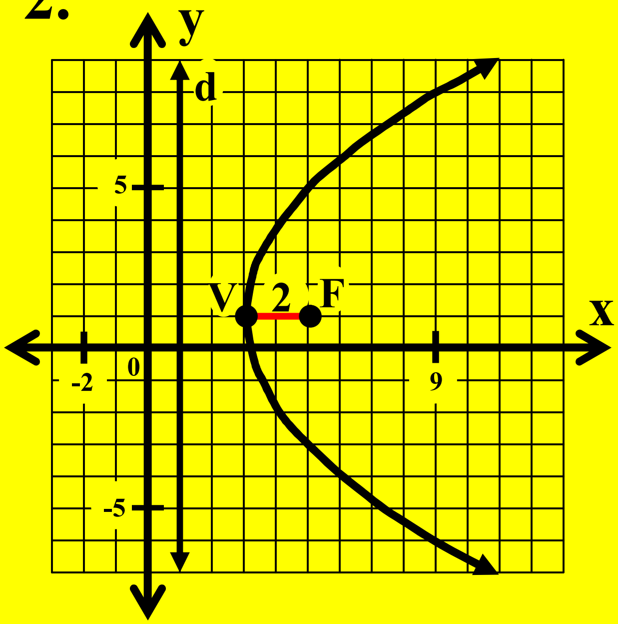

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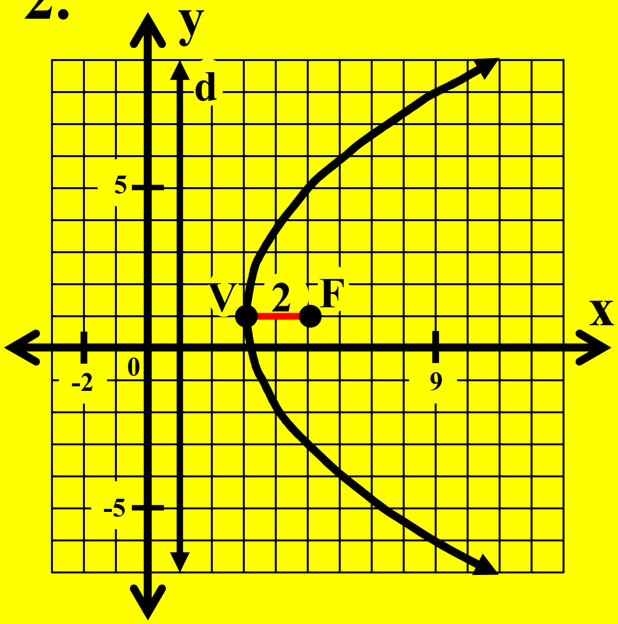

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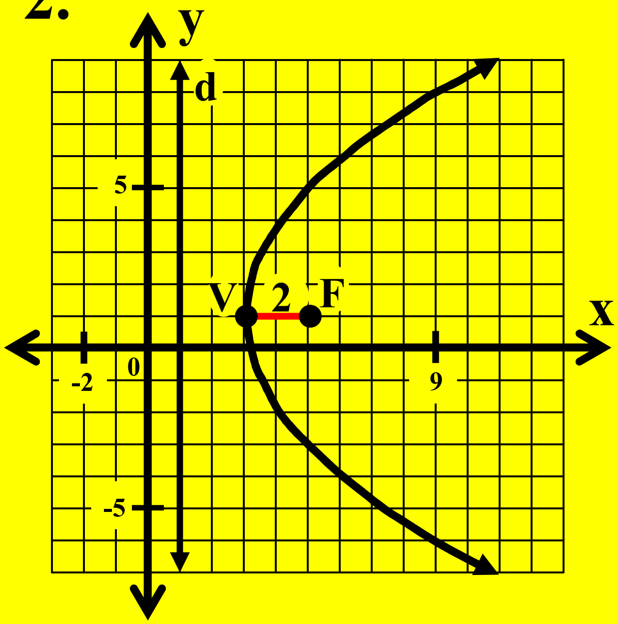

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Standard Form Equation

$$8(x - 3) = 1(y - 1)^2$$

$$8x - 24 = y^2 - 2y + 1$$

$$0 = y^2 - 8x - 2y + 25$$

Add -8x + 24 to both sides.

Class Worksheet #4

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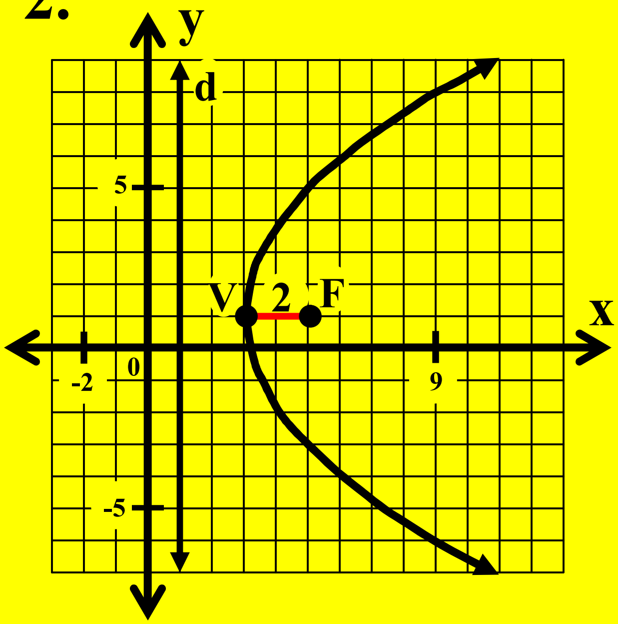

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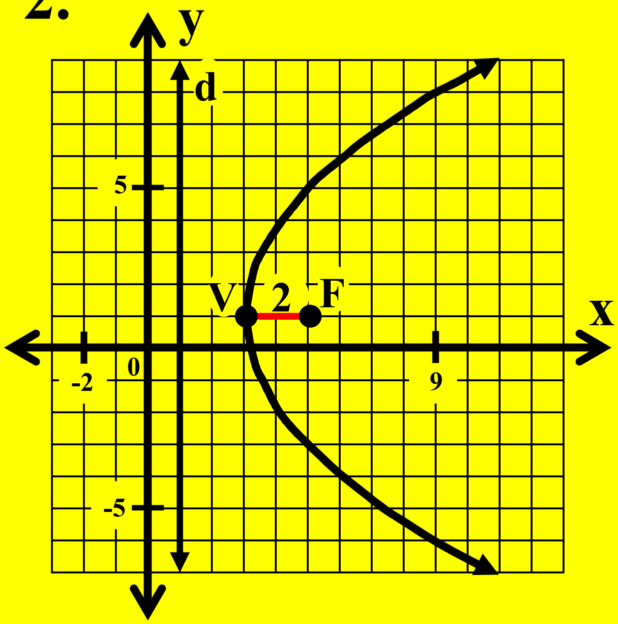

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$$y^2 - 8x - 2y + 25 = 0$$

General Form Equation

Class Worksheet #4

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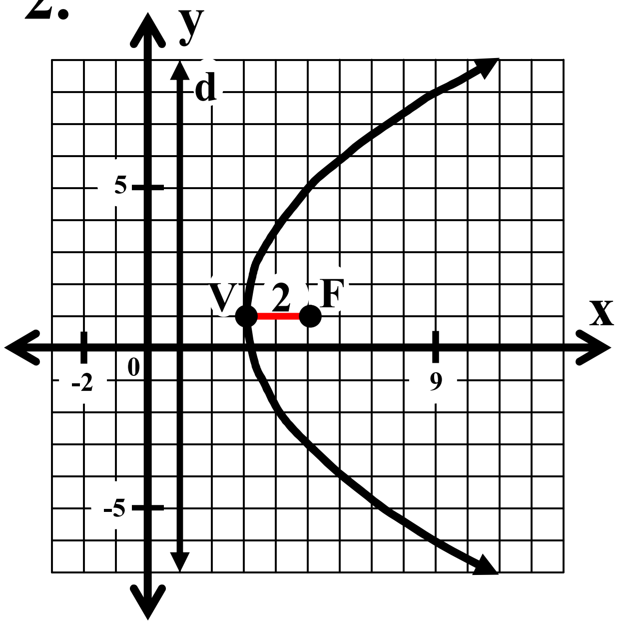

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General Form Equation

Class Worksheet #3

Express each equation using 'standard form' and sketch a graph.

3. $2x^2 + 12x - y + 17 = 0$

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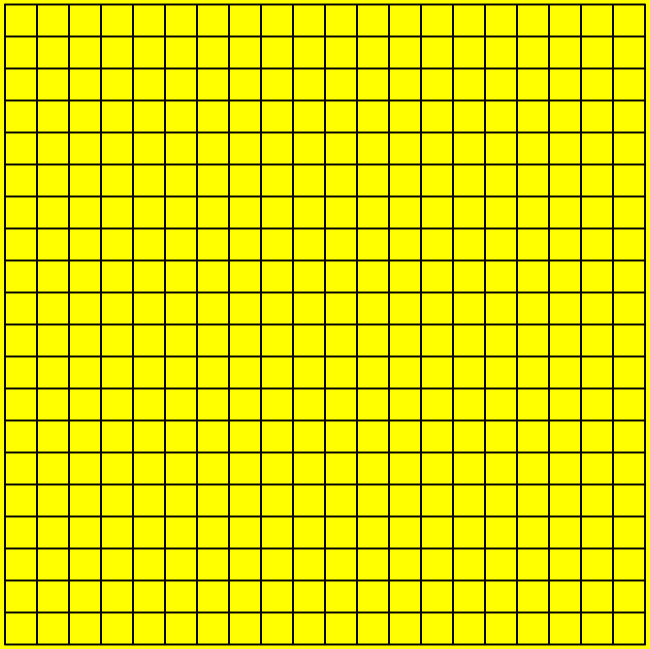

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Type 1 Parabola

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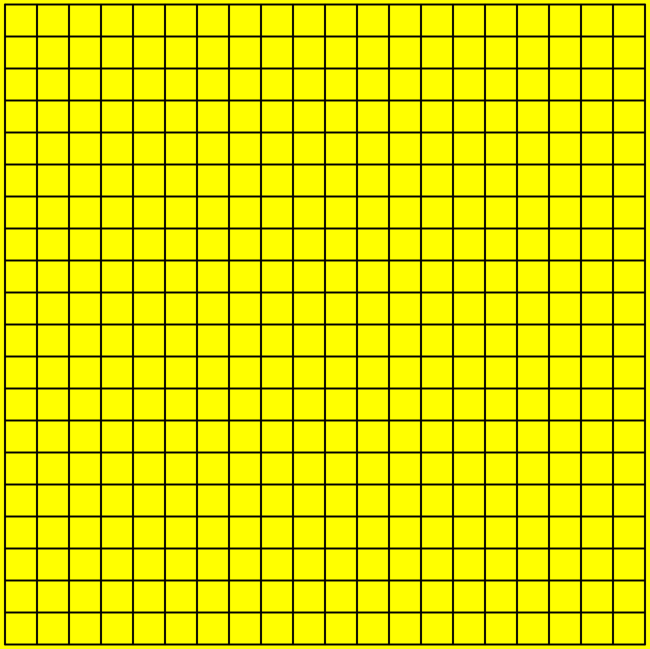

Type 1 Parabola

Standard Form Equation

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Type 1 Parabola

Standard Form Equation

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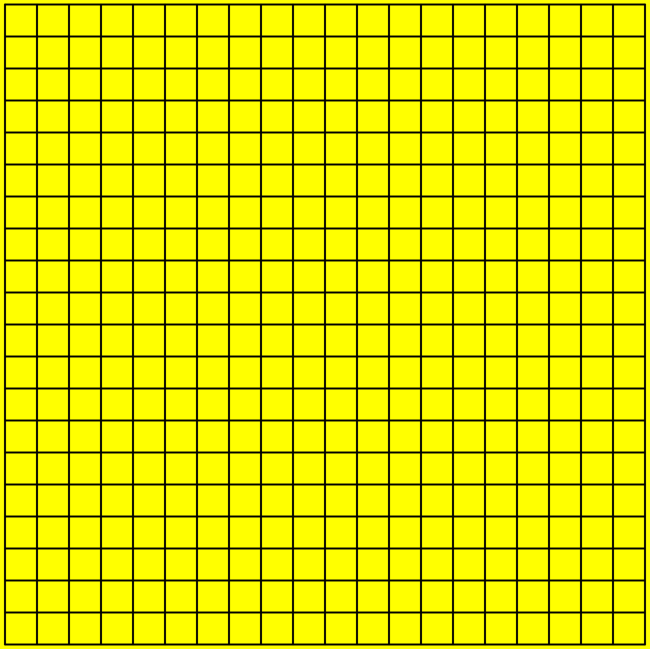

Add y – 17 to both sides.

Type 1 Parabola

Standard Form Equation

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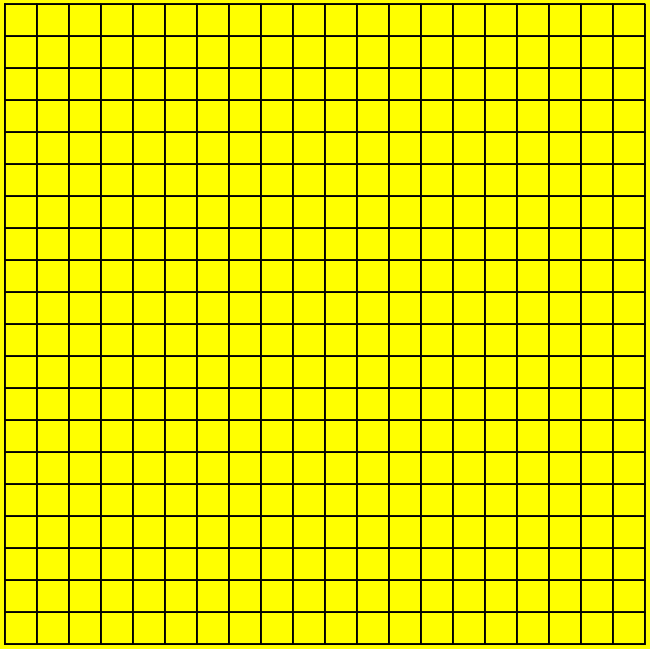
$2x^2$

Add y – 17 to both sides.



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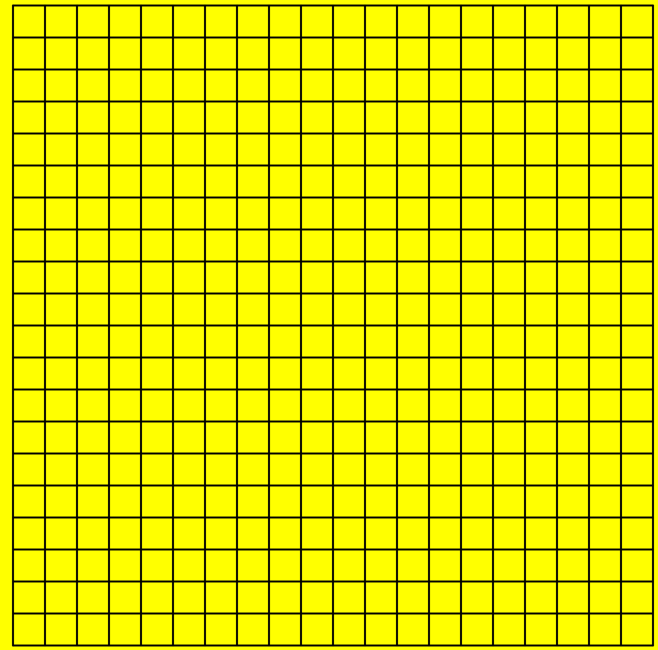

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$2x^2 + 12x$

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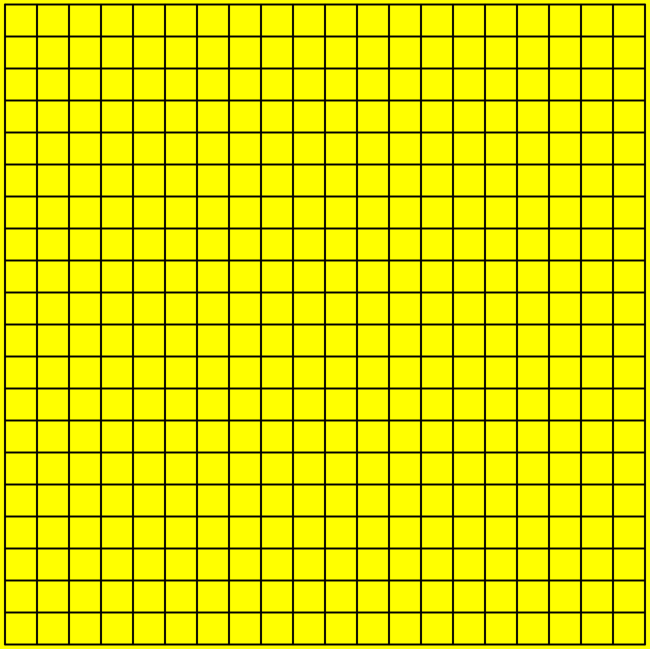

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Type 1 Parabola

Standard Form Equation

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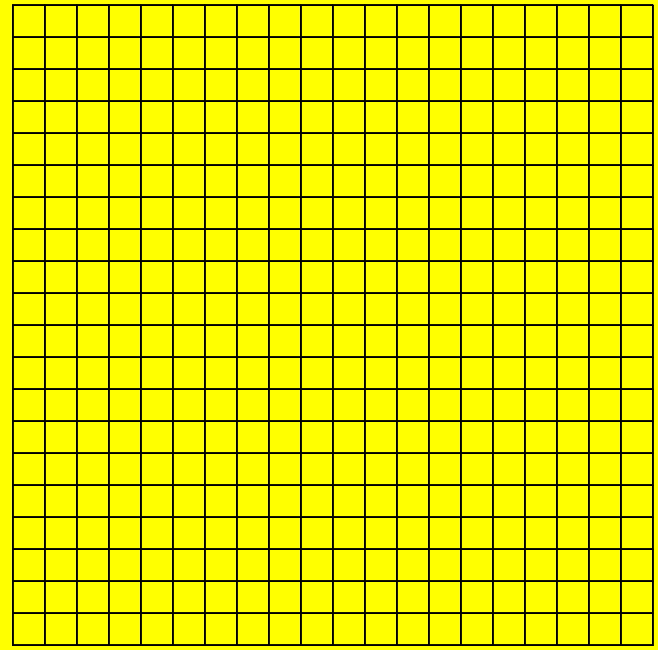
Class Worksheet #3

Express each equation using 'standard form' and sketch a graph.

3. $2x^2 + 12x - y + 17 = 0$

$$2x^2 + 12x = y$$

Add y – 17 to both sides.



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Class Worksheet #3

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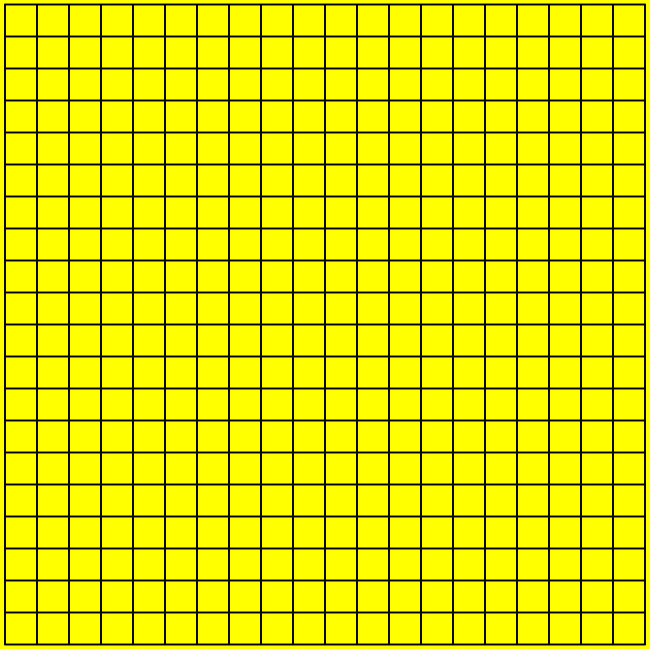

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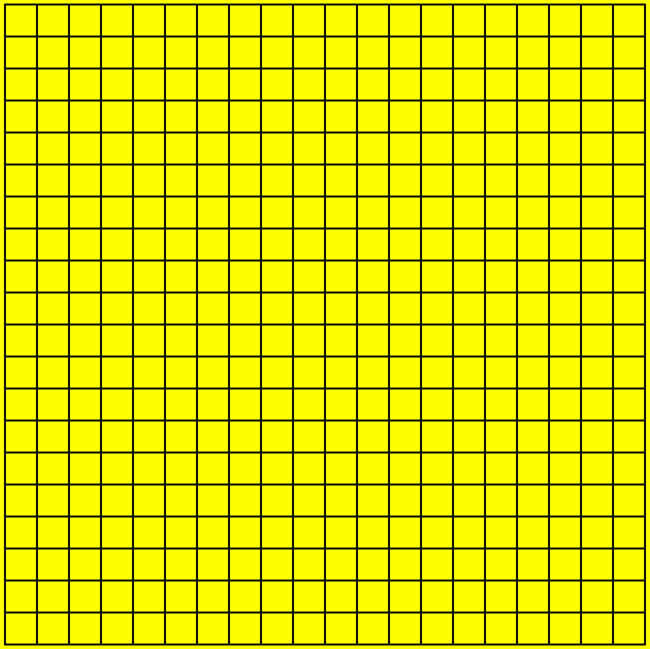

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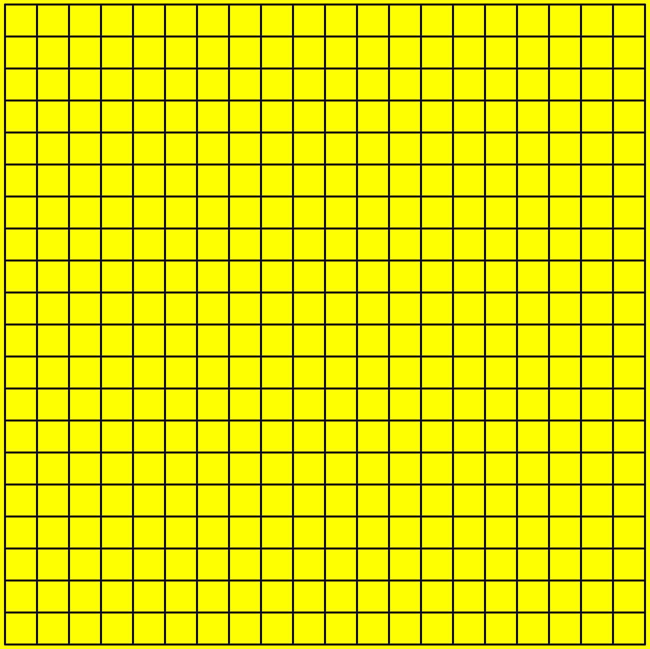

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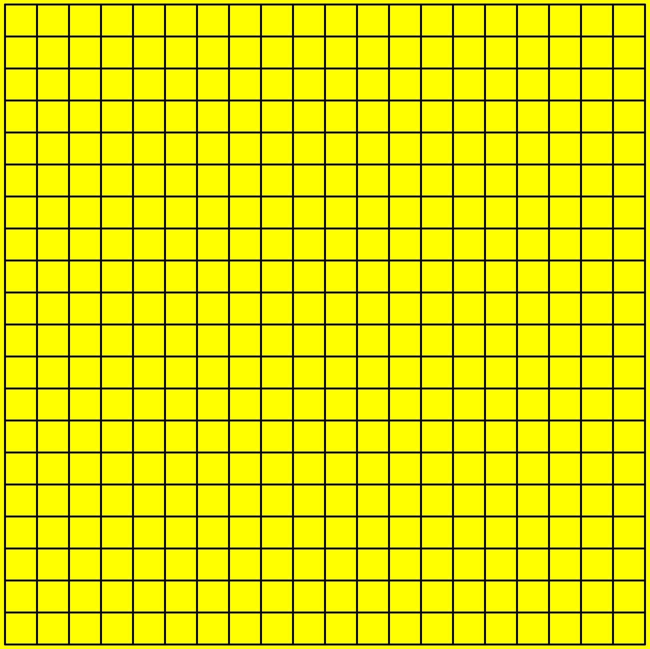
Class Worksheet #3

Express each equation using 'standard form' and sketch a graph.

3. $2x^2 + 12x - y + 17 = 0$

$$2x^2 + 12x = y - 17$$

Factor $2x^2 + 12x$.



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Standard Form Equation

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Express each equation using 'standard form' and sketch a graph.

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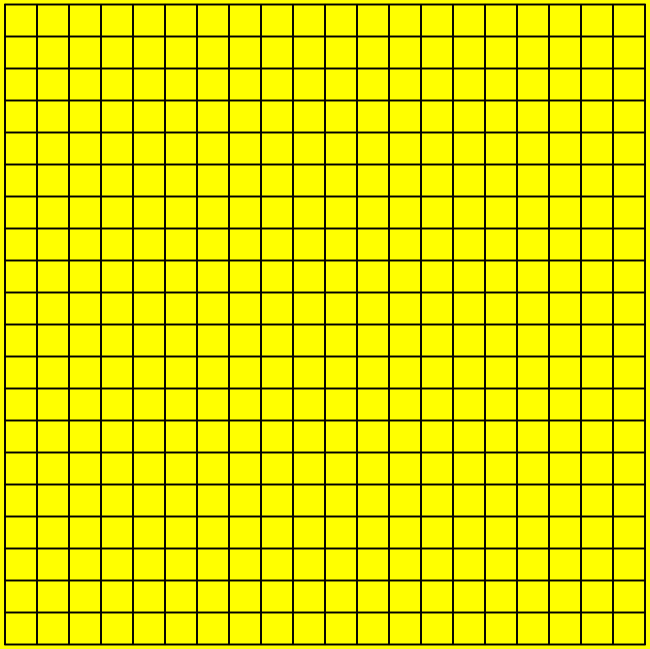

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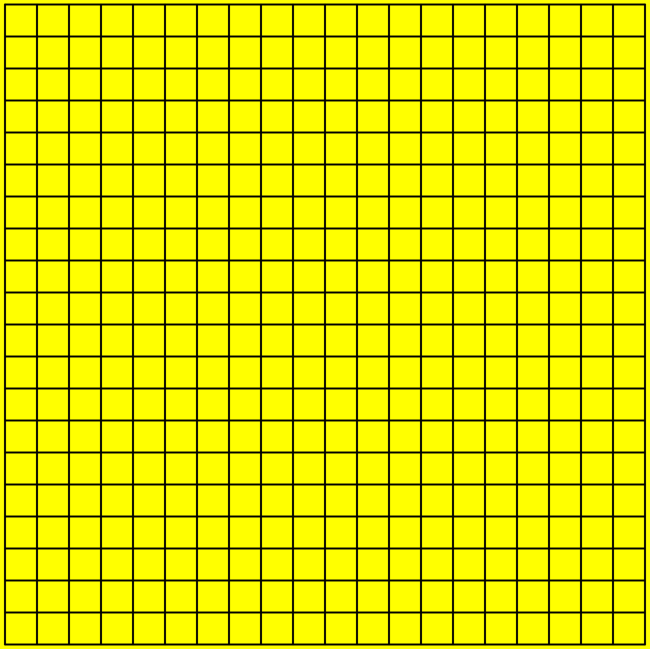

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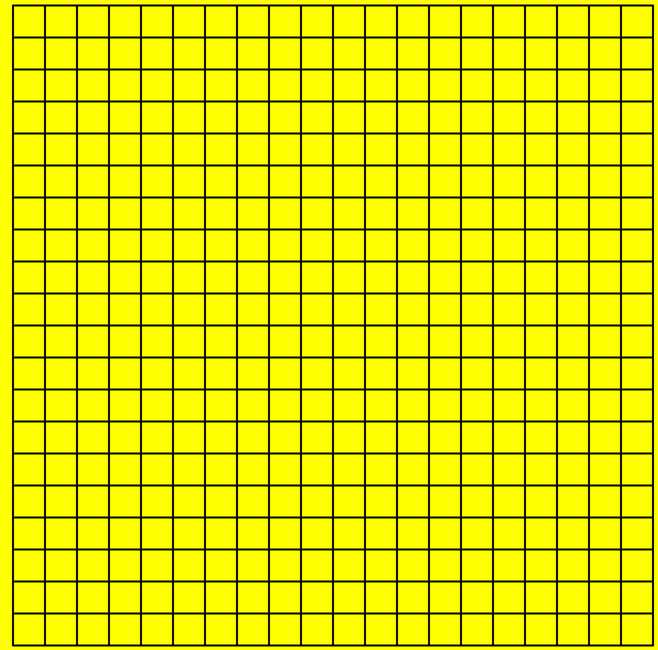

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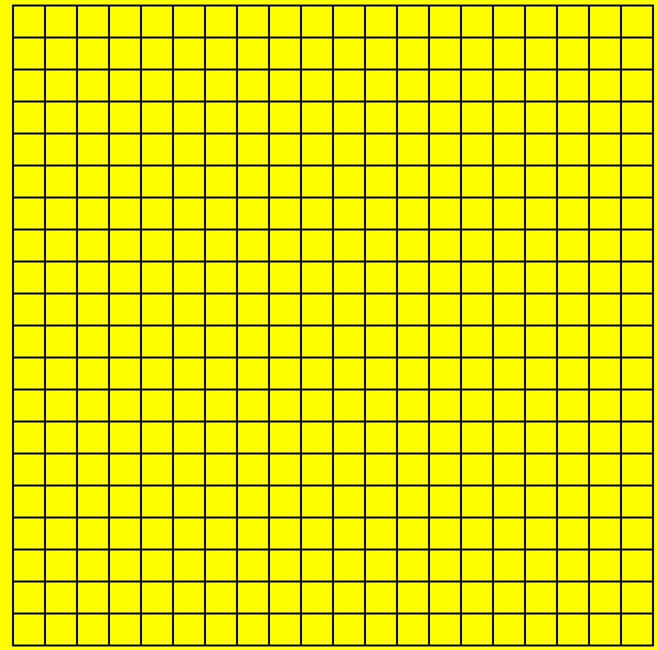

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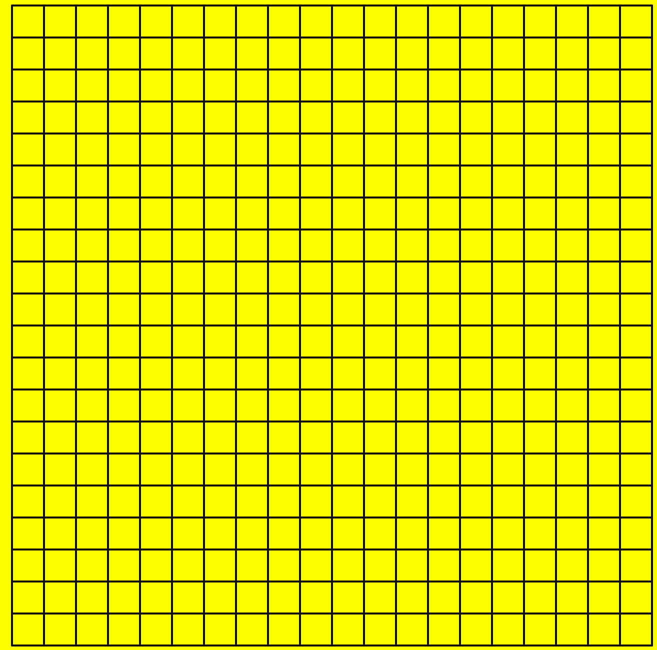

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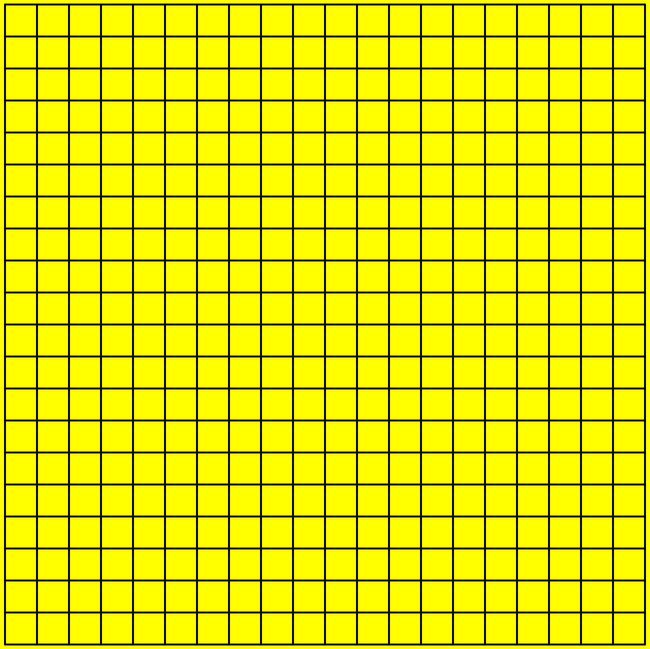

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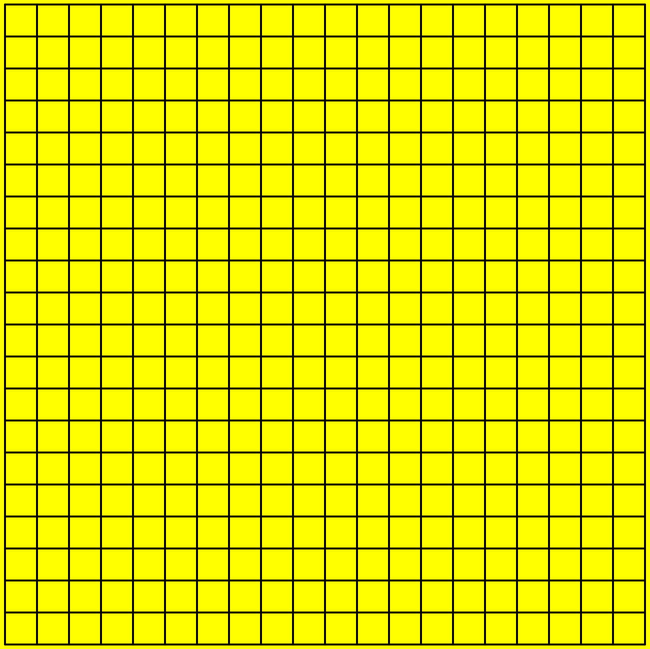

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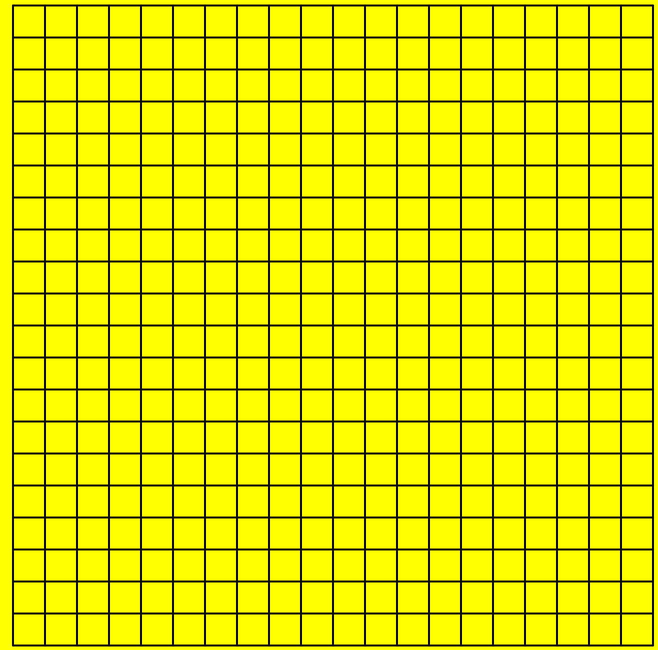

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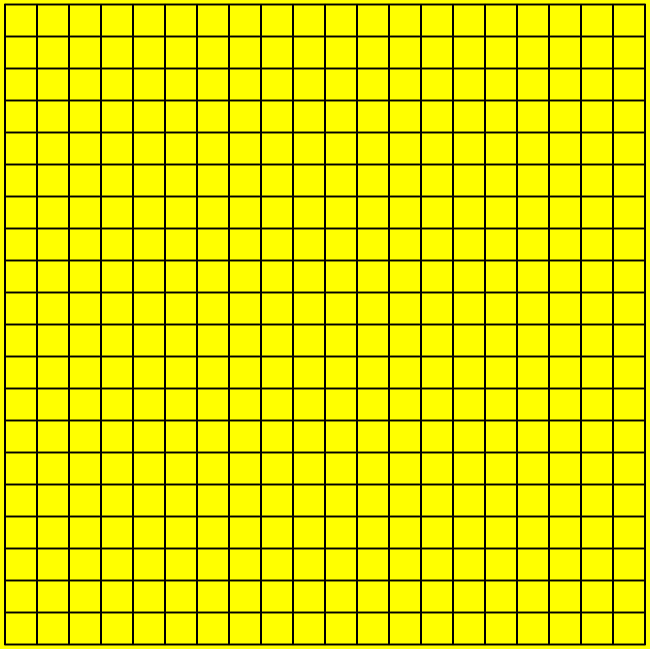

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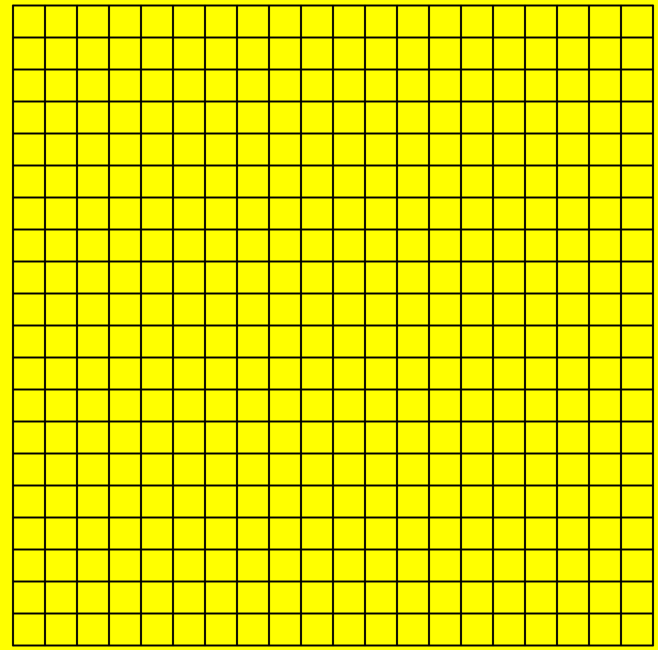

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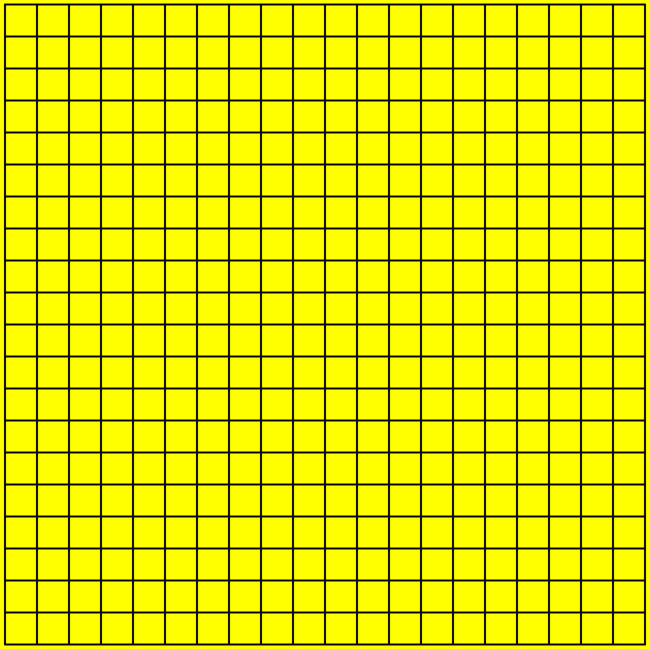

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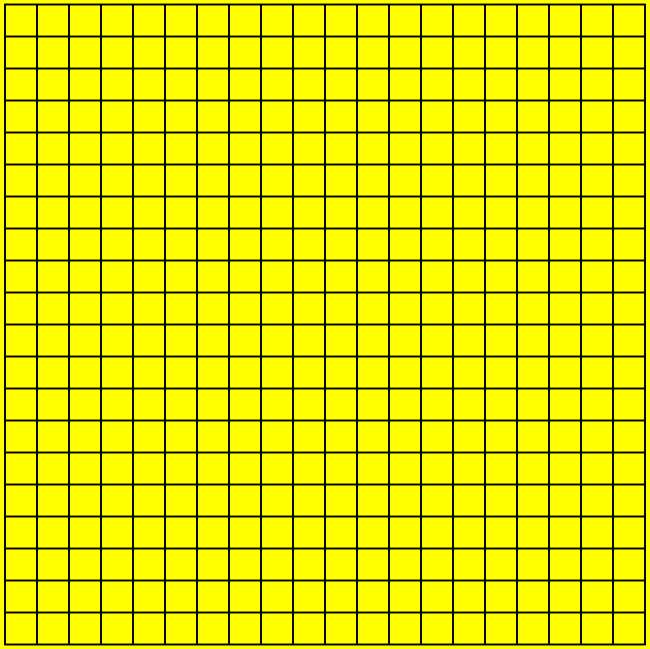

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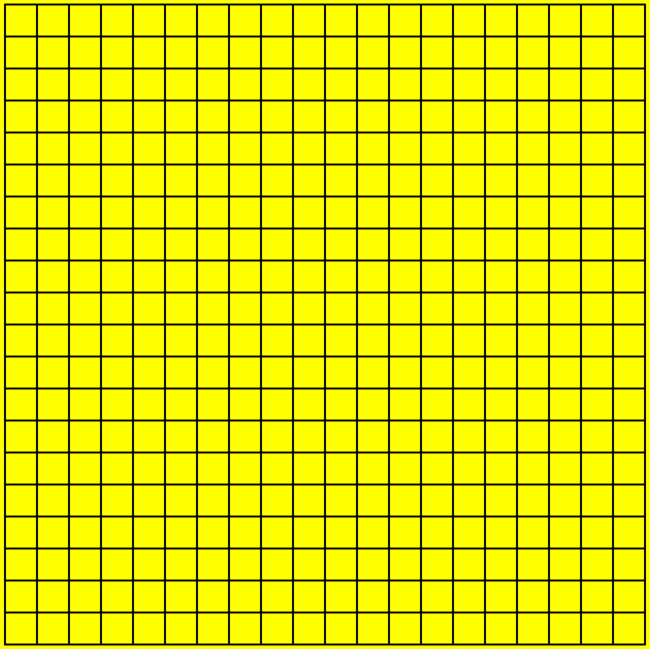

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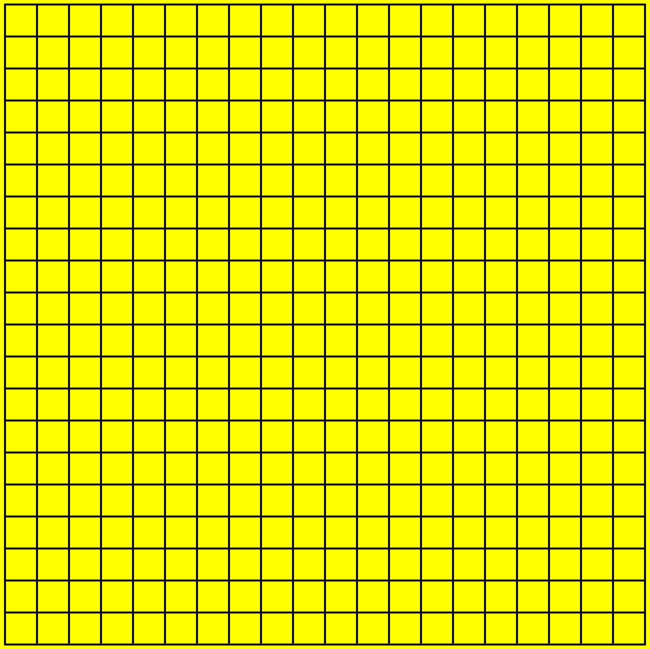

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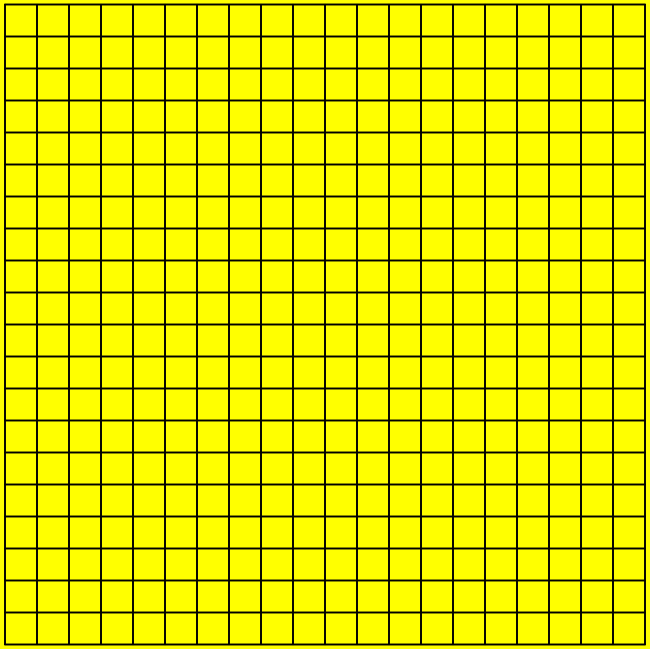

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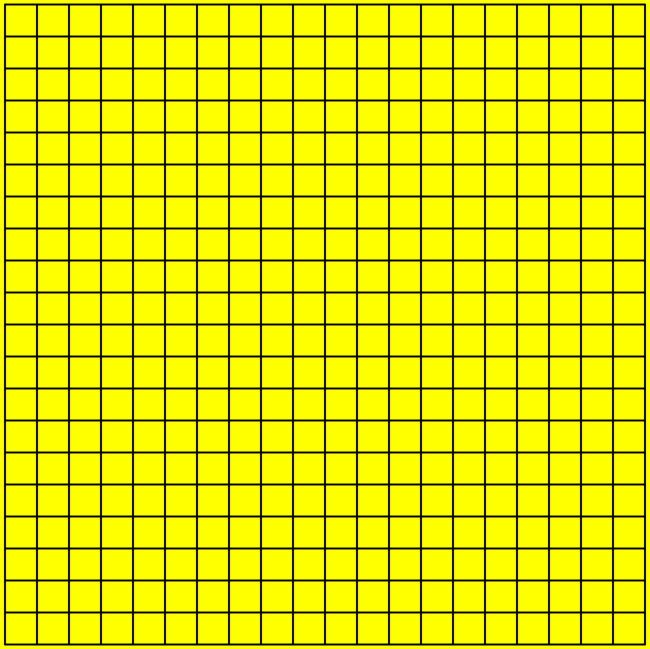

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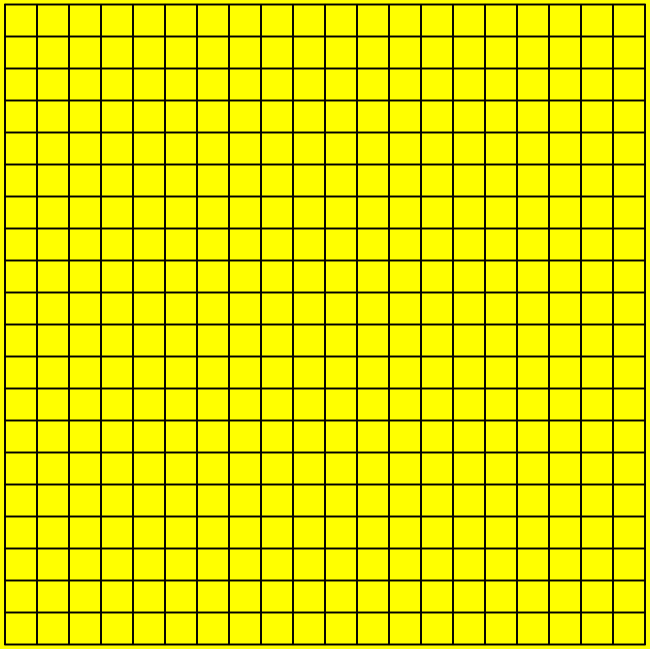

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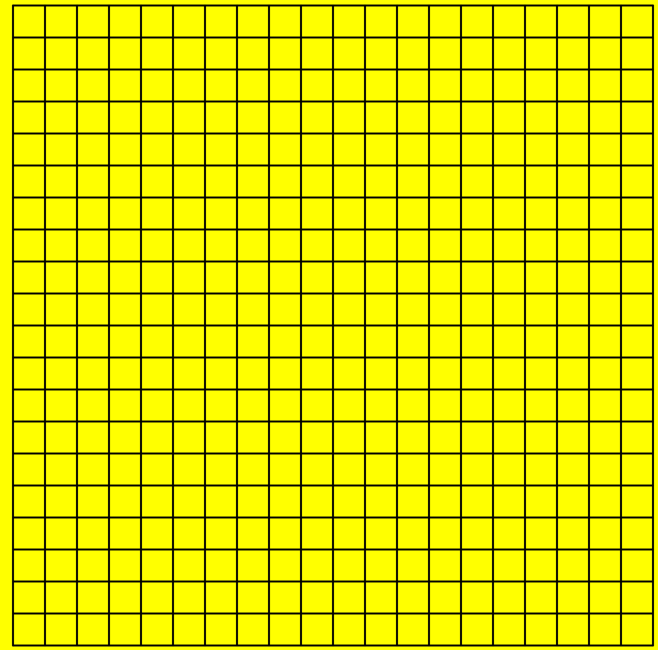

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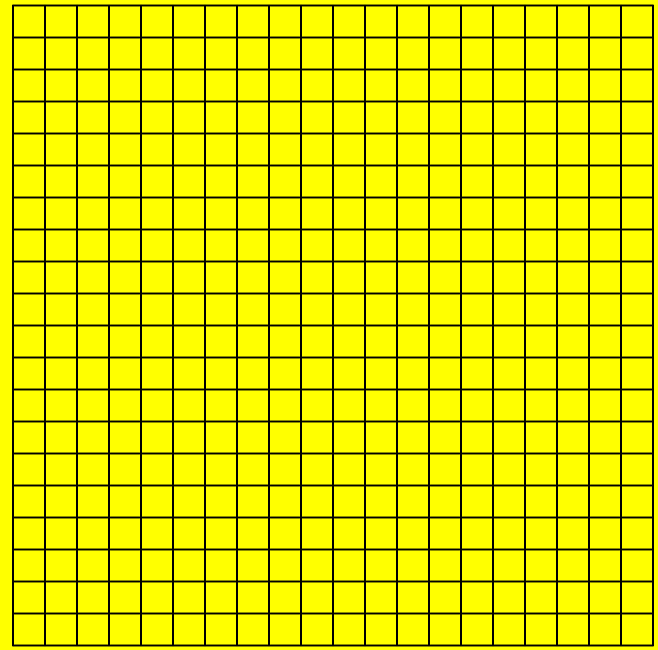

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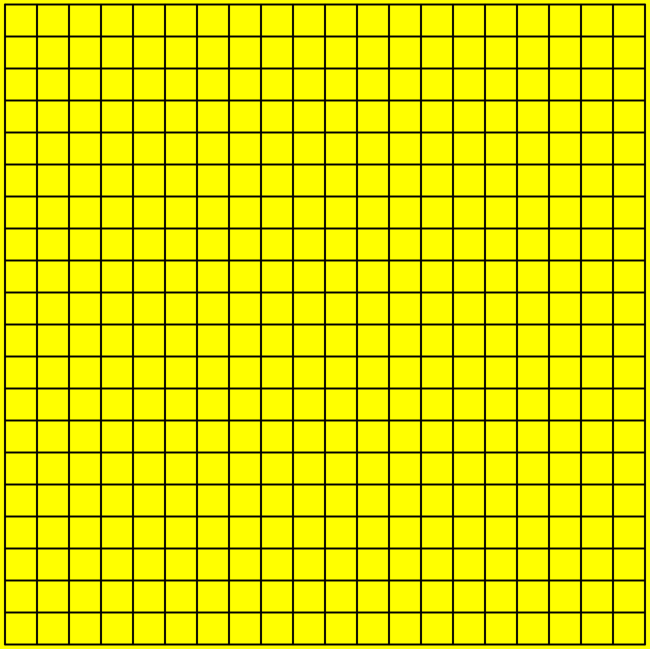

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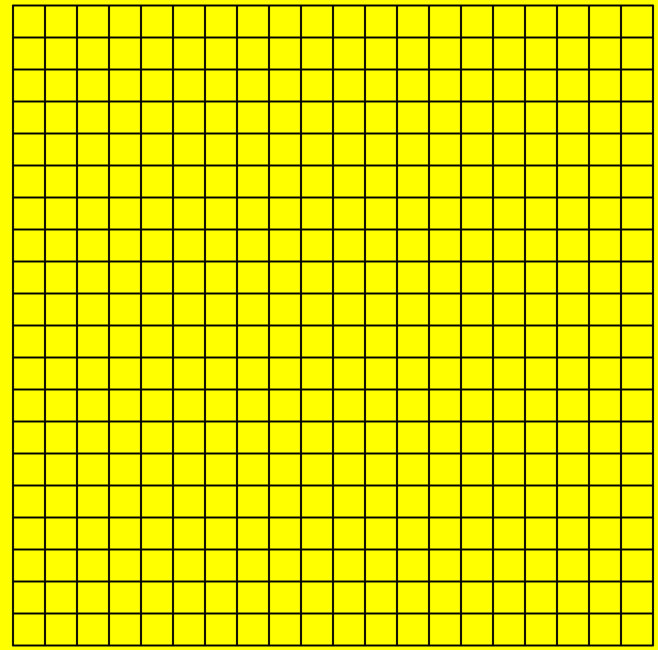

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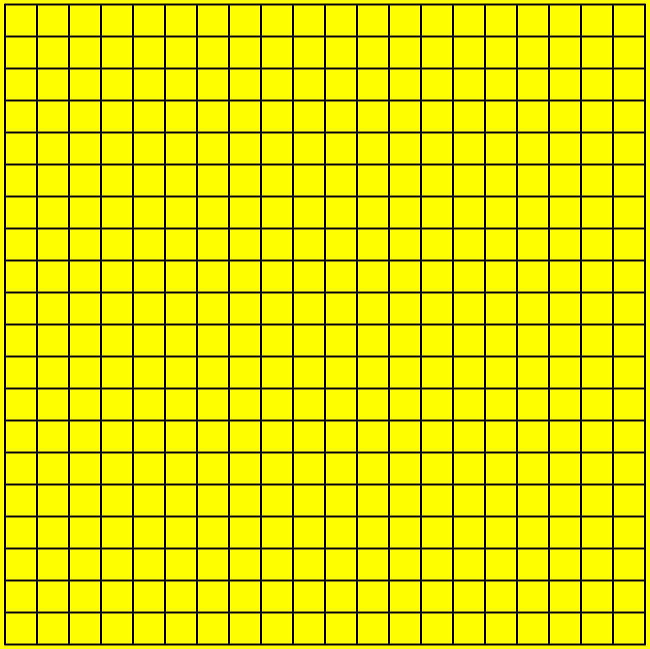

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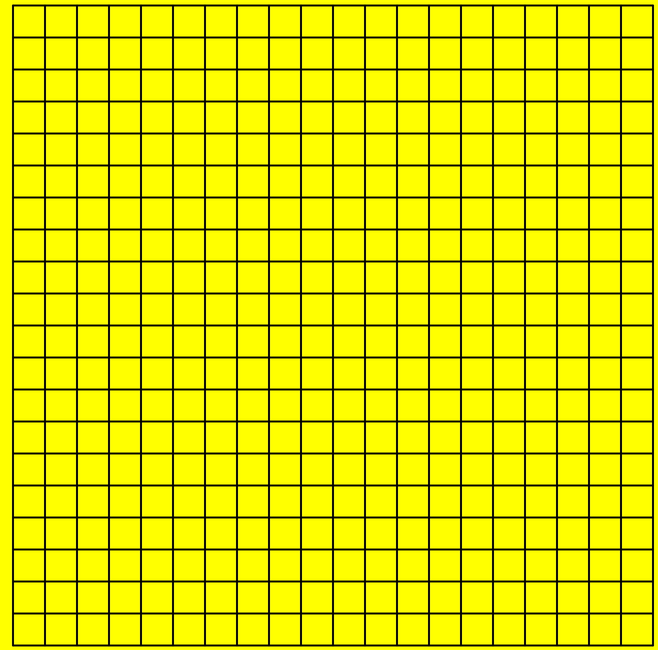

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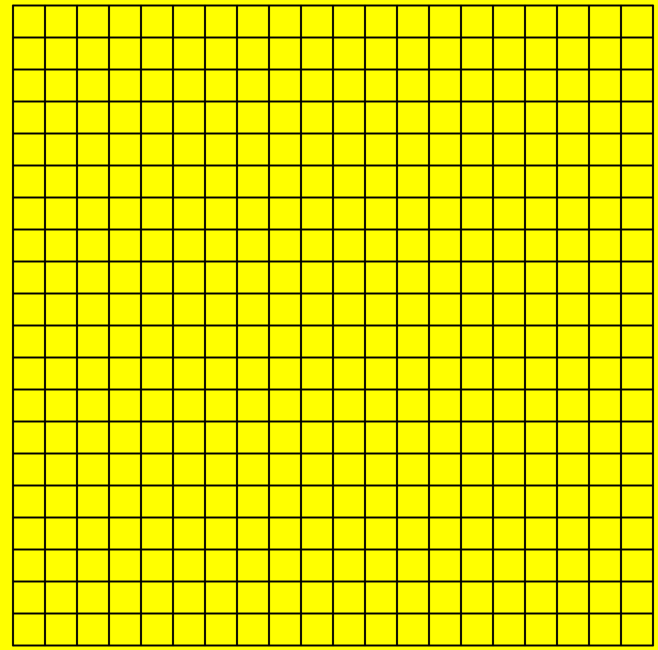

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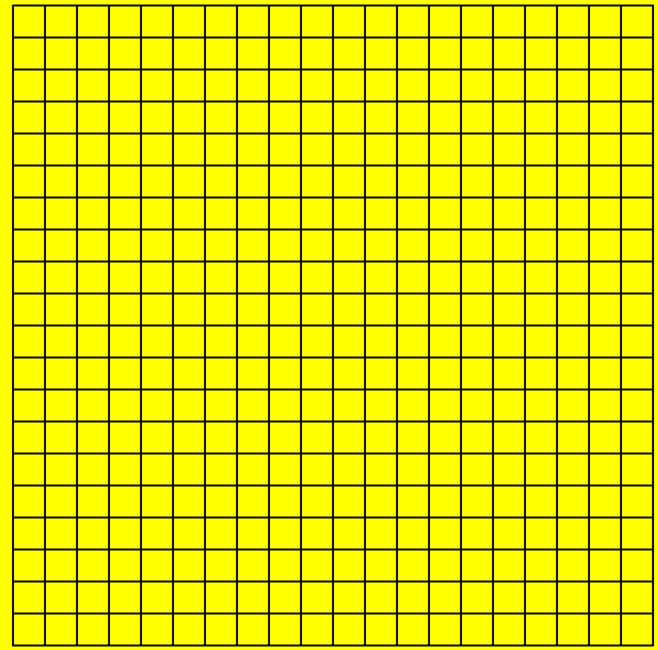

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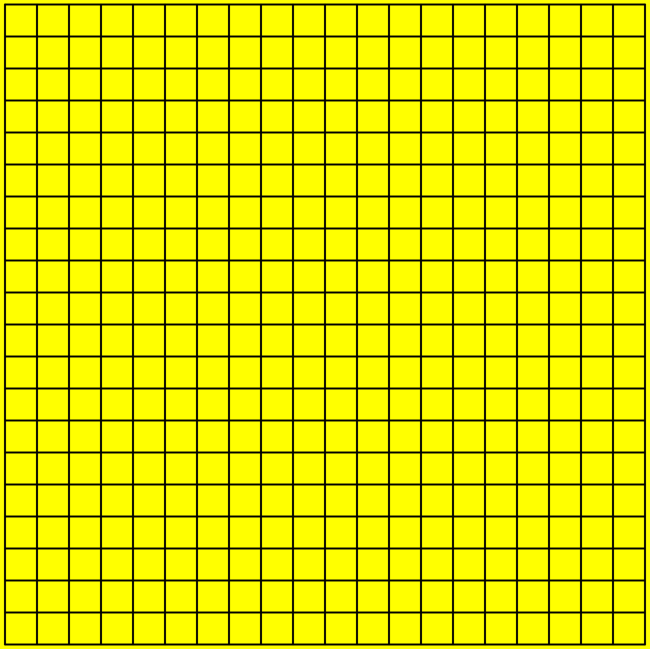

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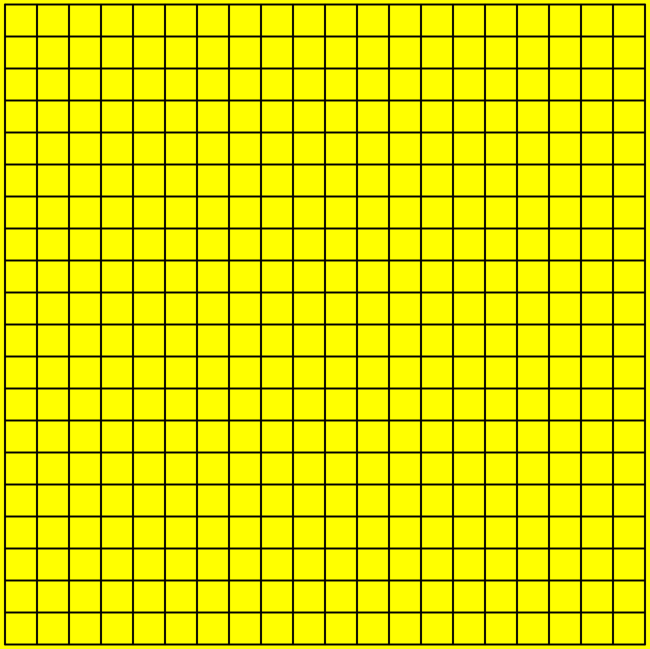

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$V(h,k)$

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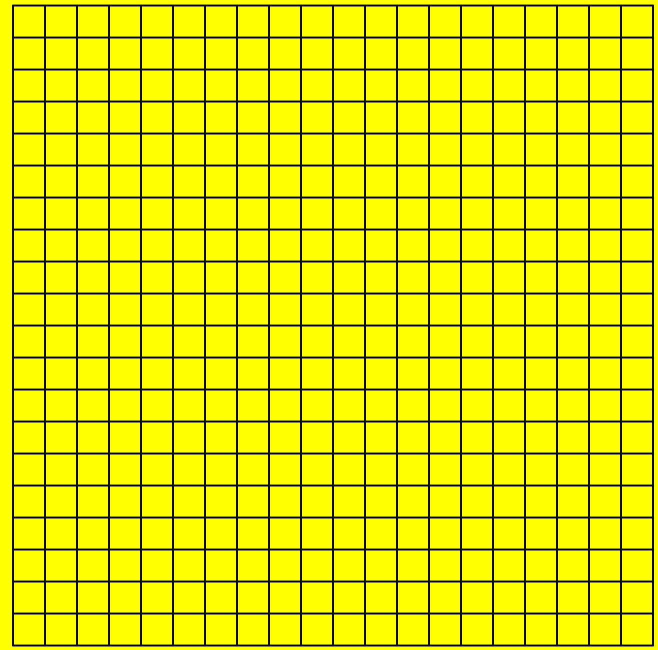

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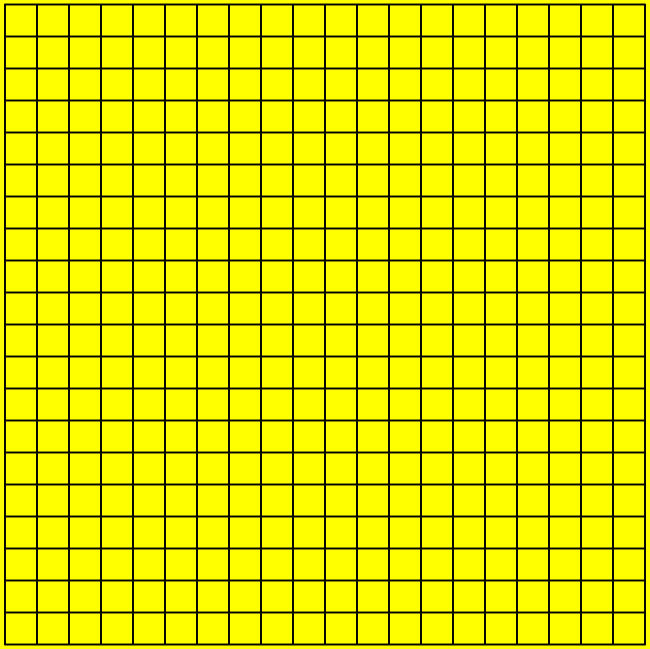

Type 1 Parabola

Standard Form Equation

$$y - k = a(x - h)^2$$

V(h,k)

Class Worksheet #3

Express each equation using 'standard form' and sketch a graph.

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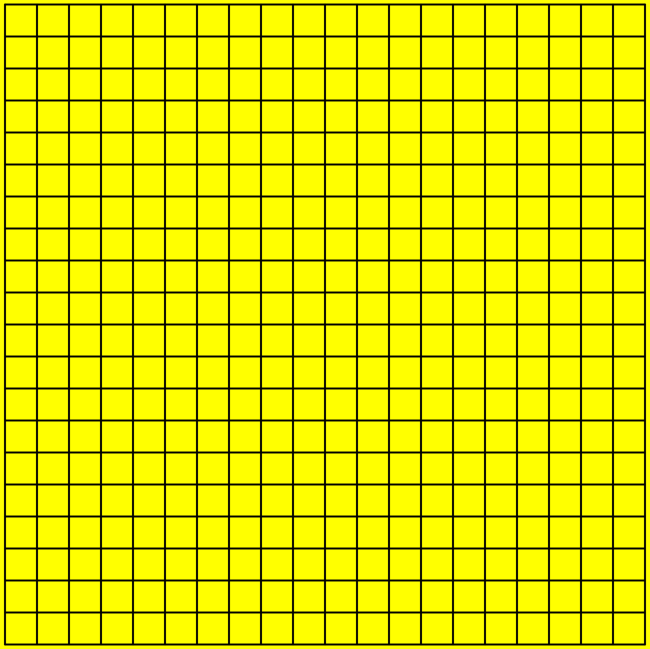

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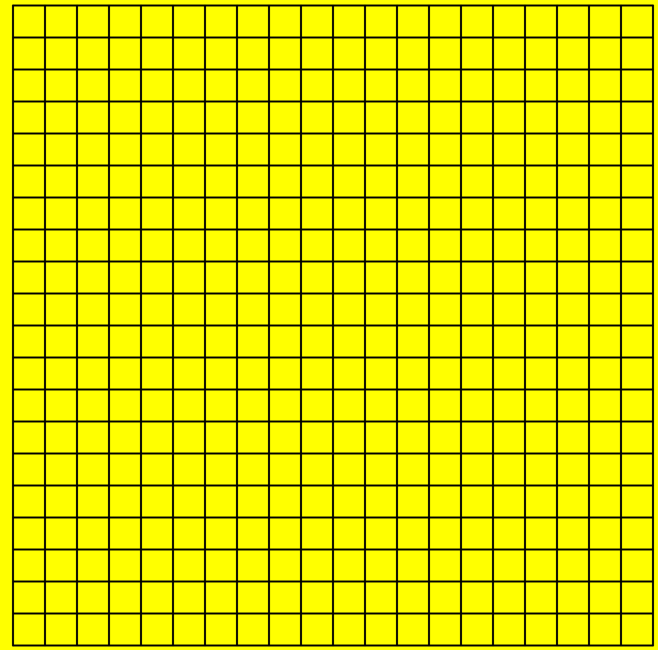

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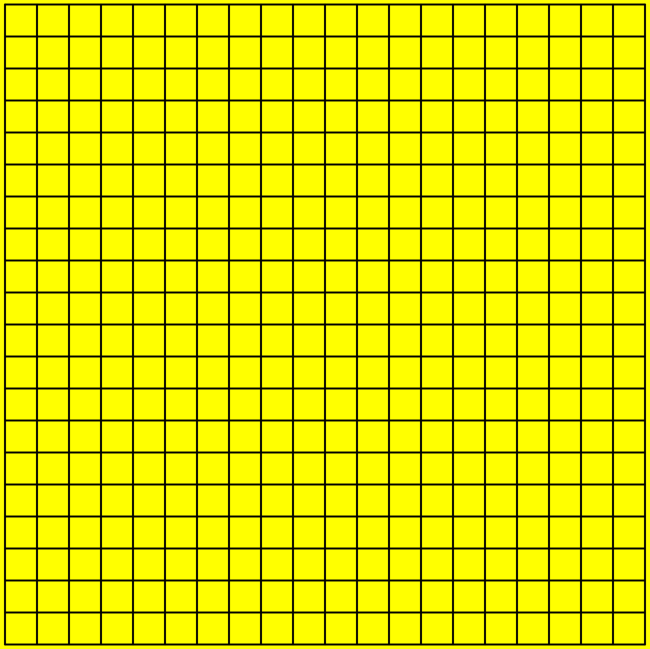

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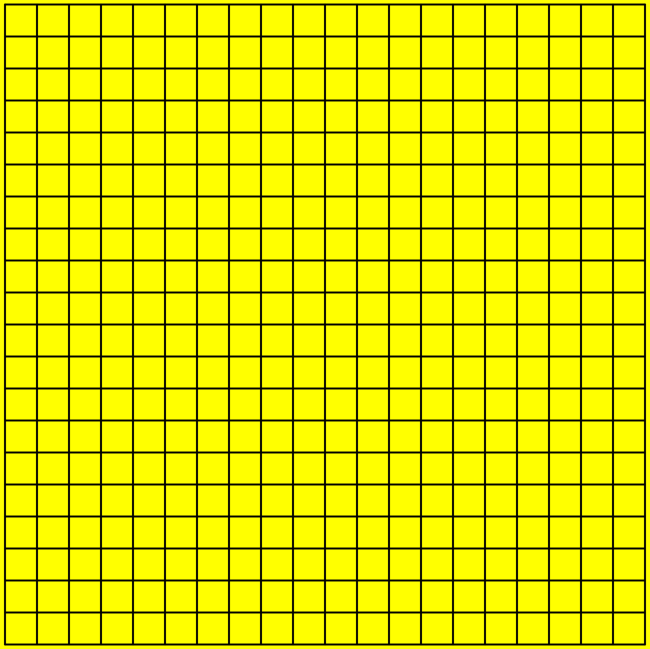

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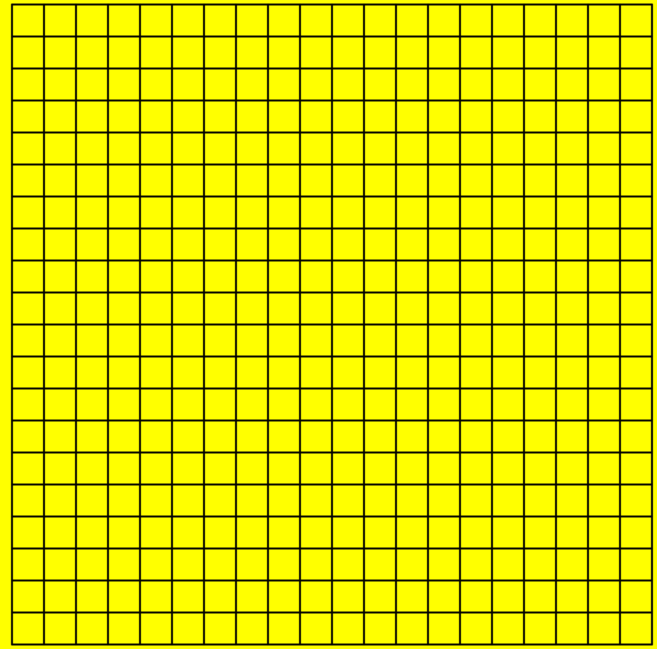

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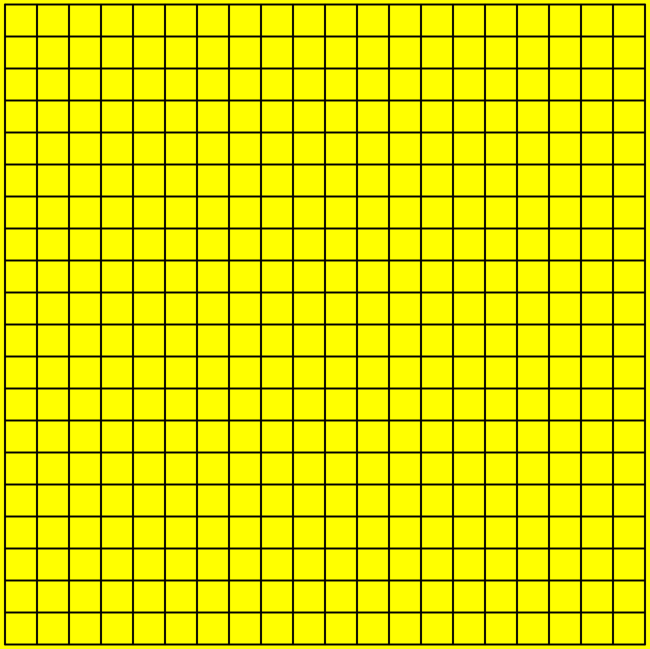

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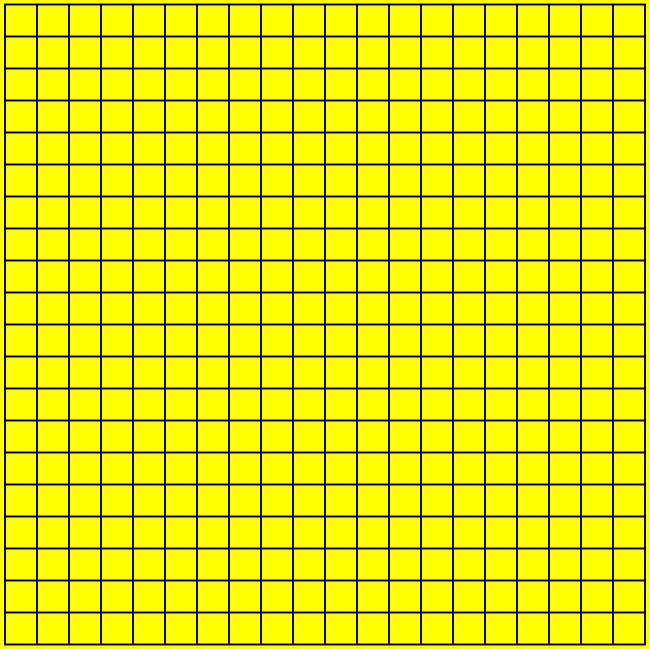

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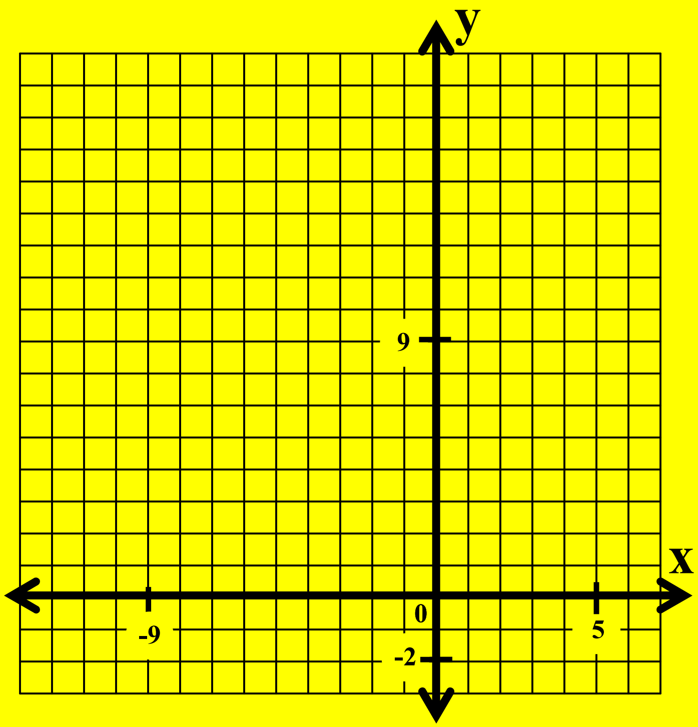

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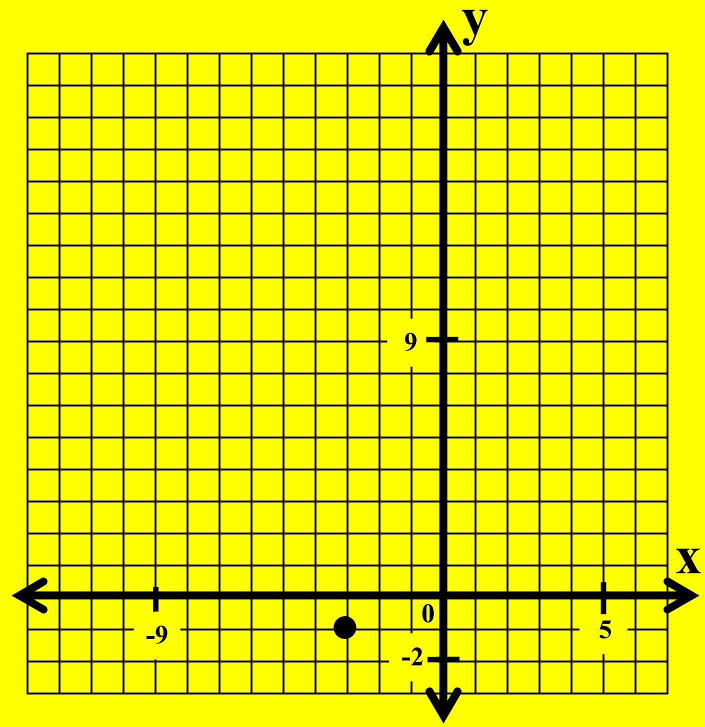

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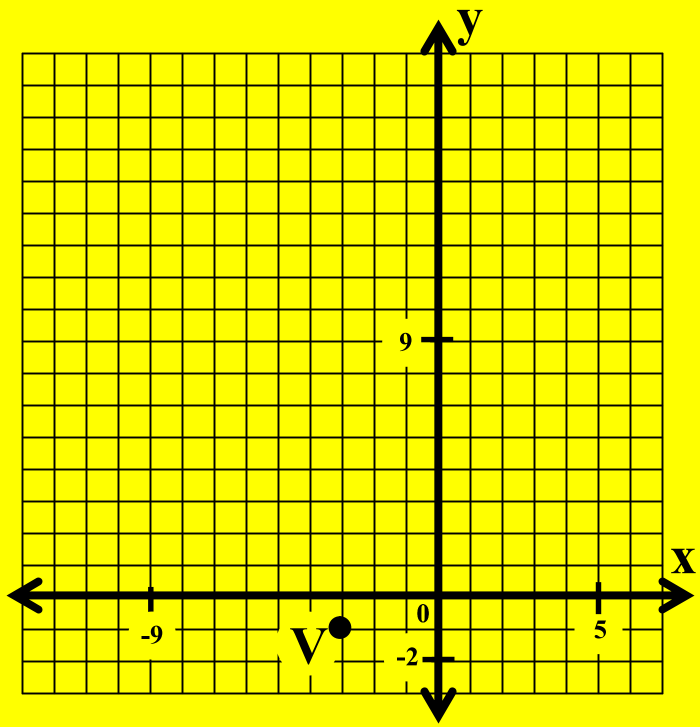

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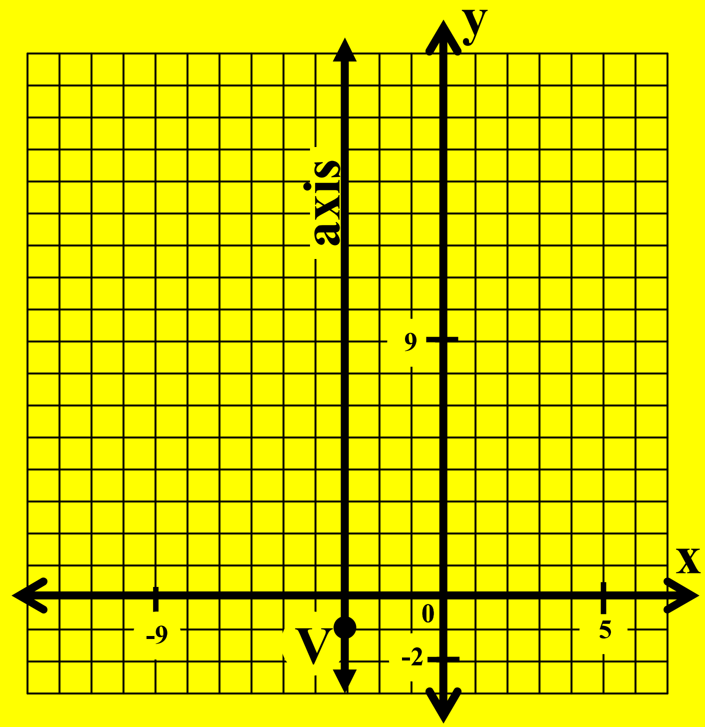

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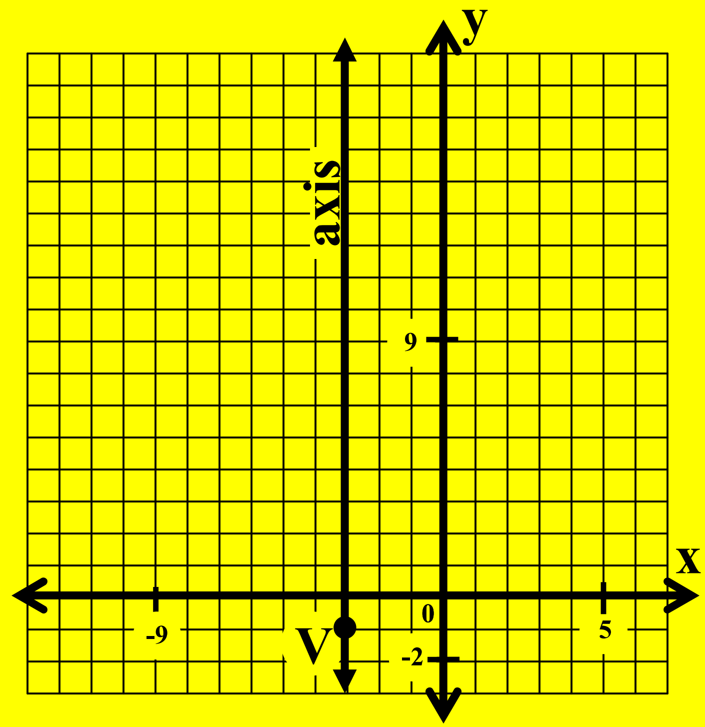

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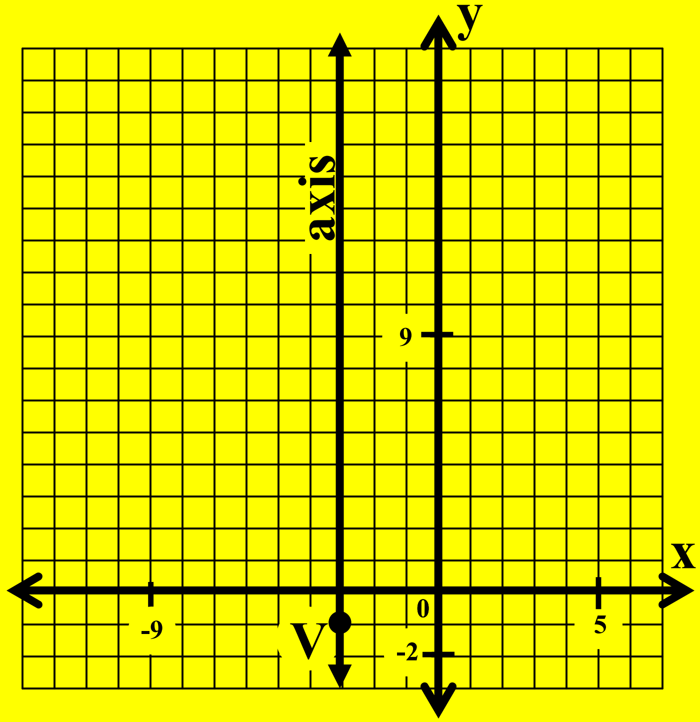

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$h = -3$ $k = -1$

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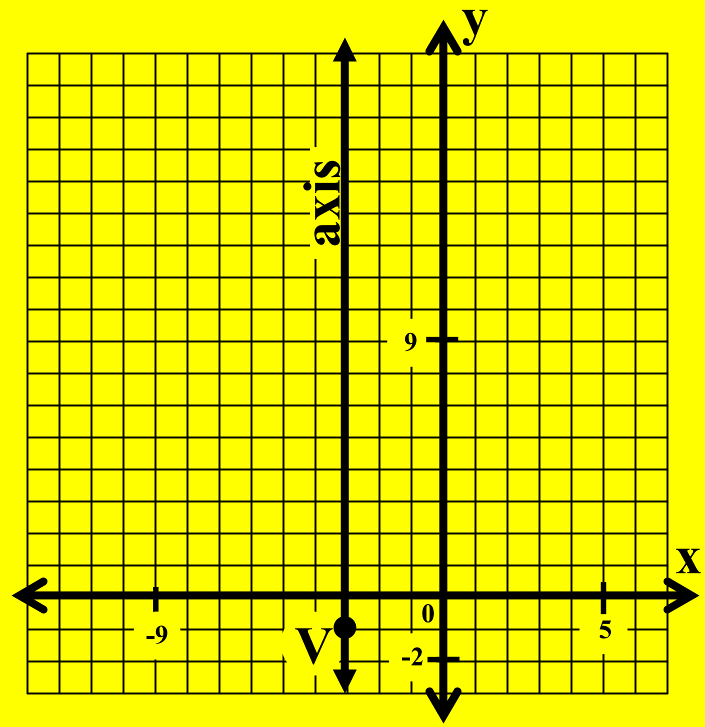

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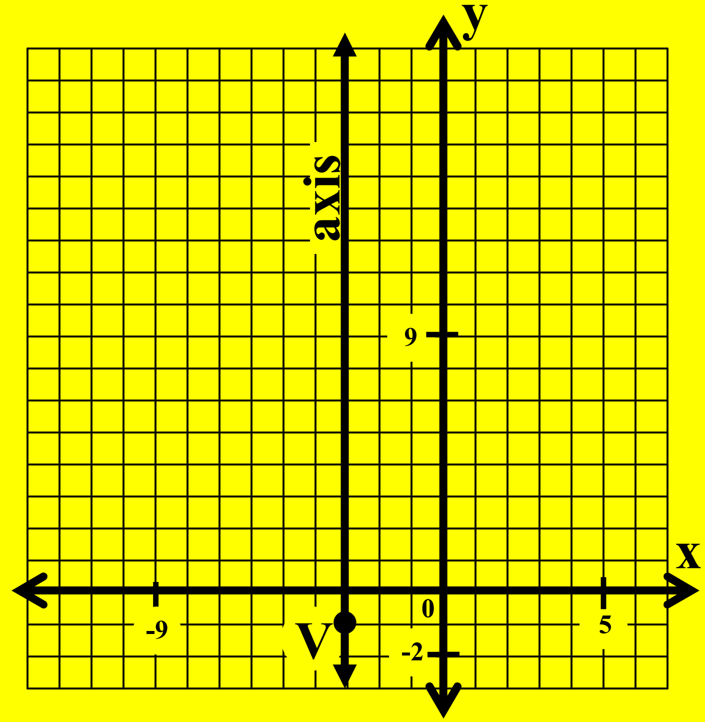
V(-3, -1)

We will use the value of a, and what we know about the shape of a parabola, to find other points on the graph.



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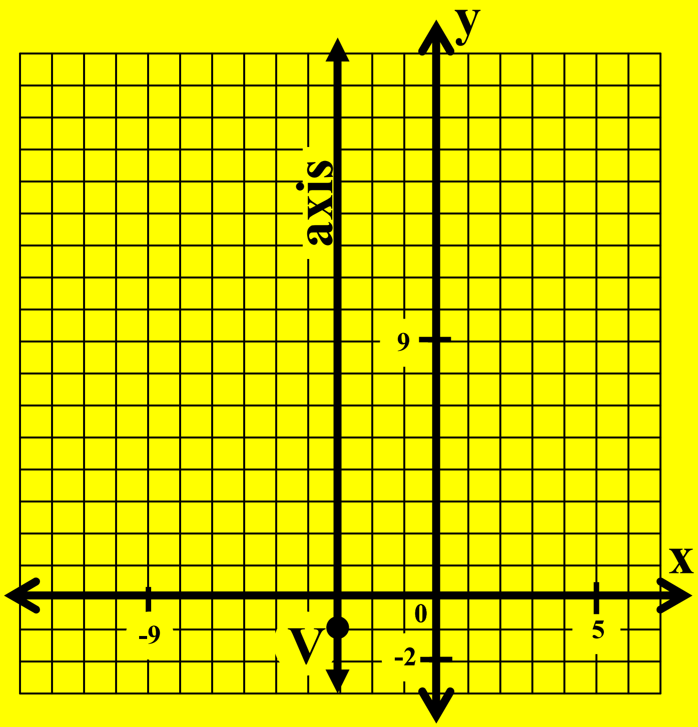

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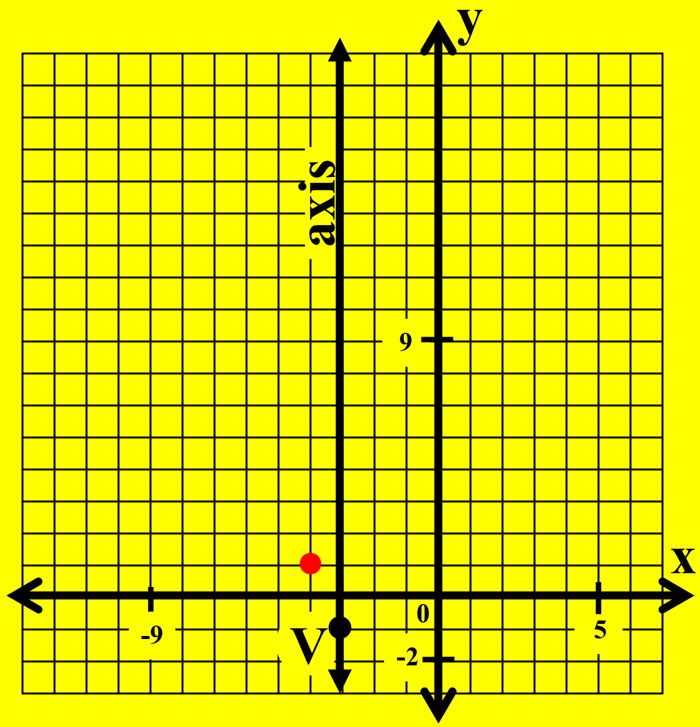

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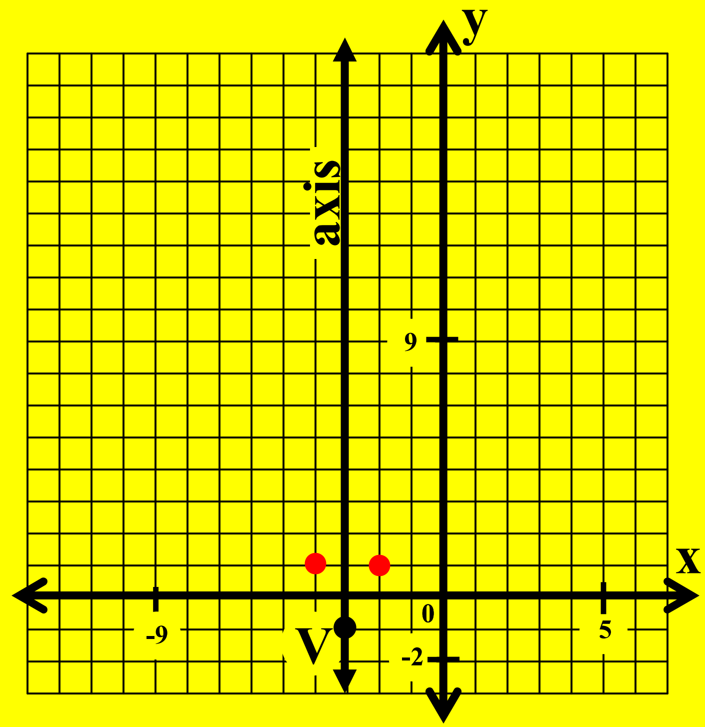

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V(-3, -1)

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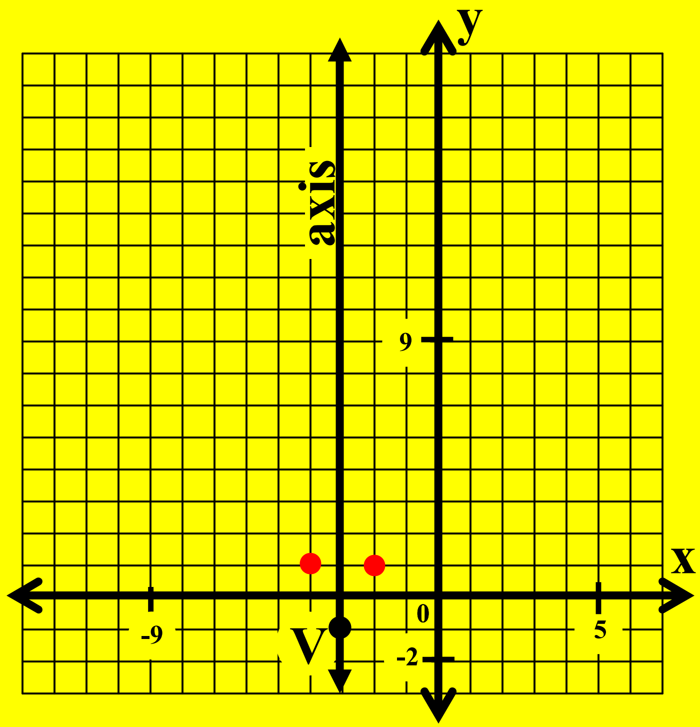

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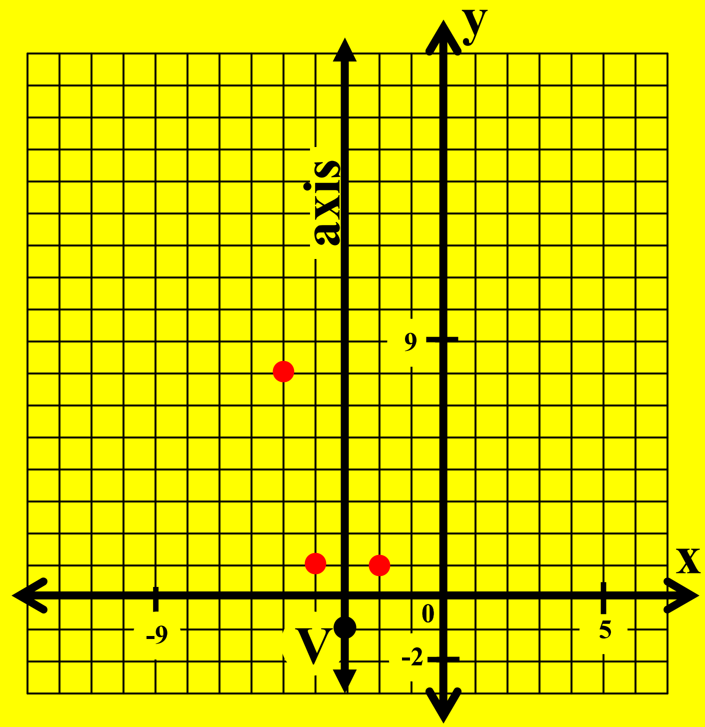

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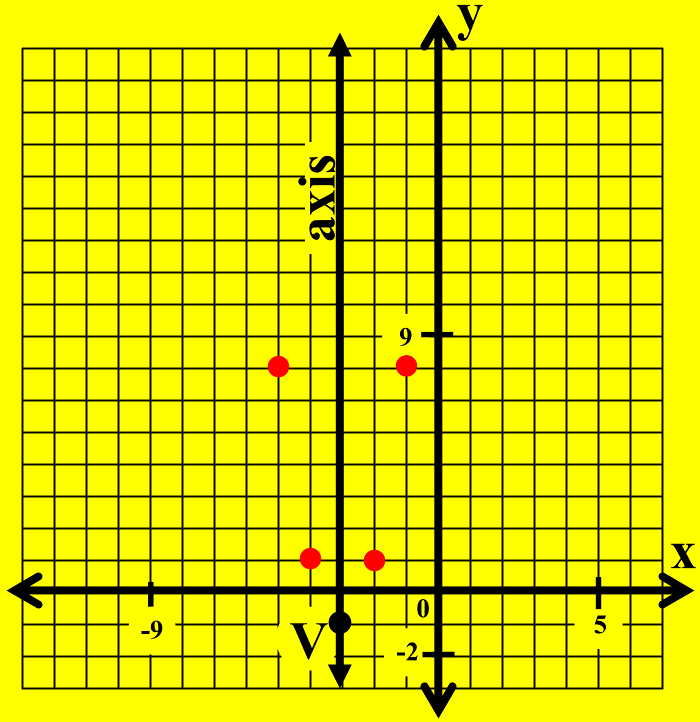

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$3a = 6$

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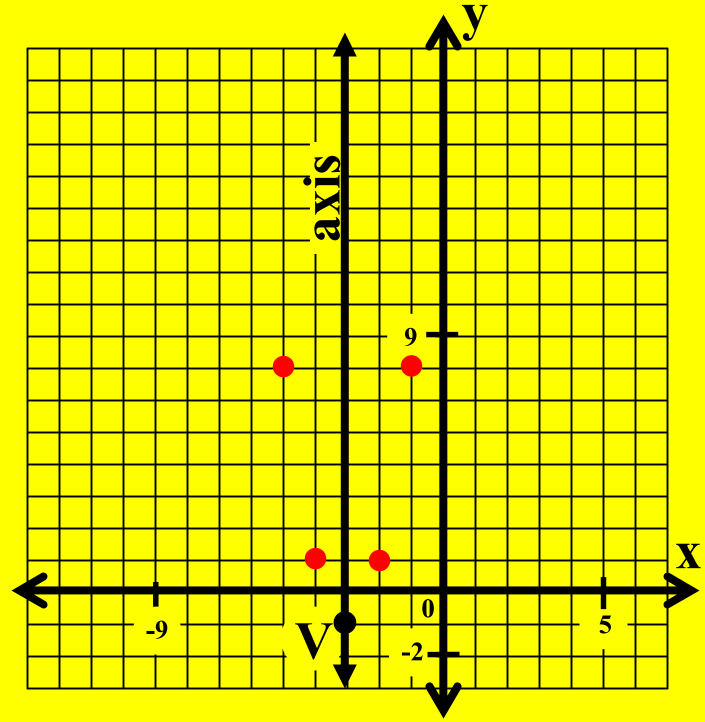

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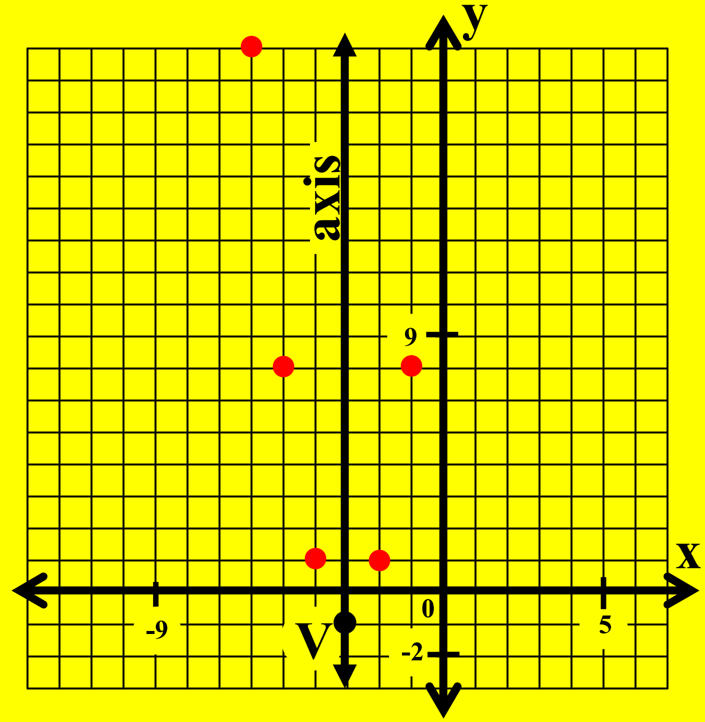

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a = 2
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3a = 6
5a = 10

h = -3   k = -1

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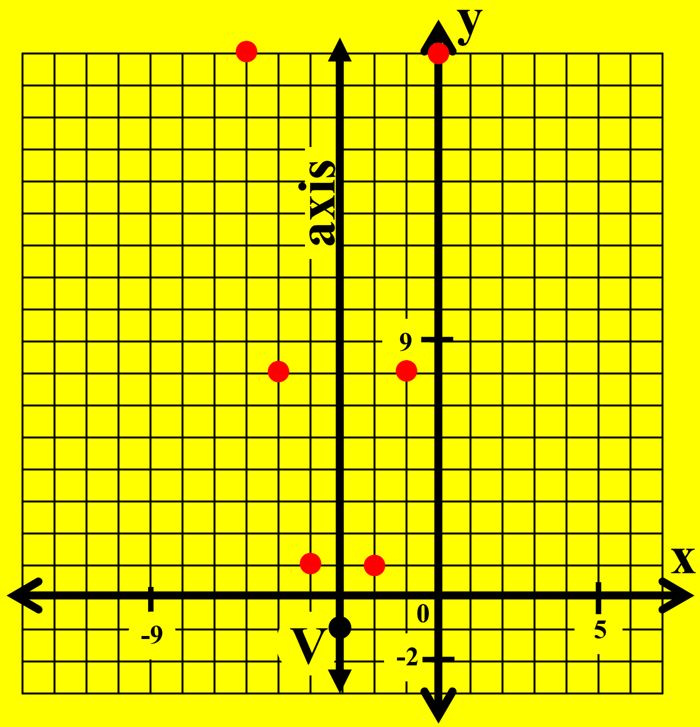

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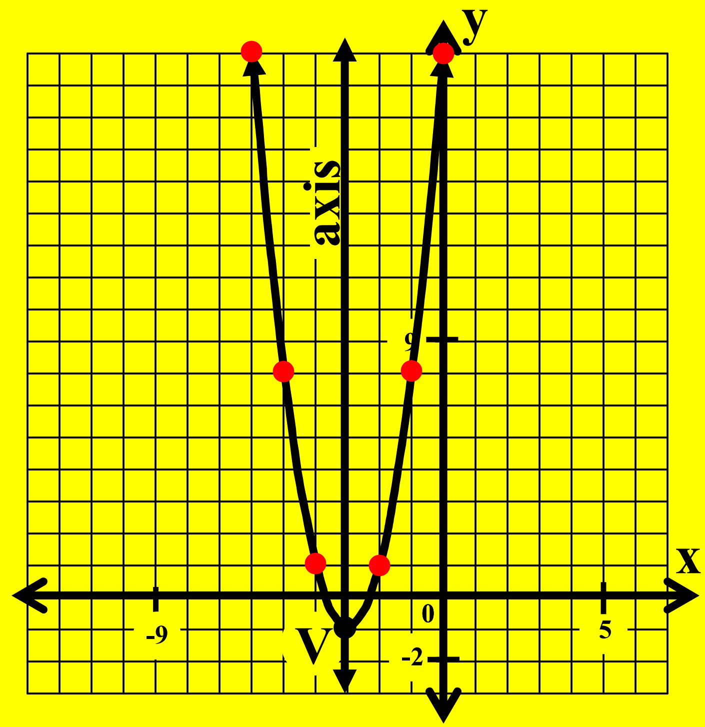

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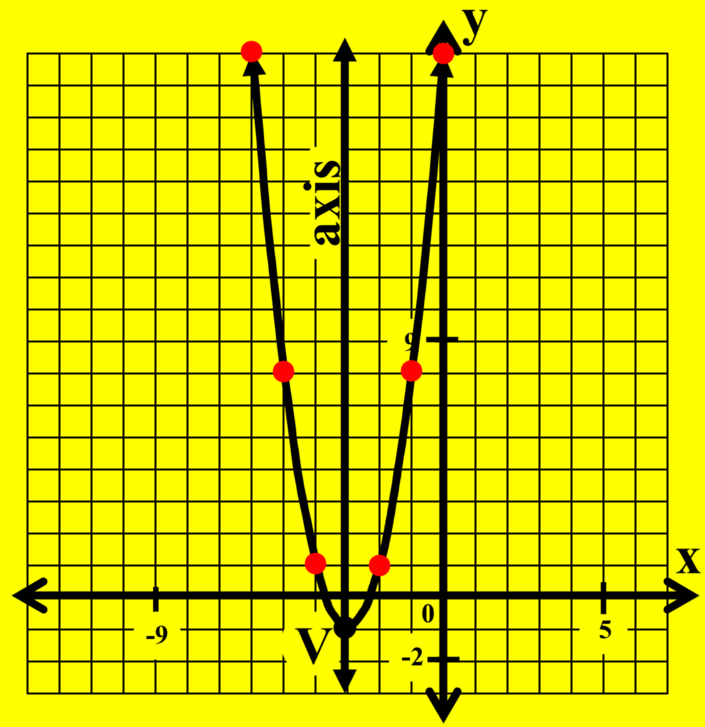

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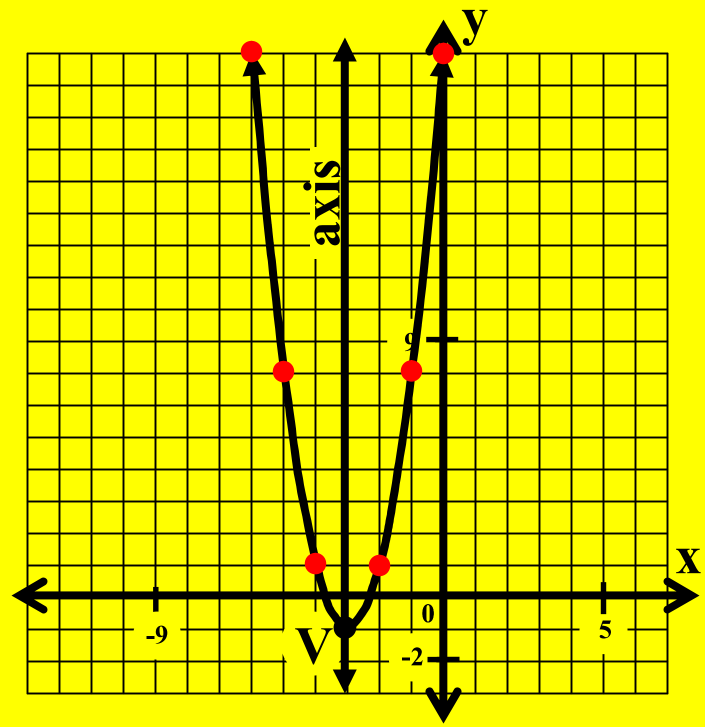

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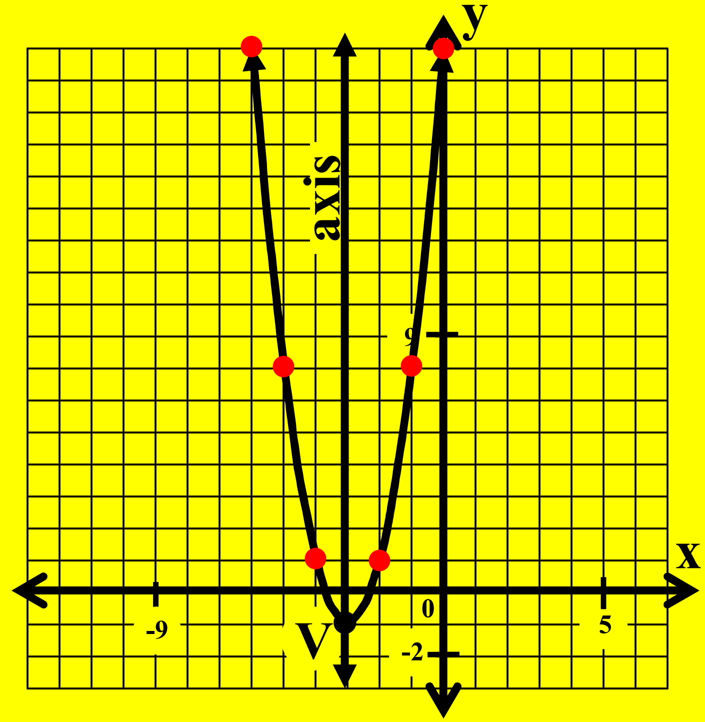

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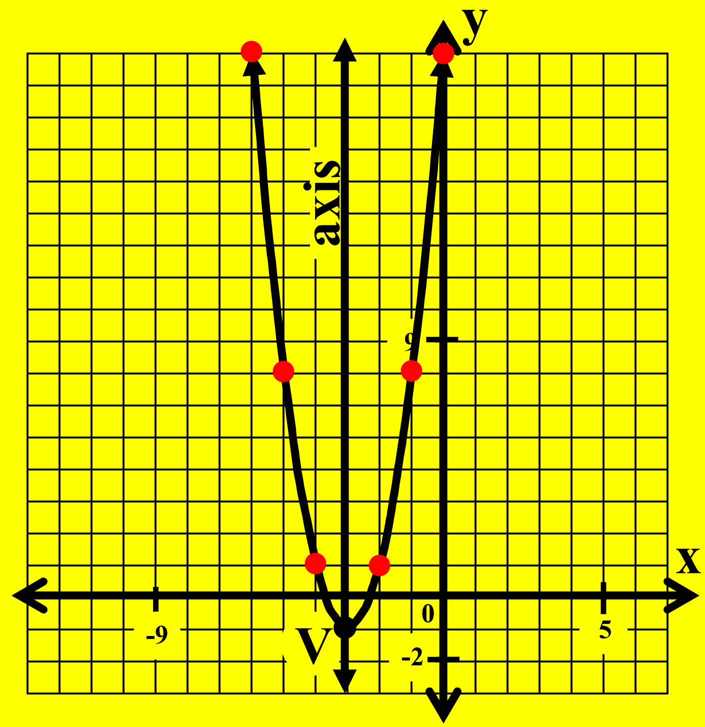

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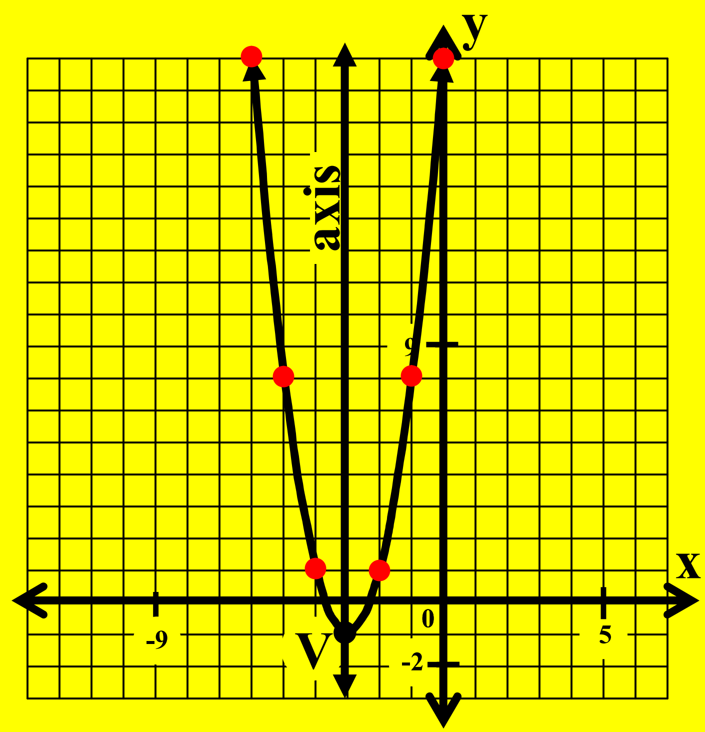

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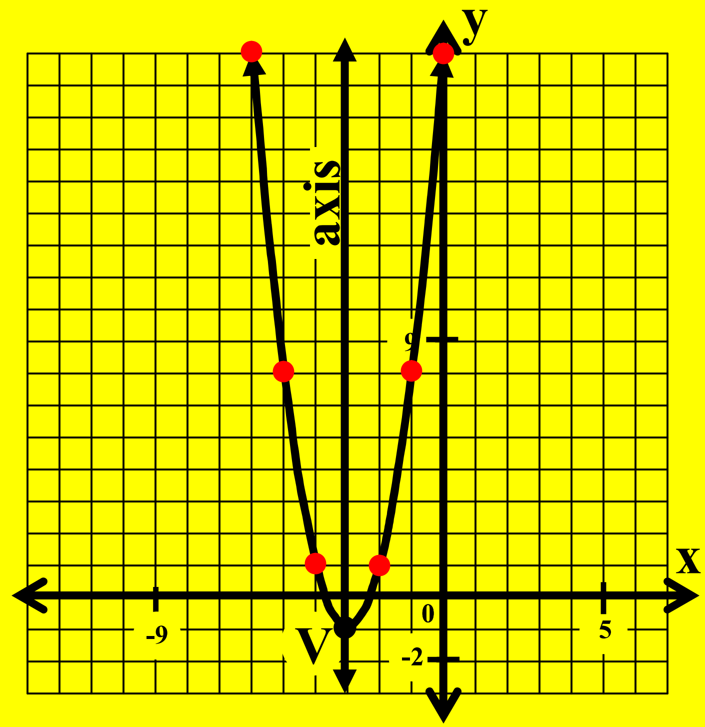

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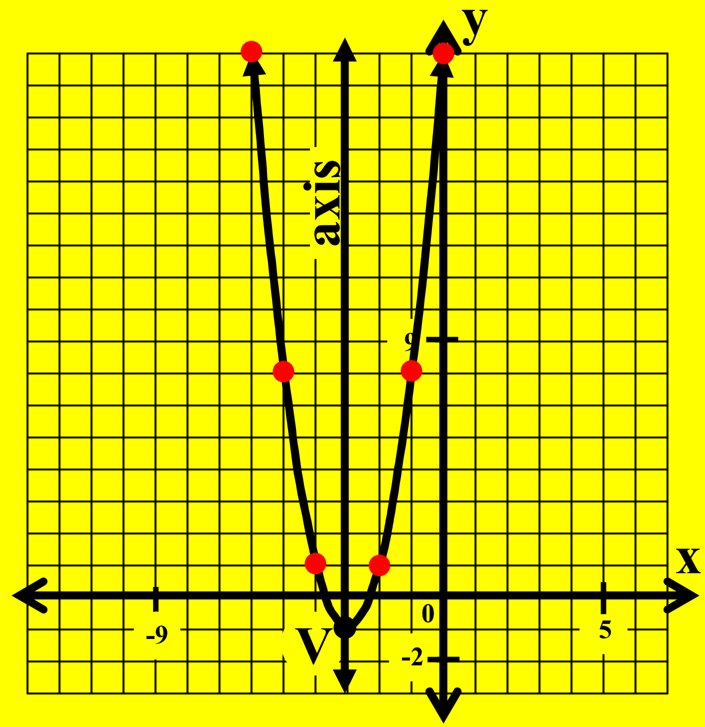

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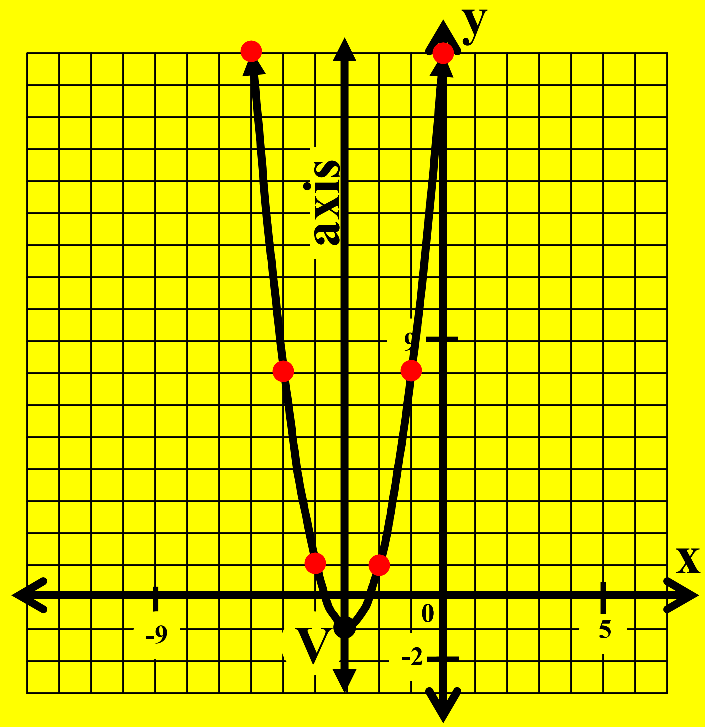

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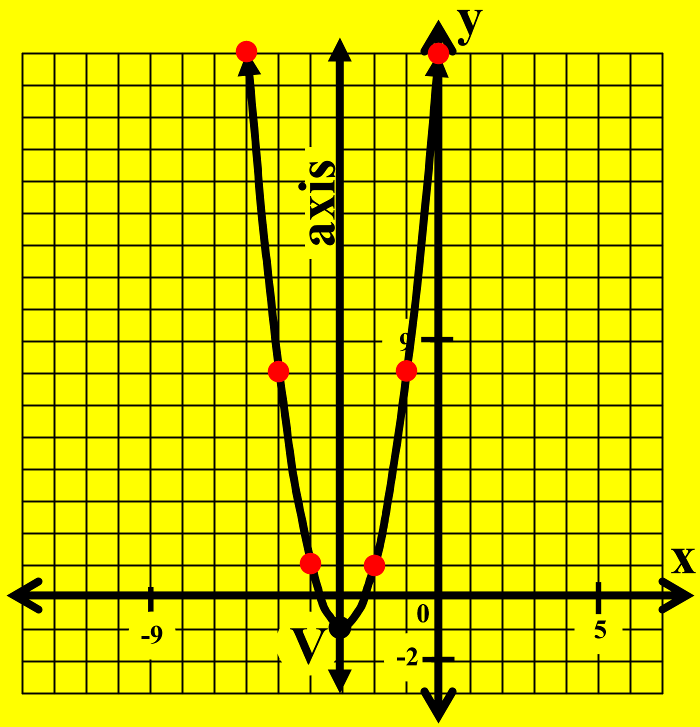

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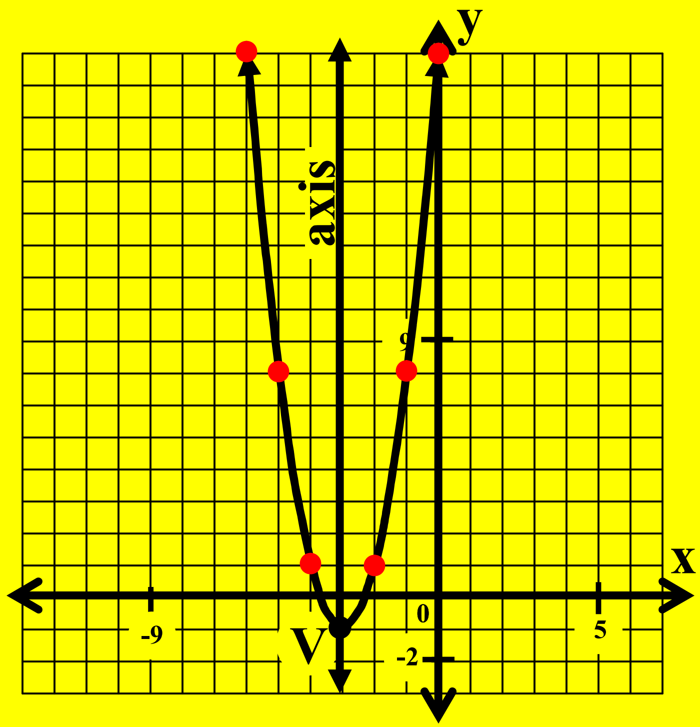

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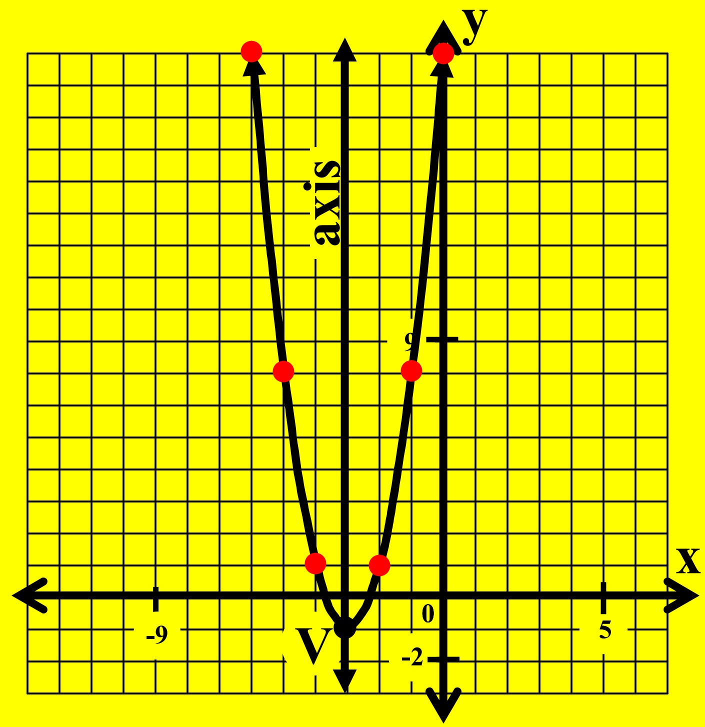

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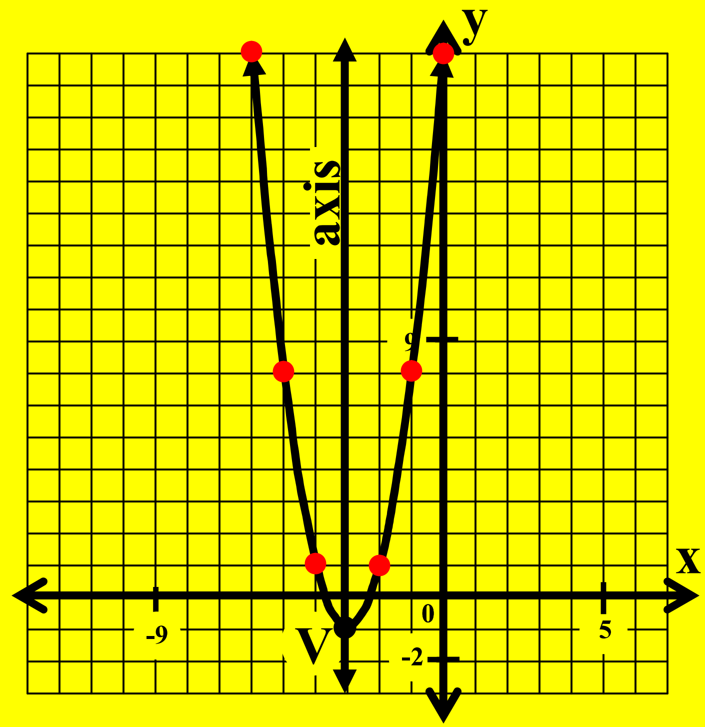

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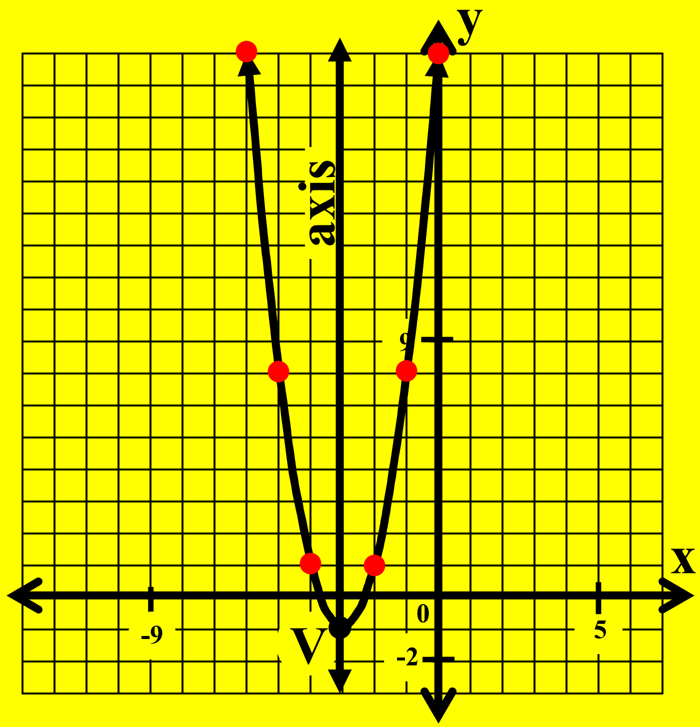

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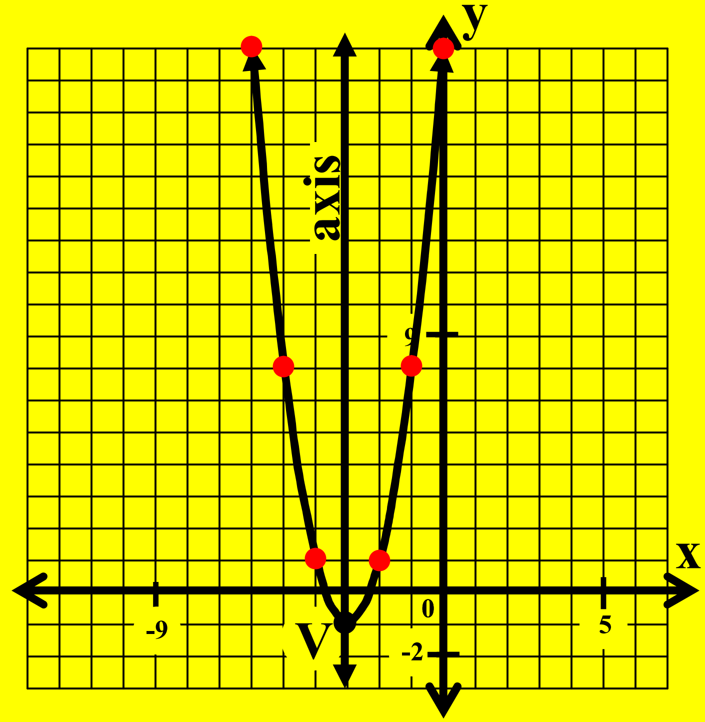

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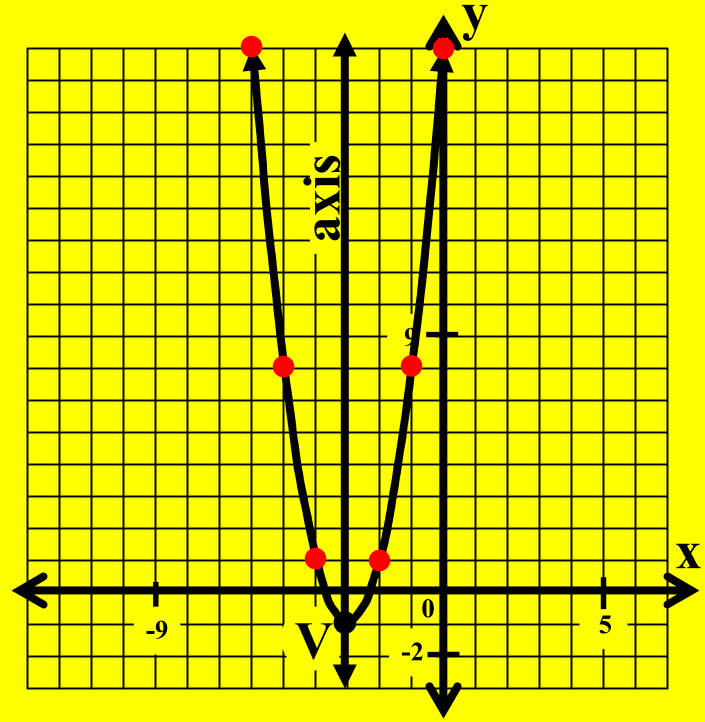

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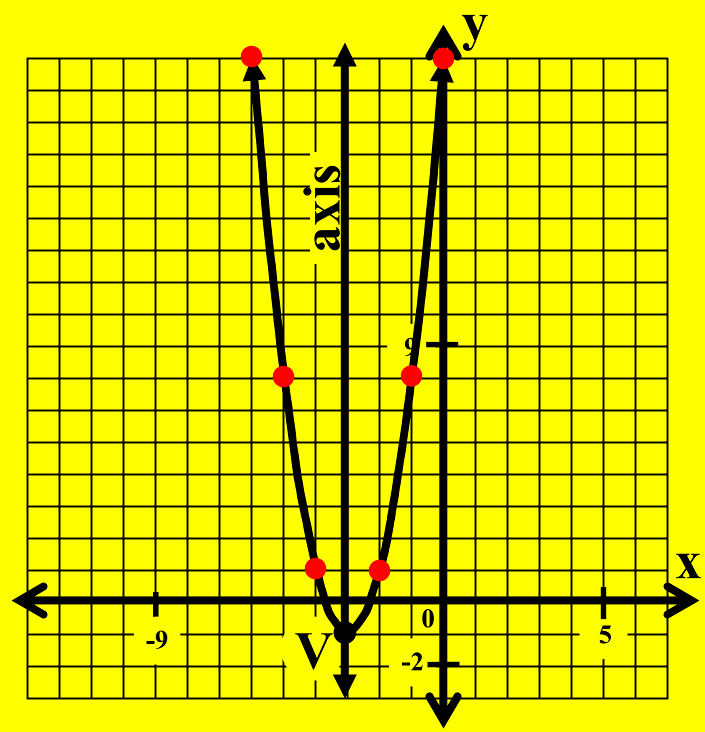

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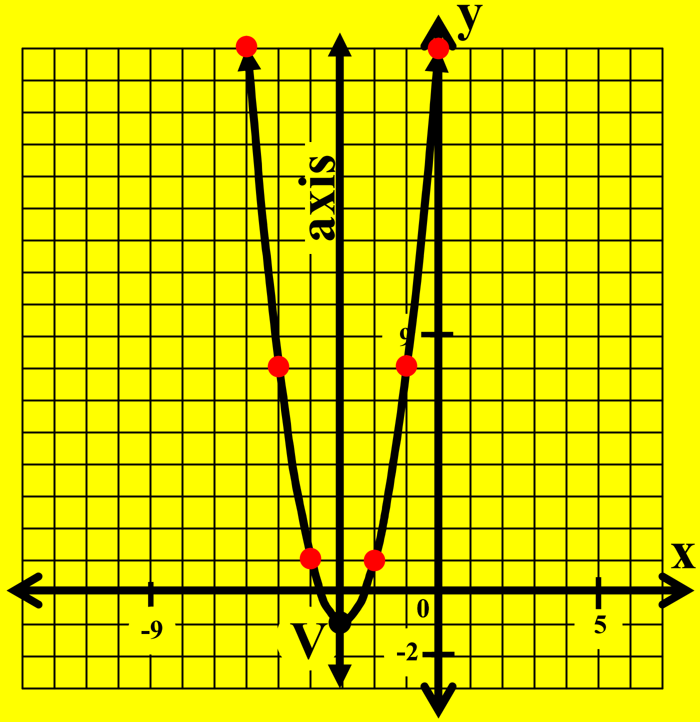

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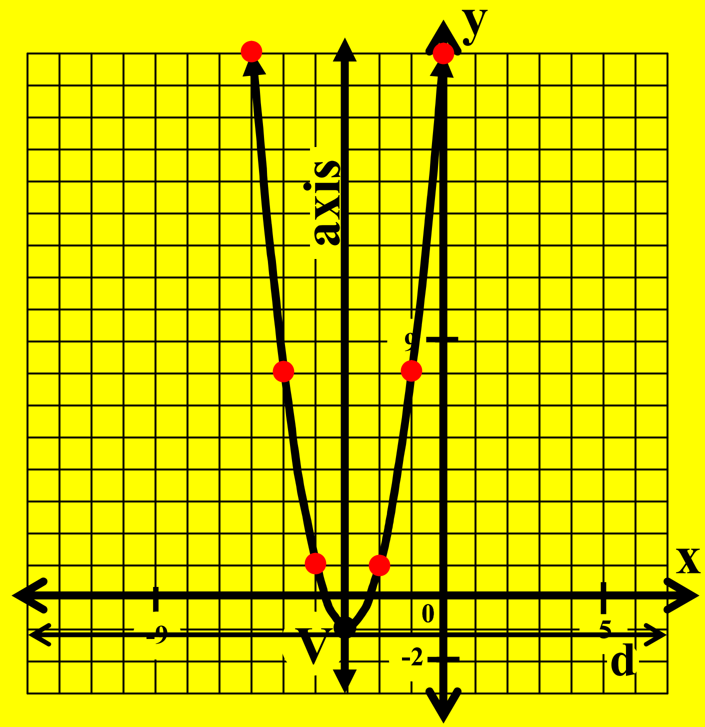

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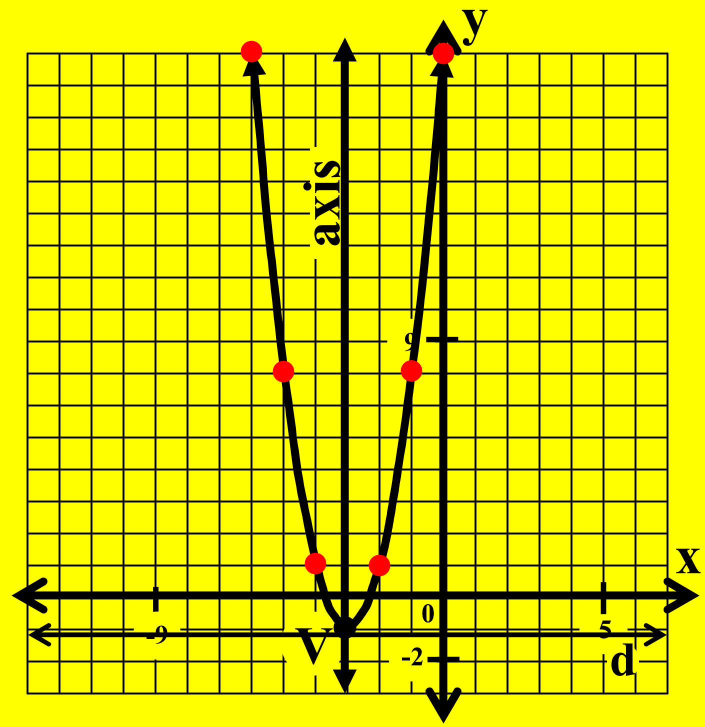

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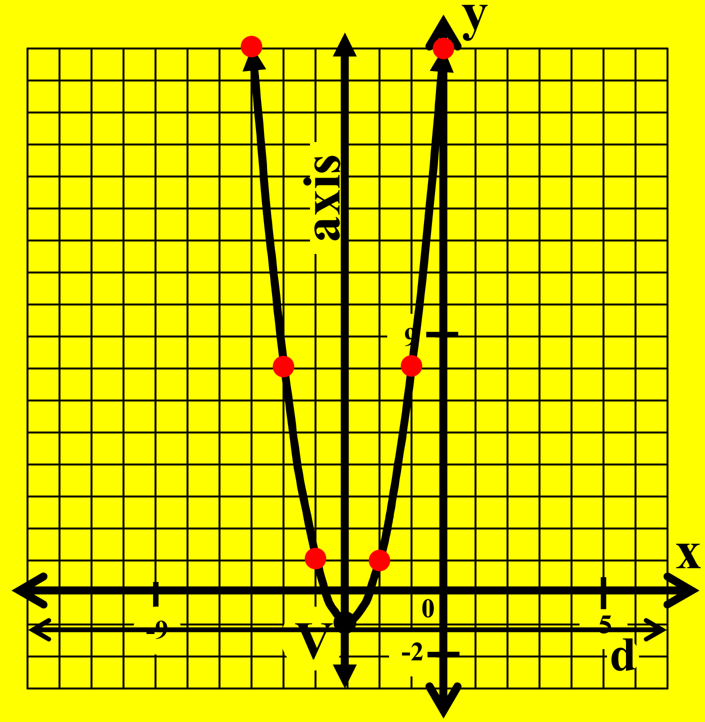

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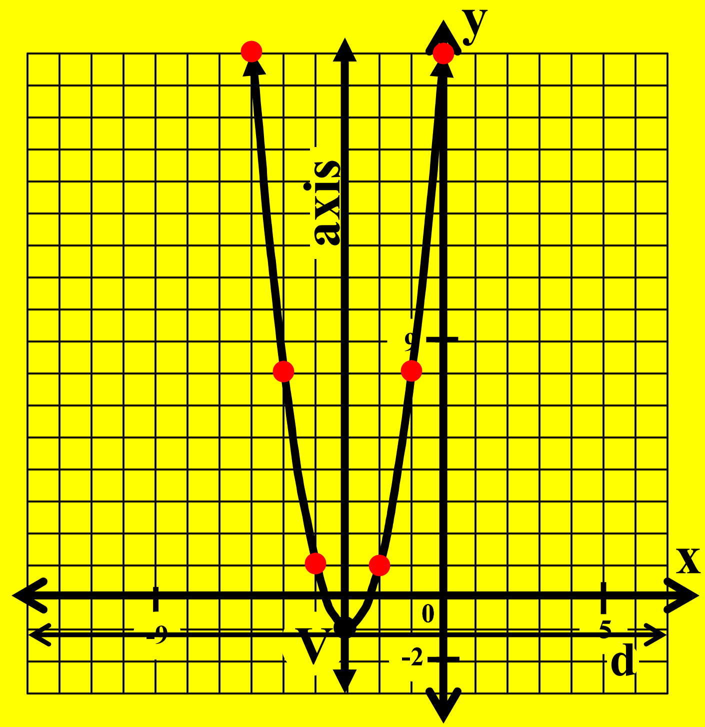

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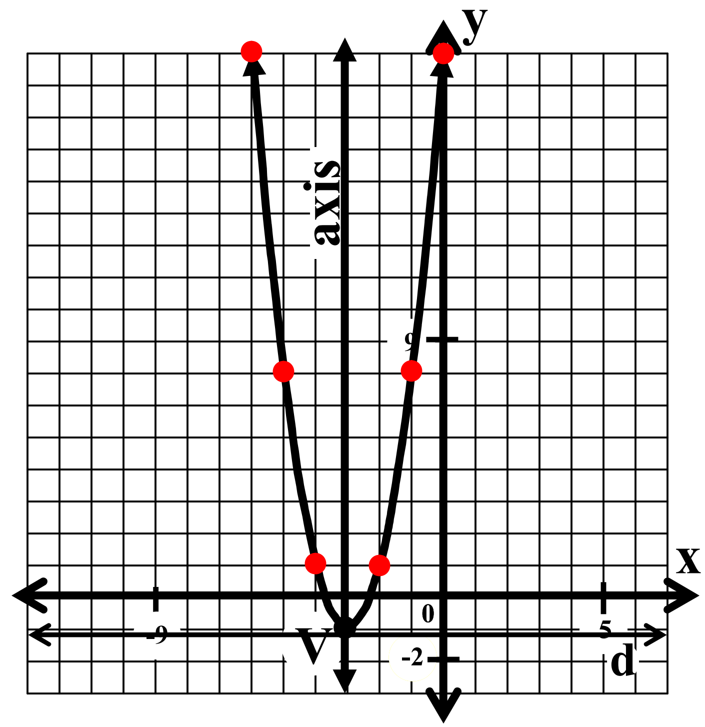

Type 1 Parabola

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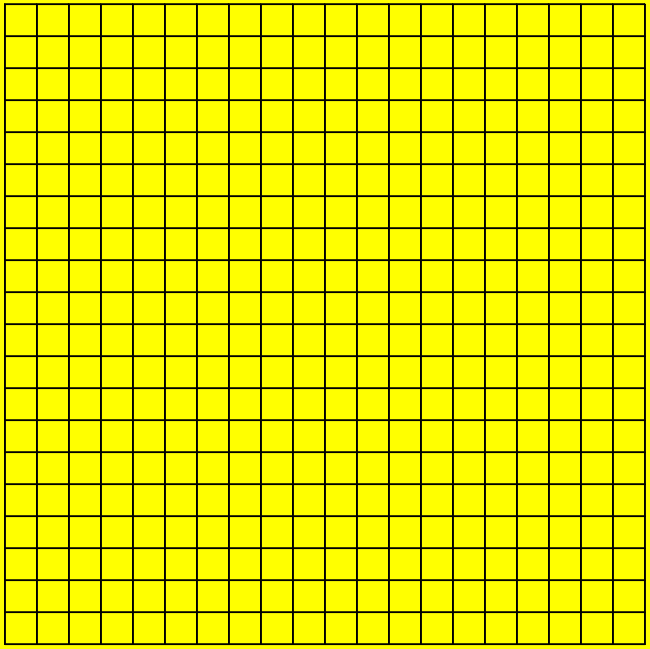

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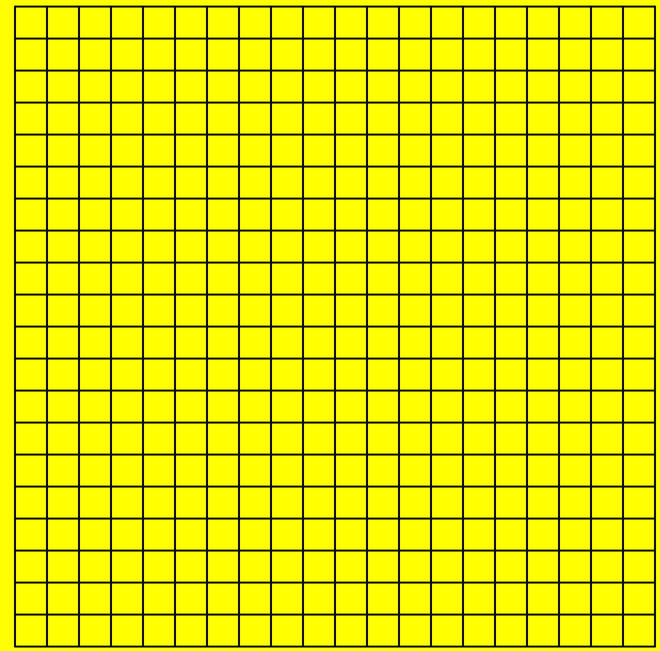

Type 2 Parabola

Class Worksheet #3

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Type 2 Parabola

Standard Form Equation

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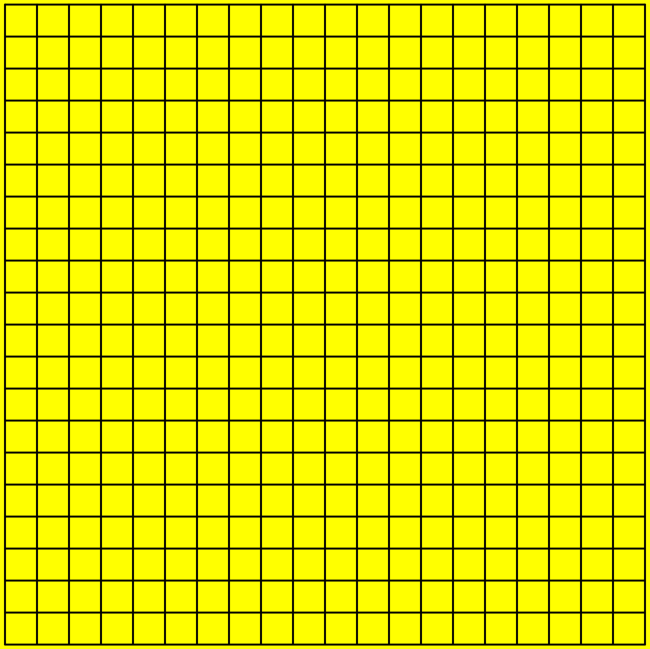

Type 2 Parabola

Standard Form Equation

$$x - h = a(y - k)^2$$

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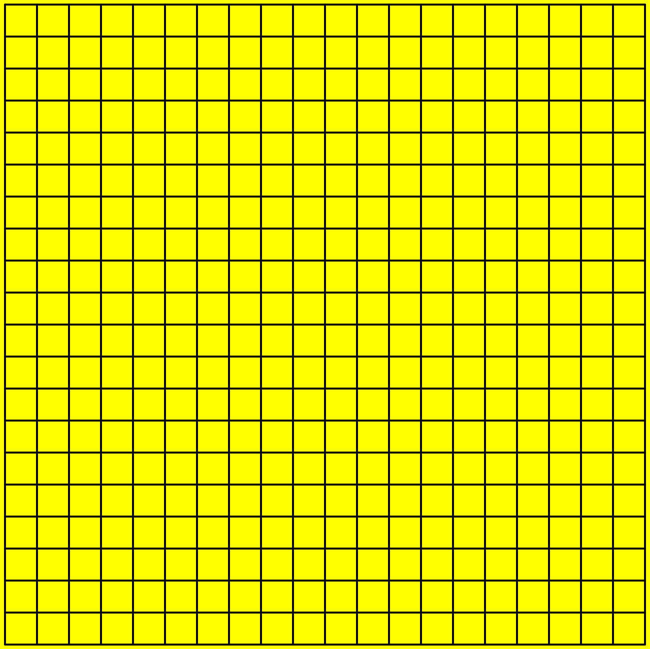

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Type 2 Parabola

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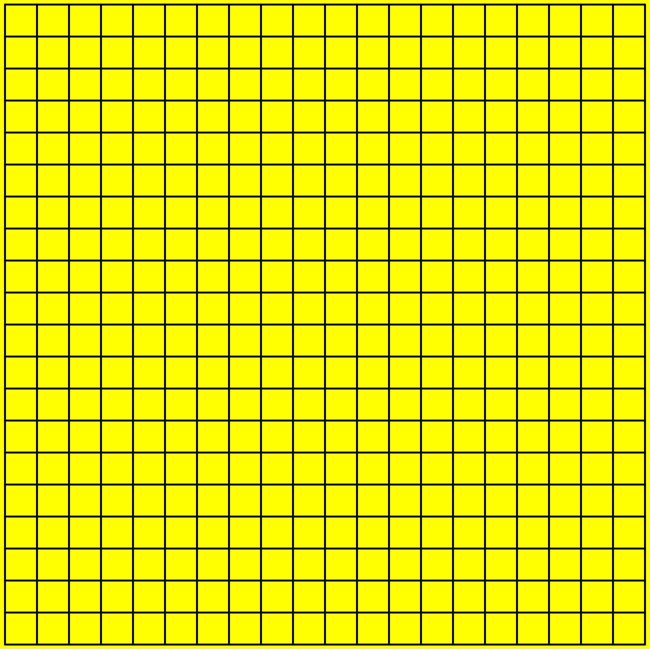

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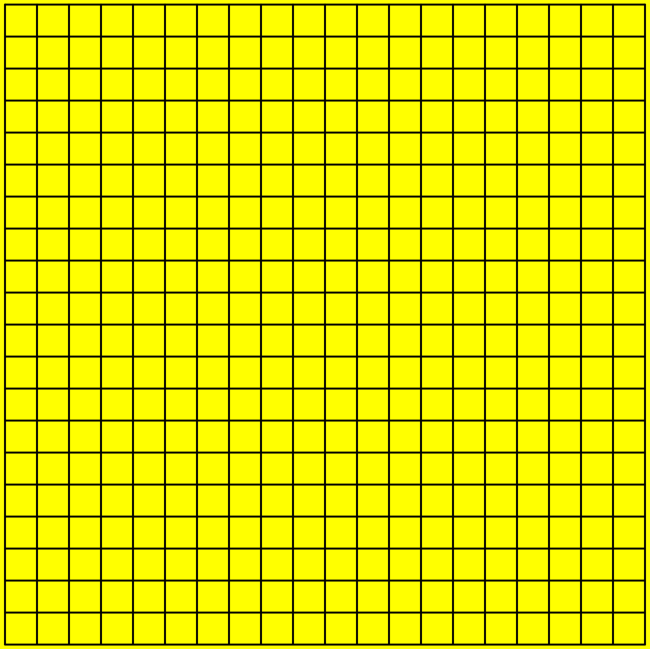

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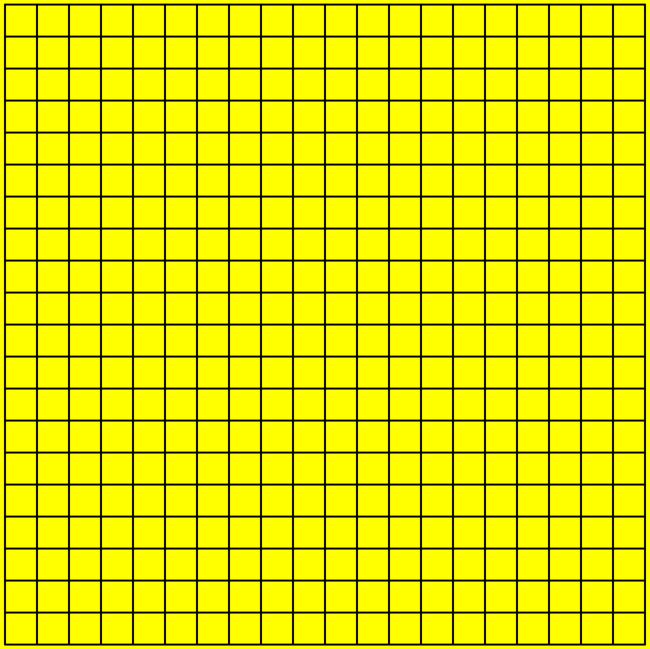

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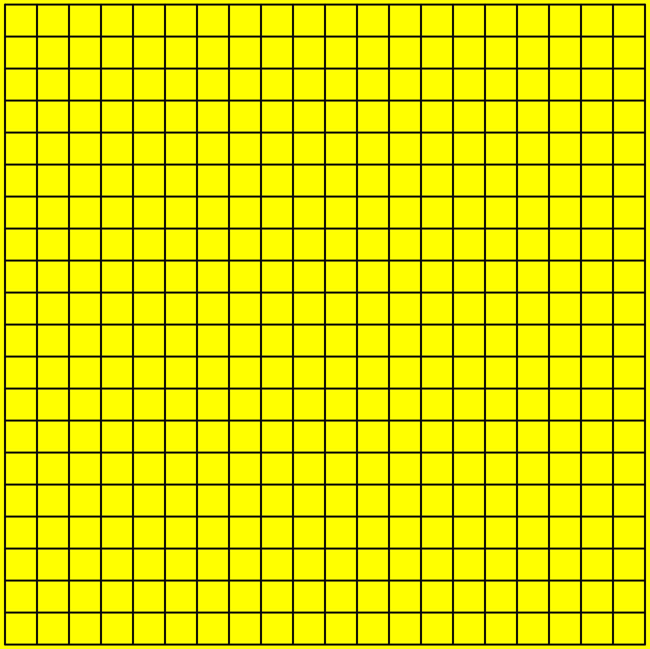

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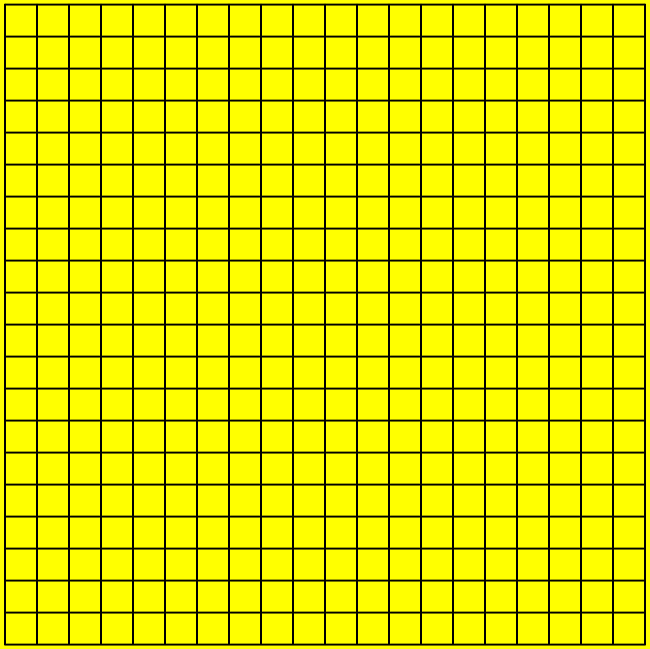

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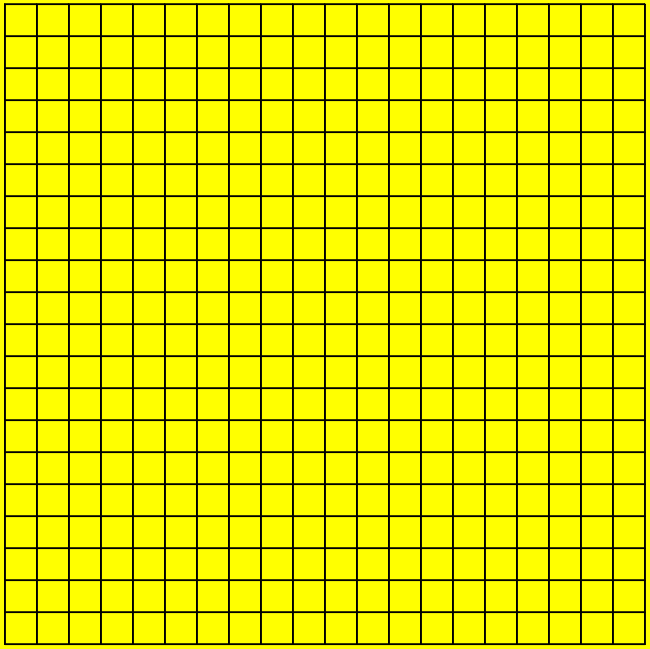

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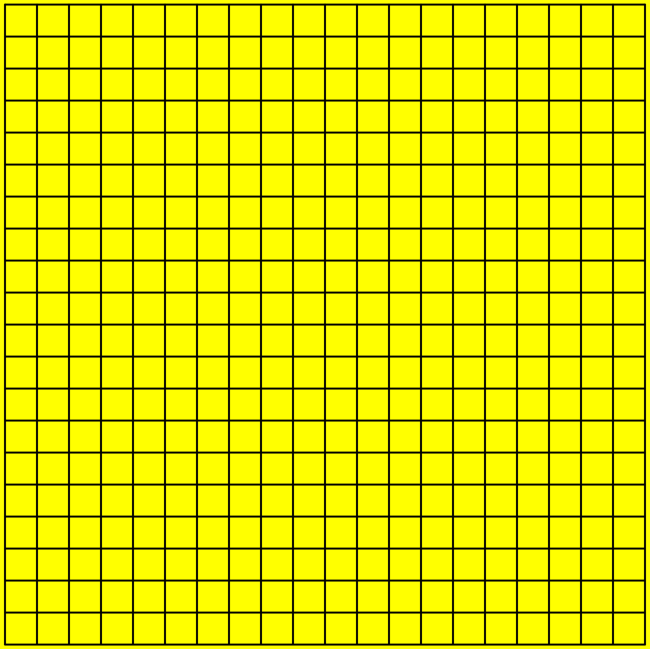

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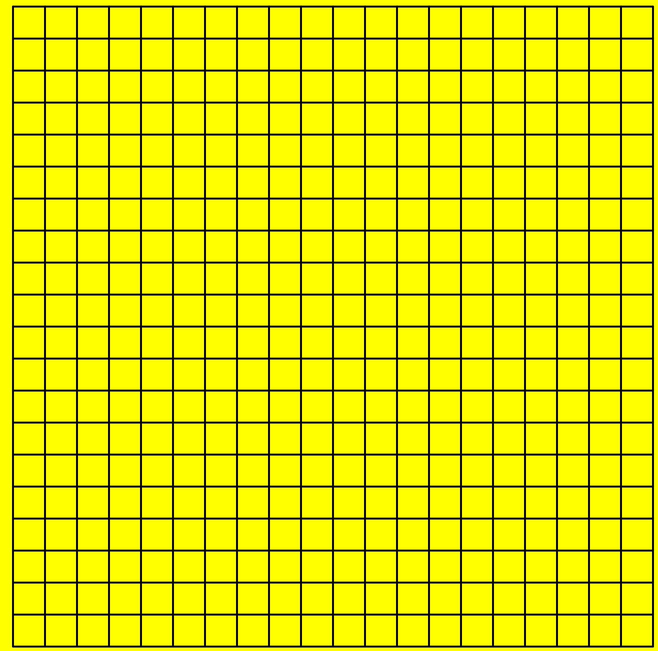

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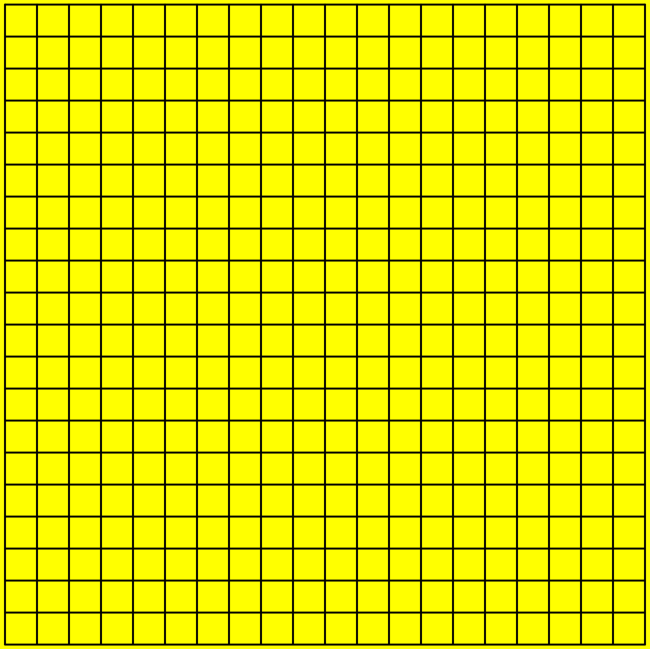

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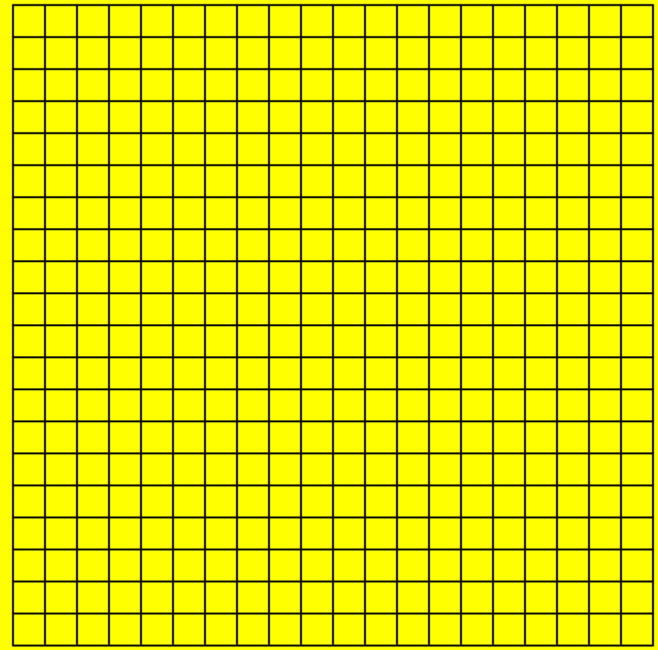

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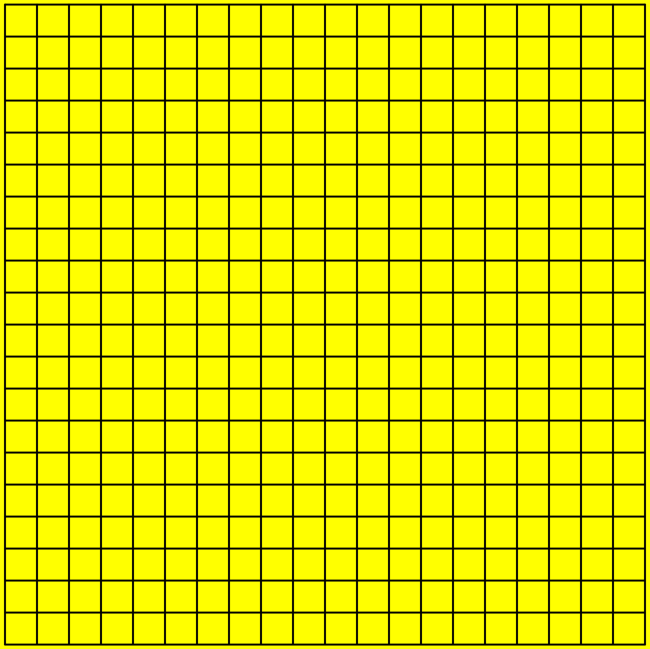

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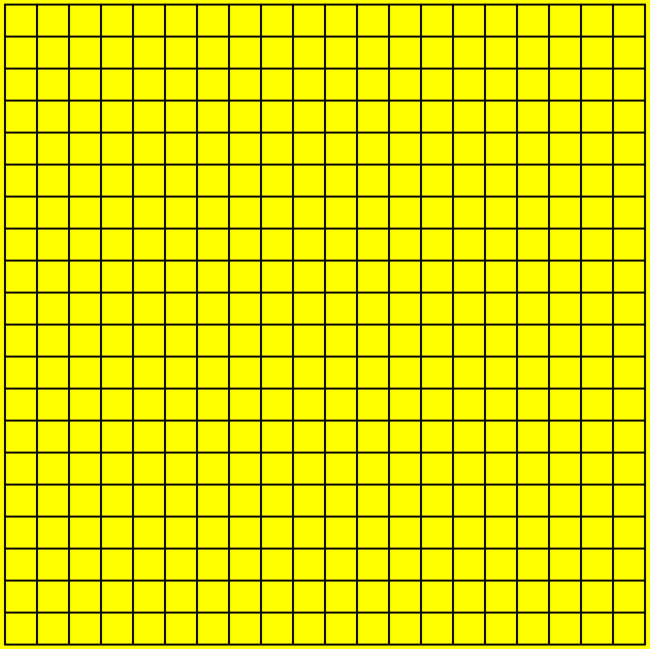

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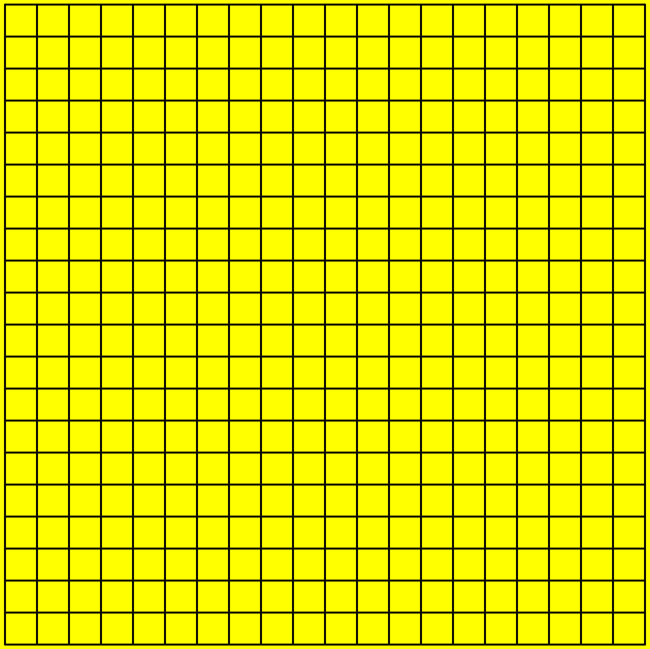

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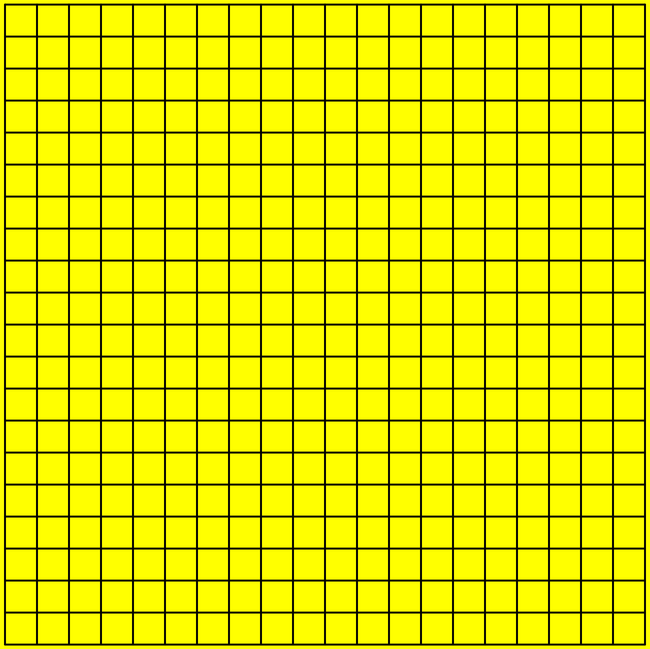

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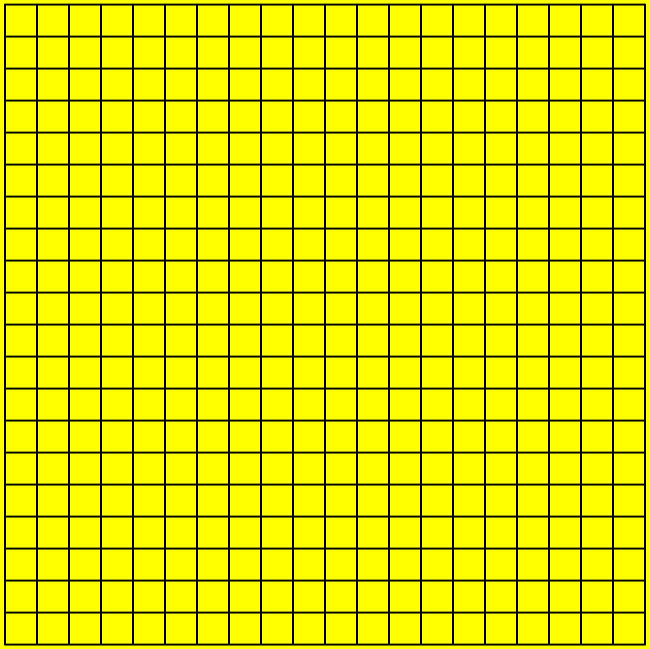

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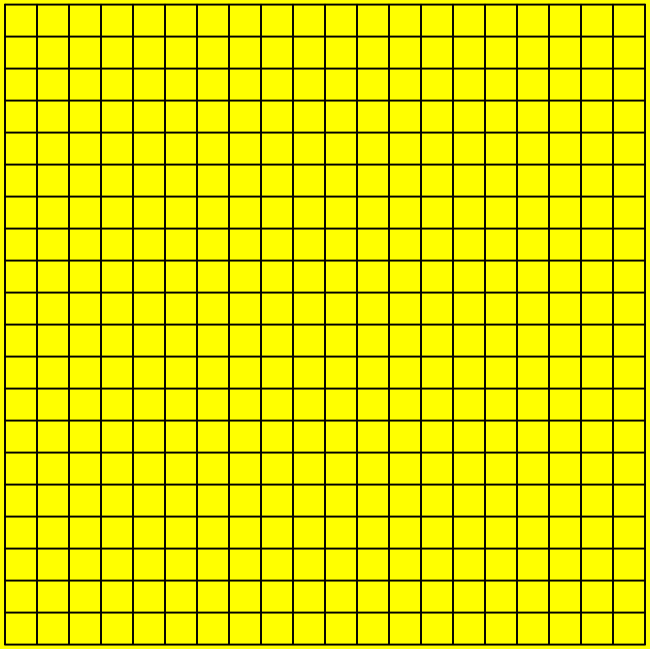

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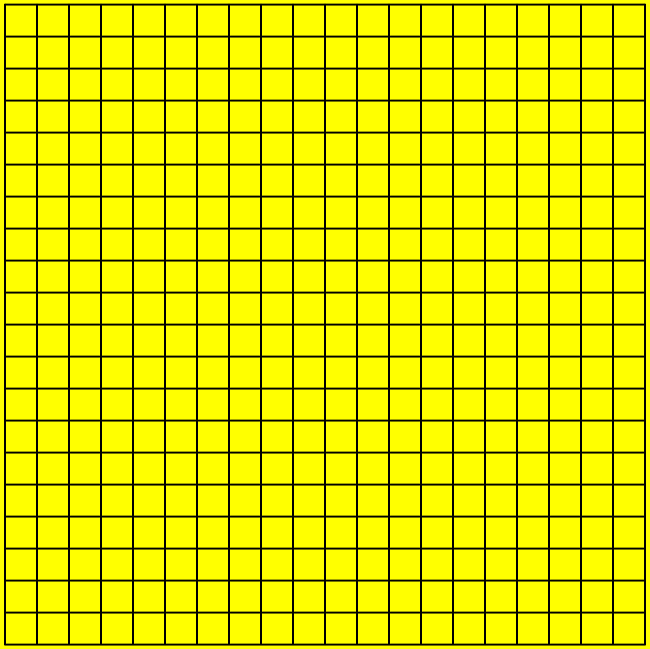

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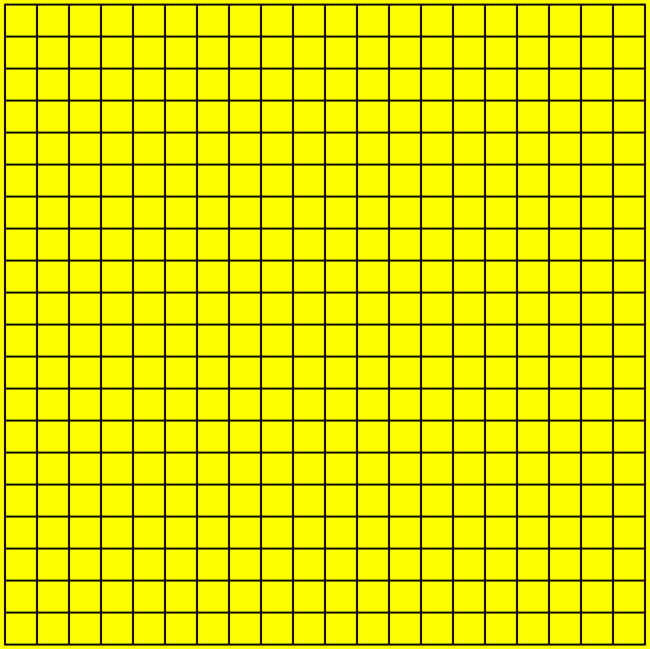

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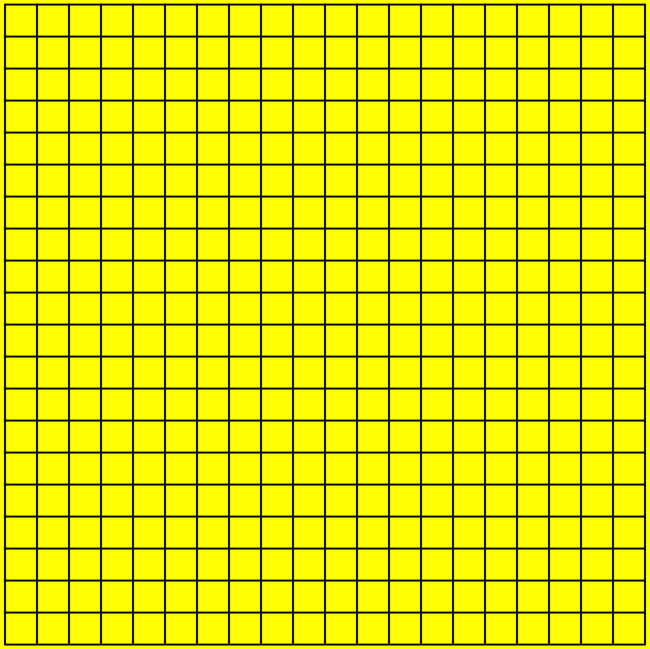

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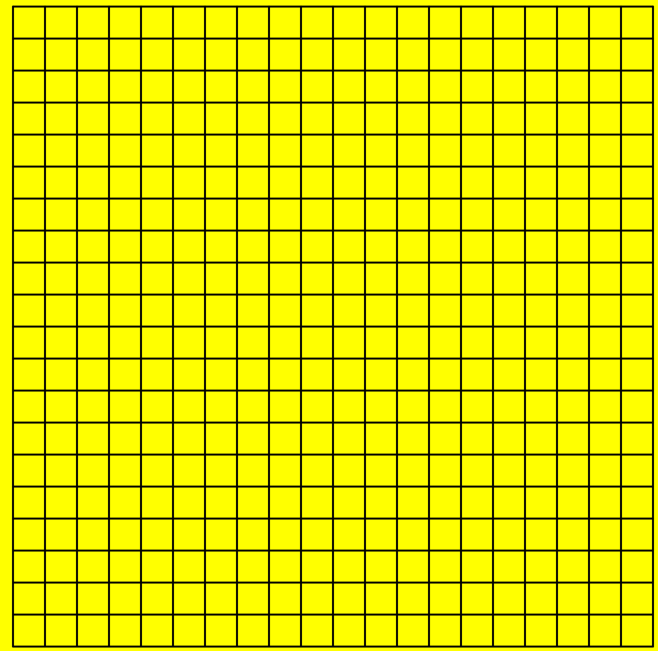

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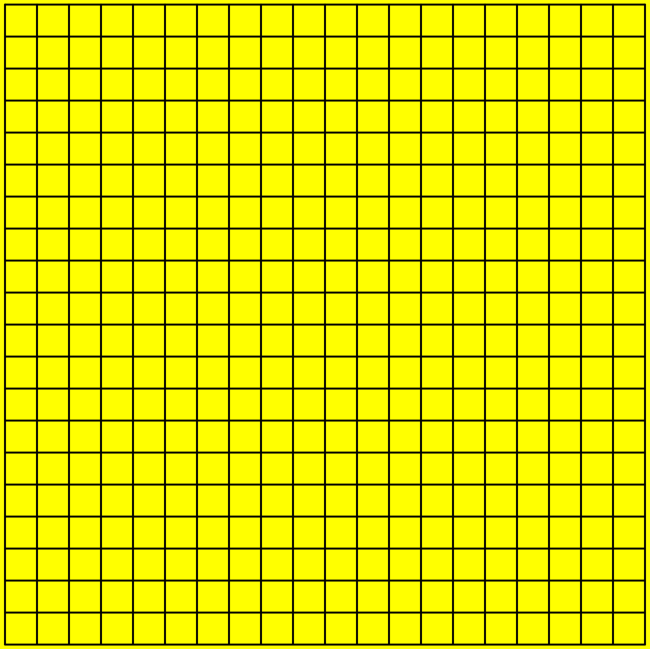
Multiply both sides by $\frac{-1}{4}$.



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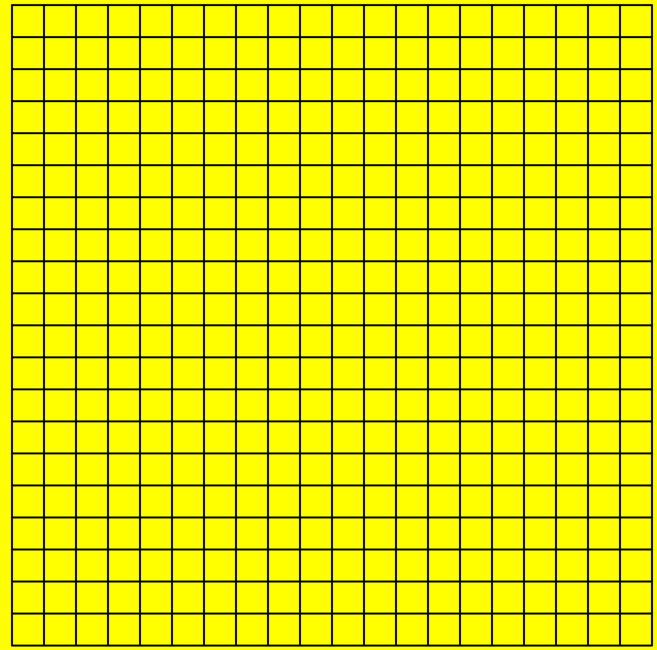

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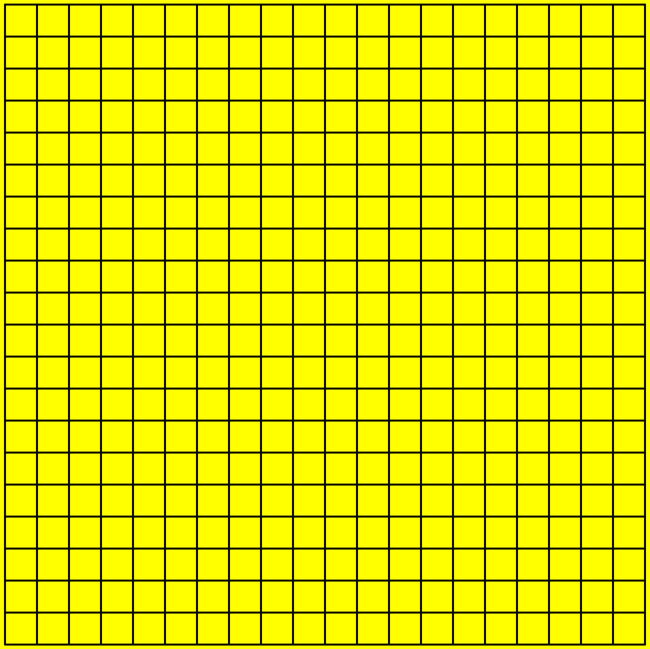

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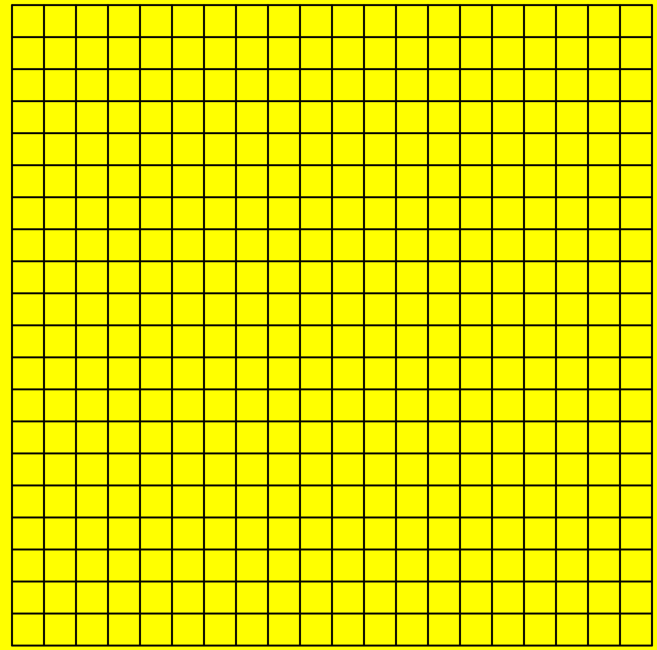

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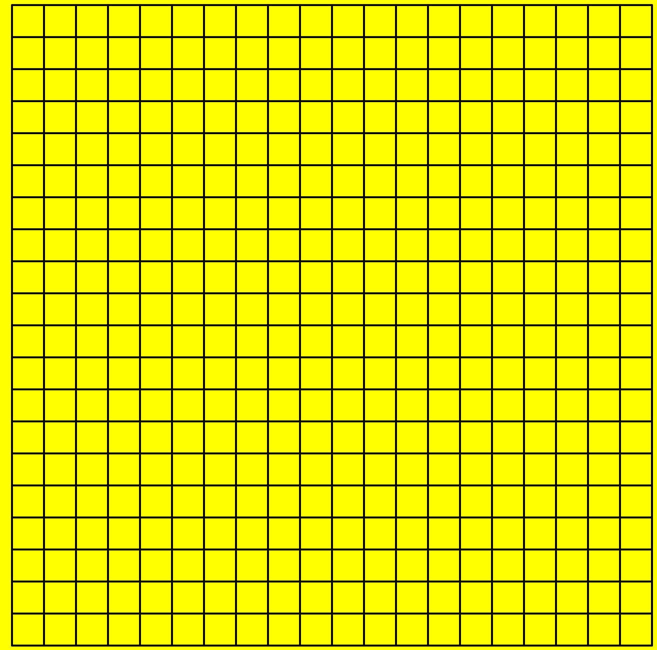

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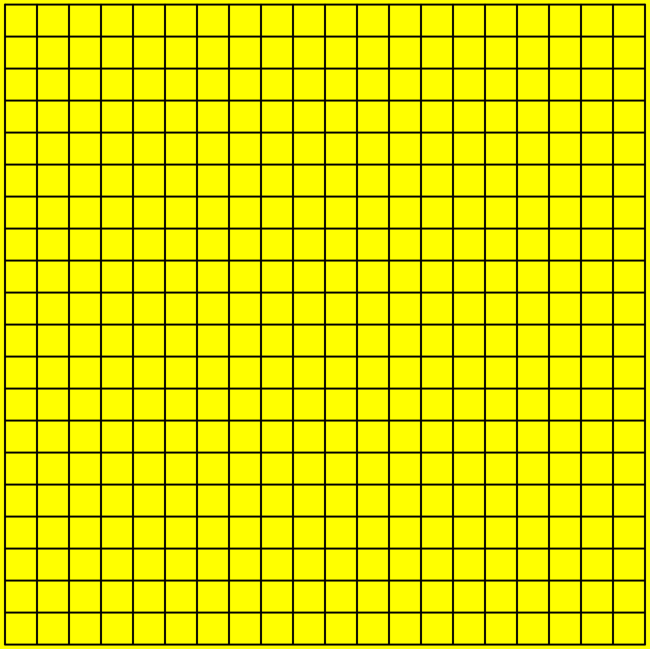

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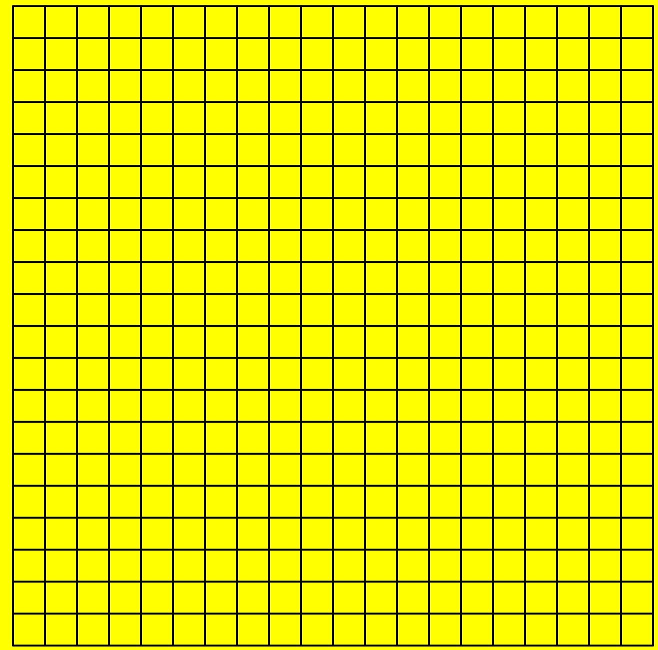

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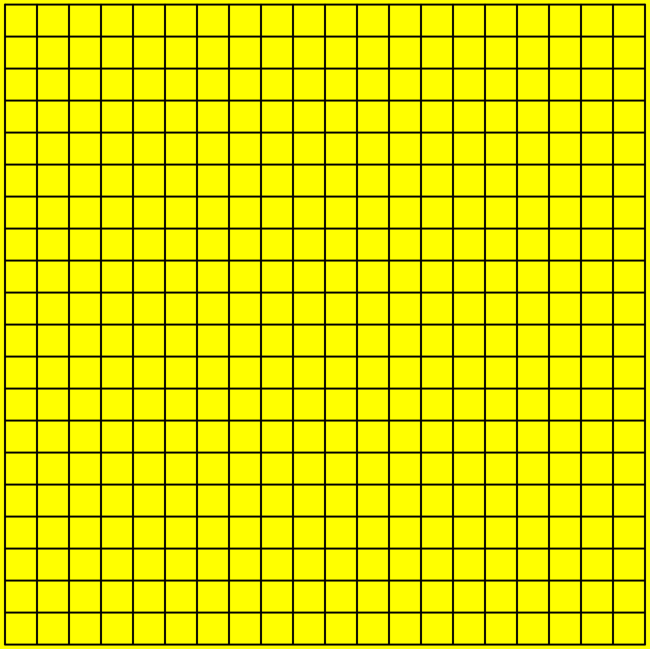

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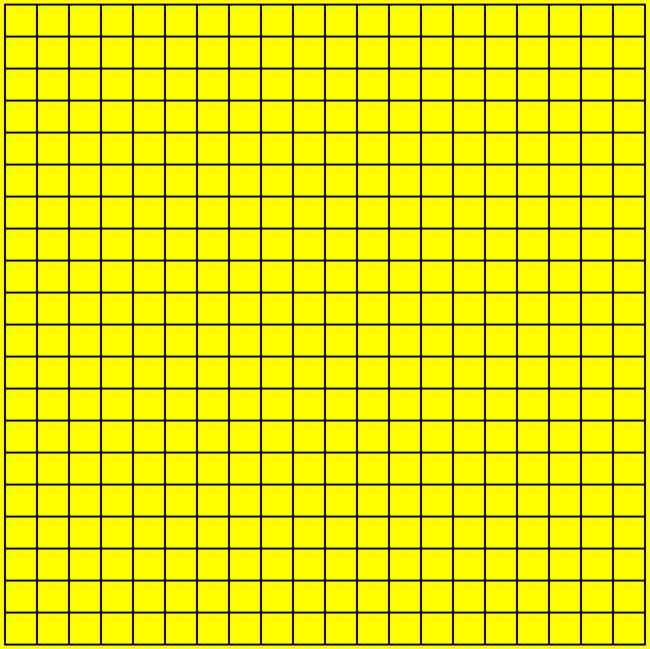

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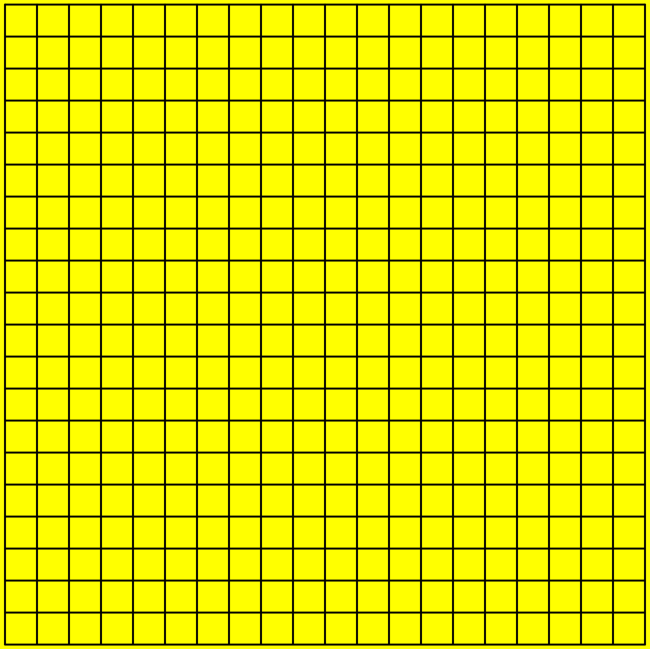

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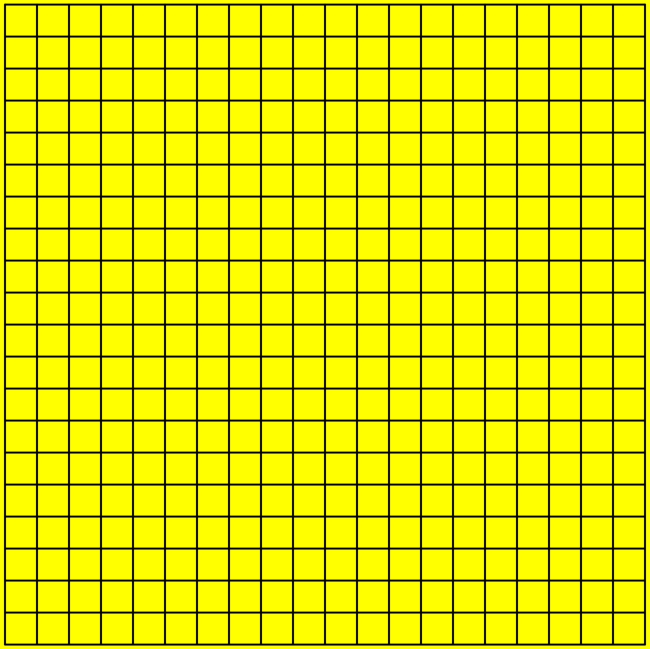

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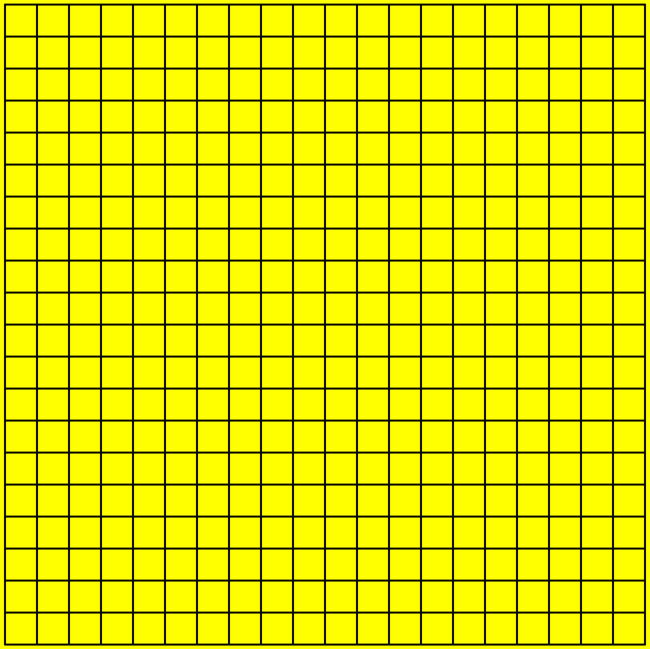

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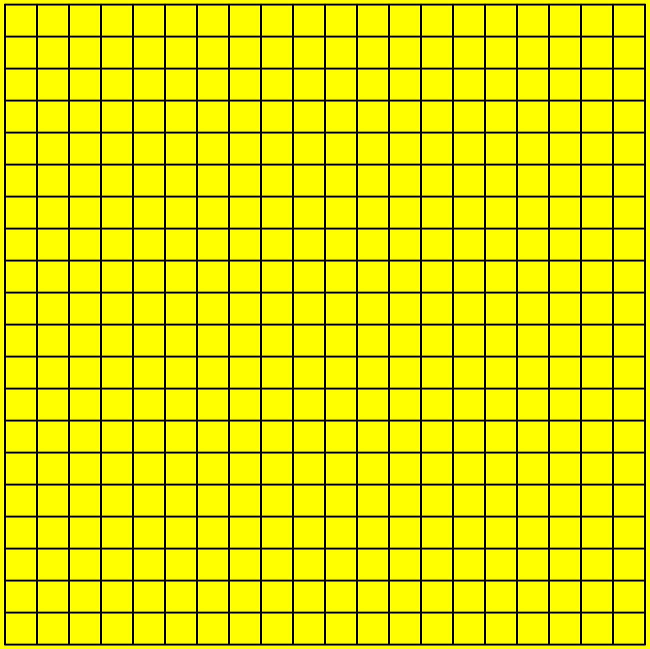

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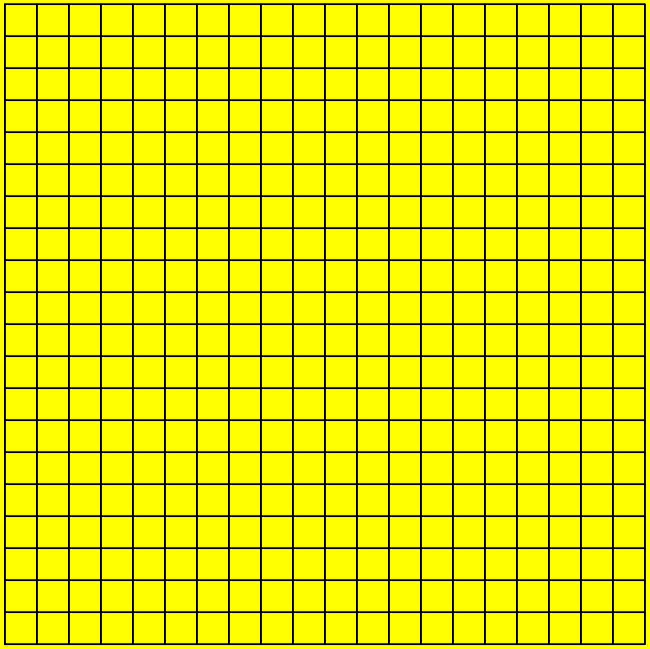

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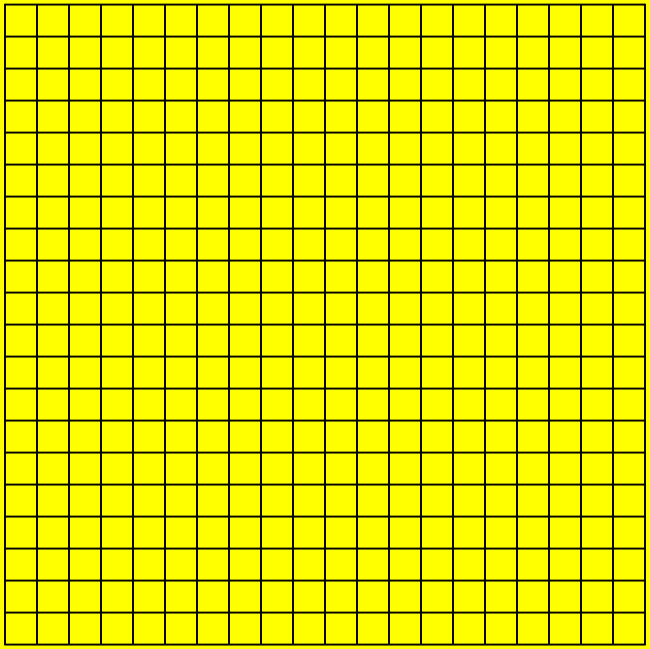

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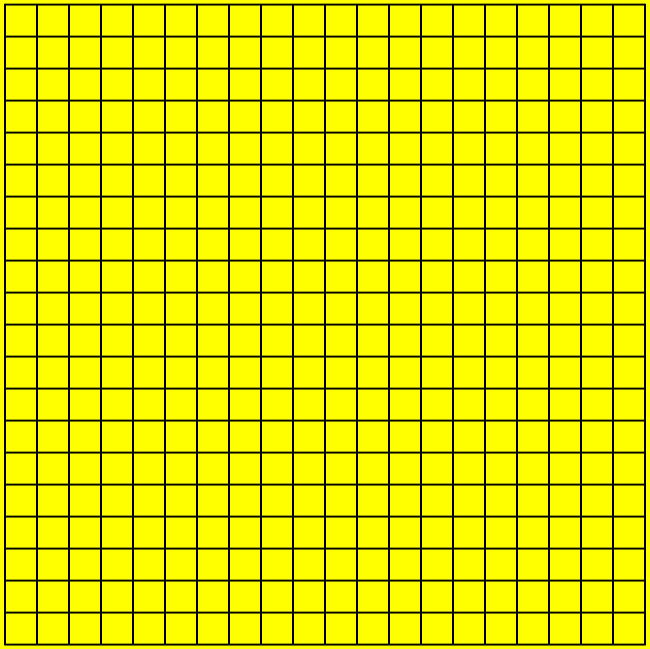

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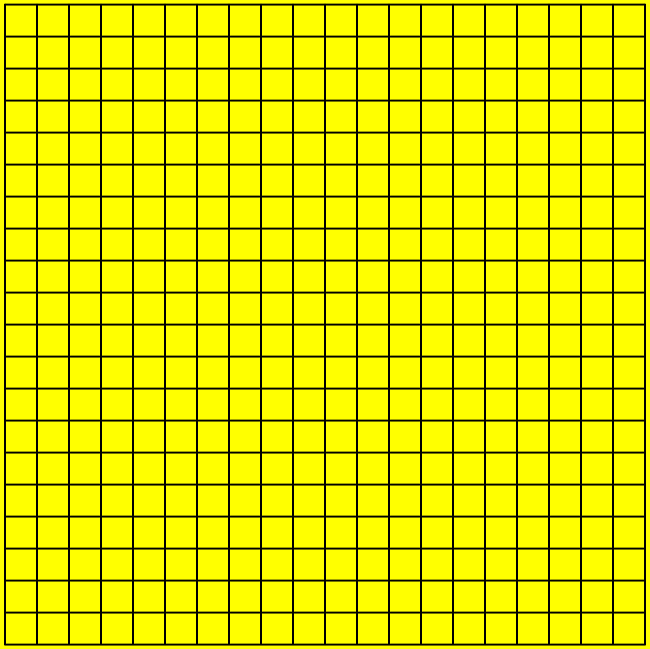

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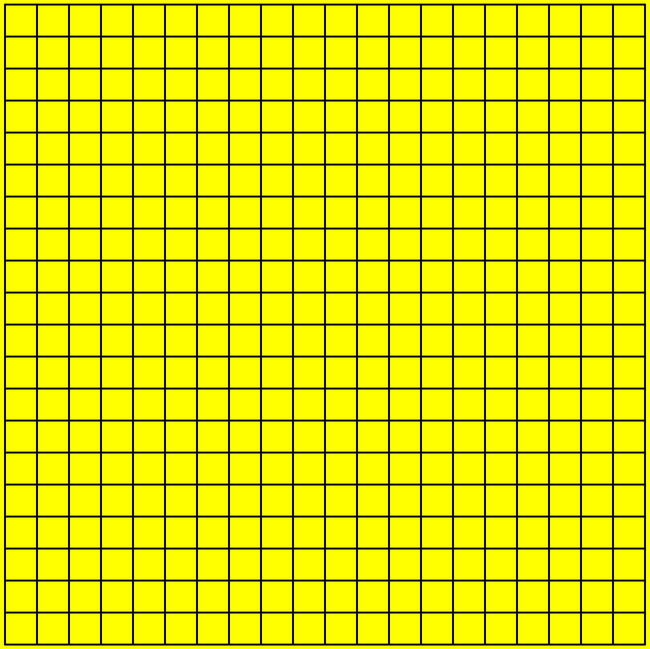

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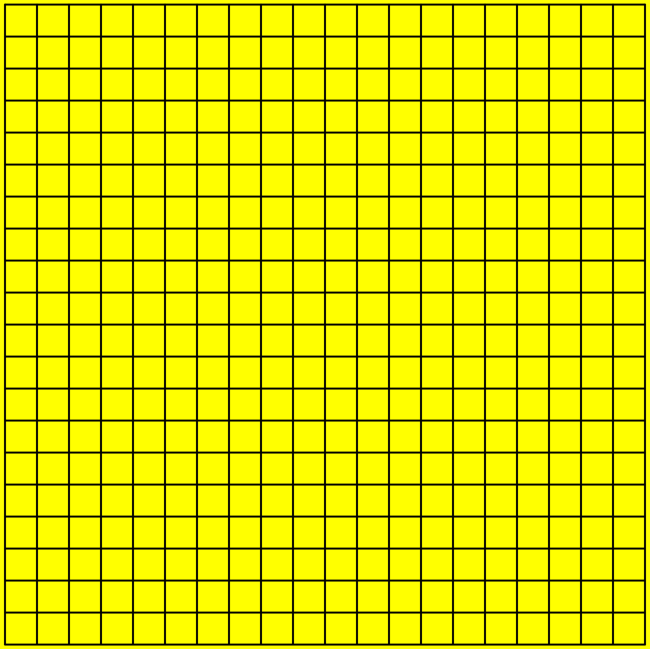

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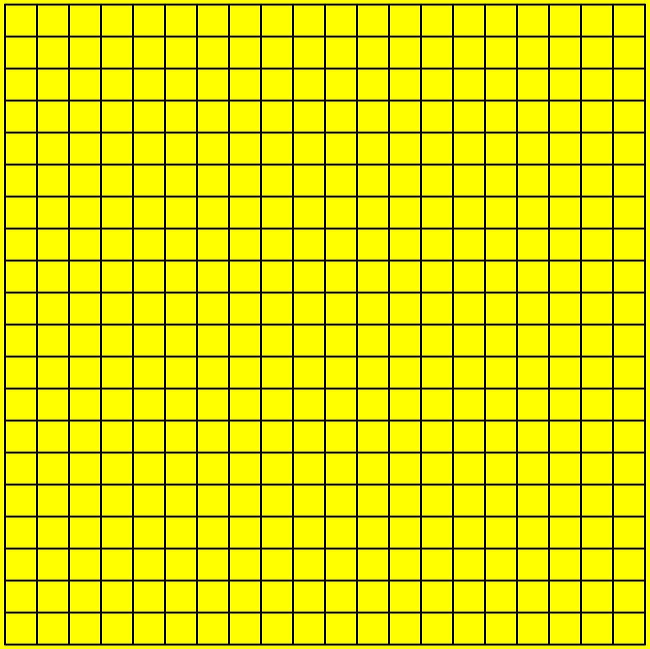

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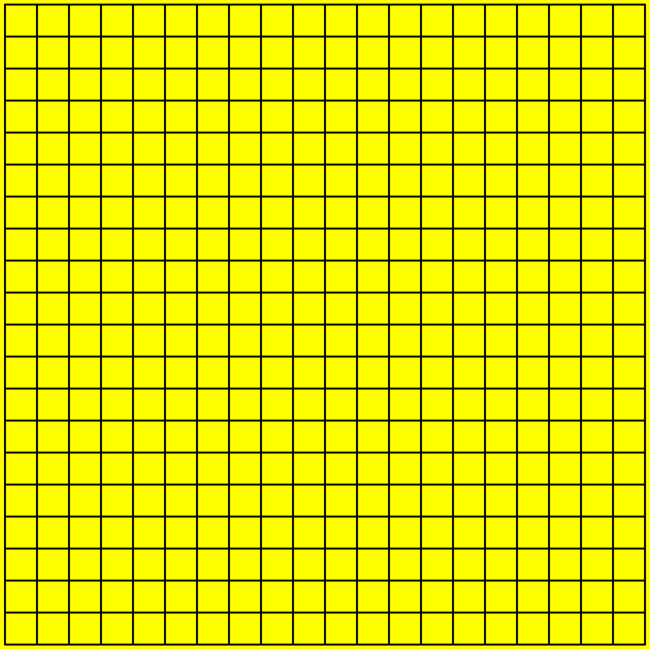

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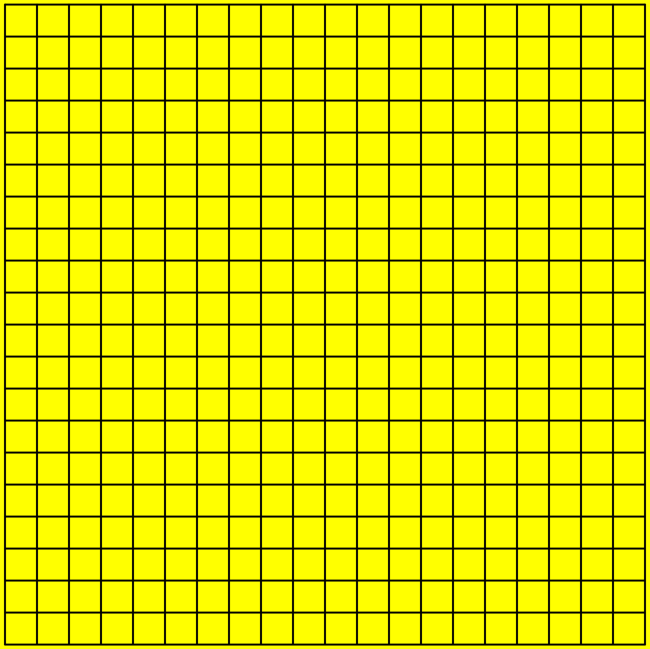

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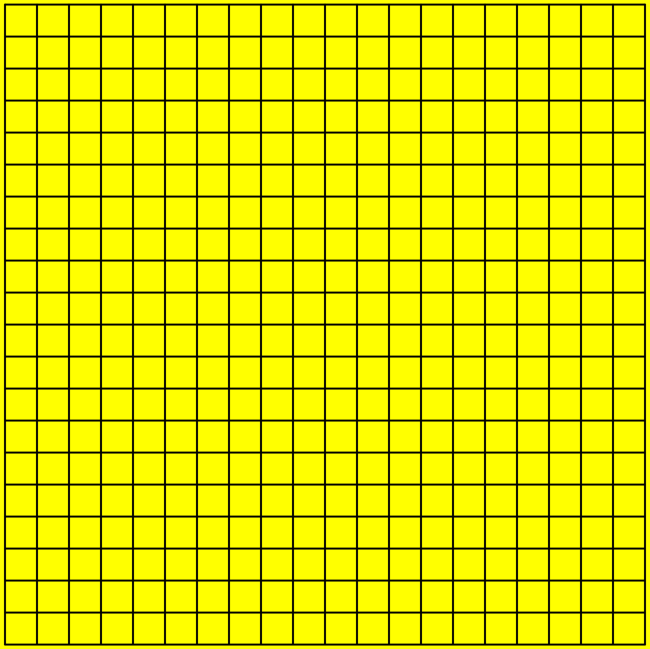

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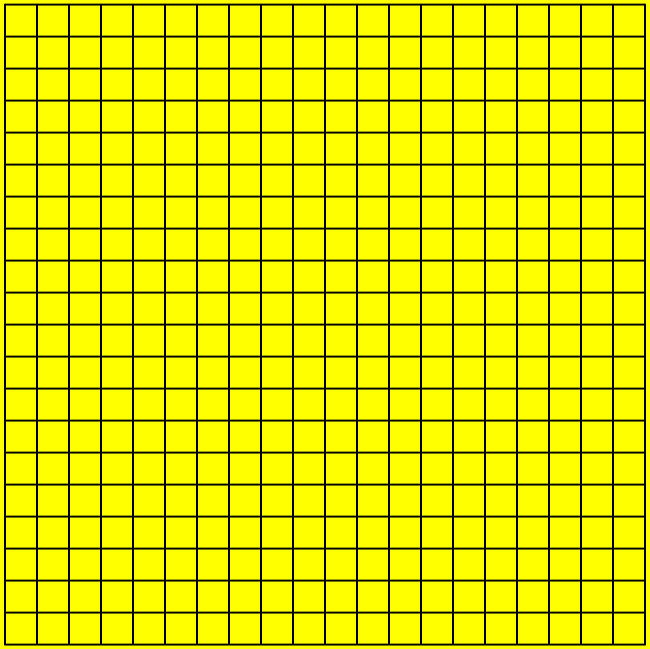

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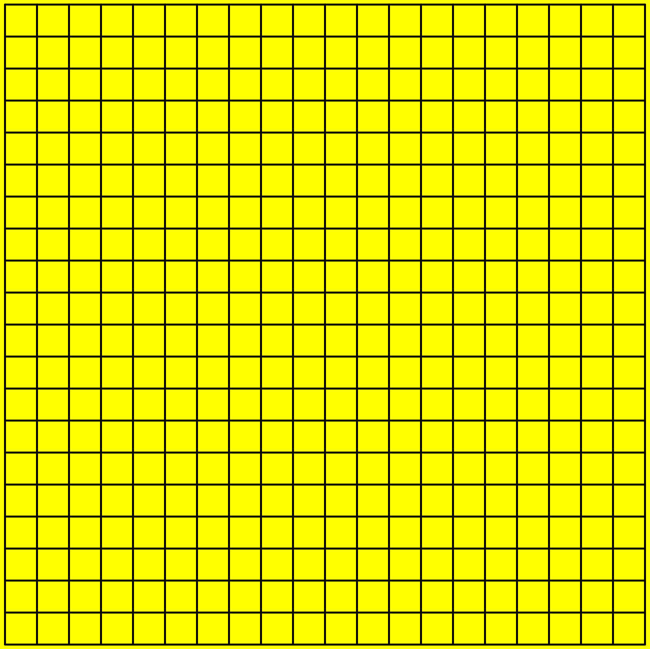

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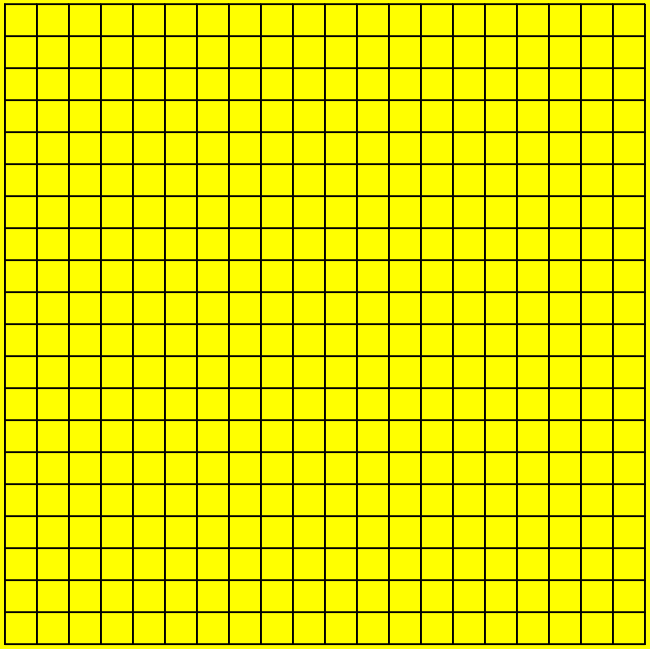

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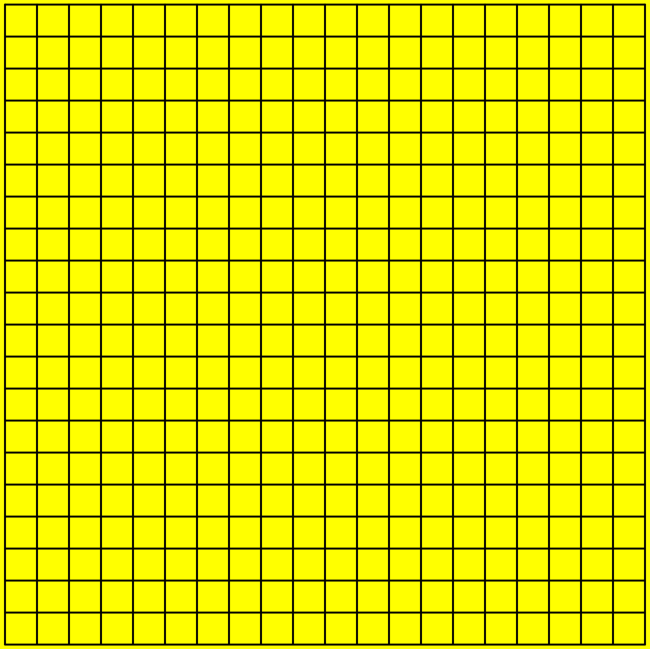

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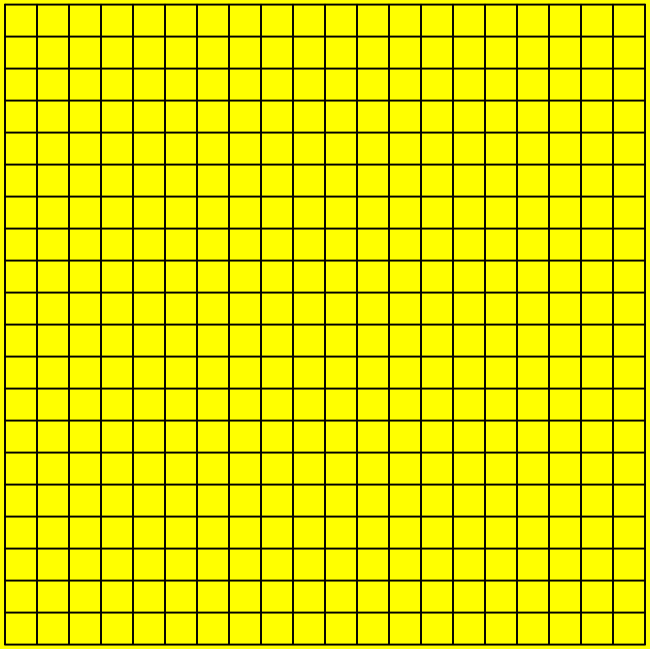

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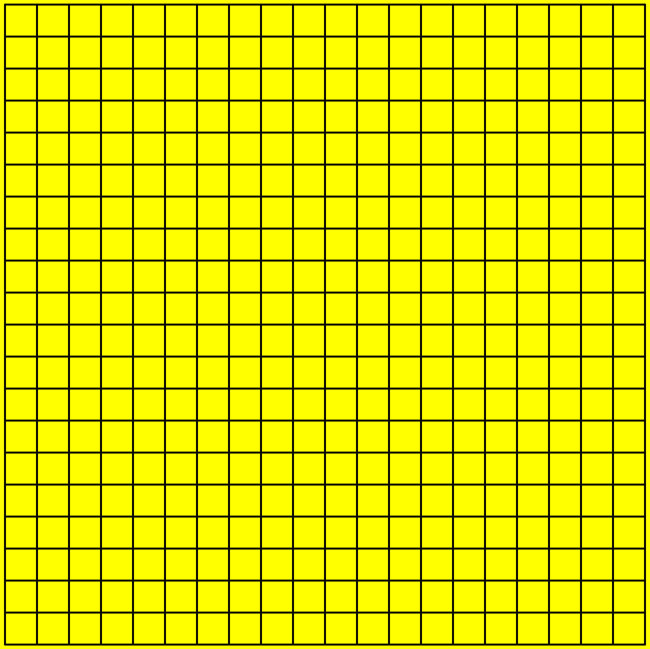

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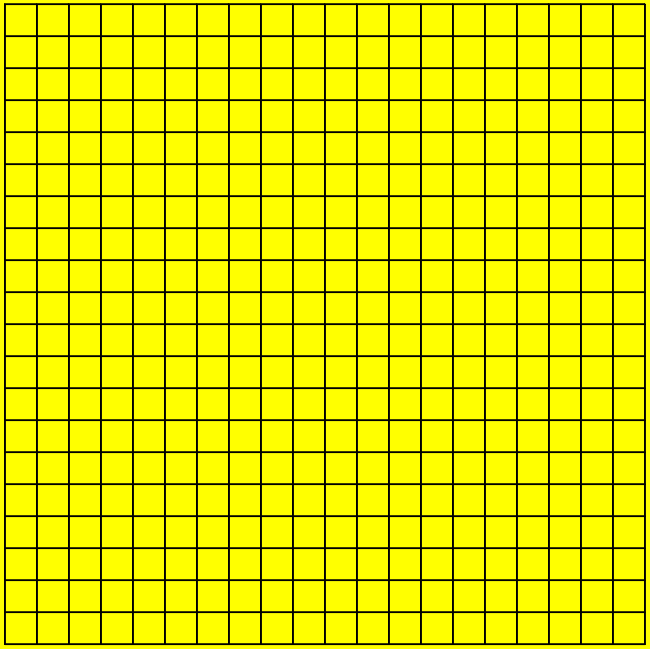

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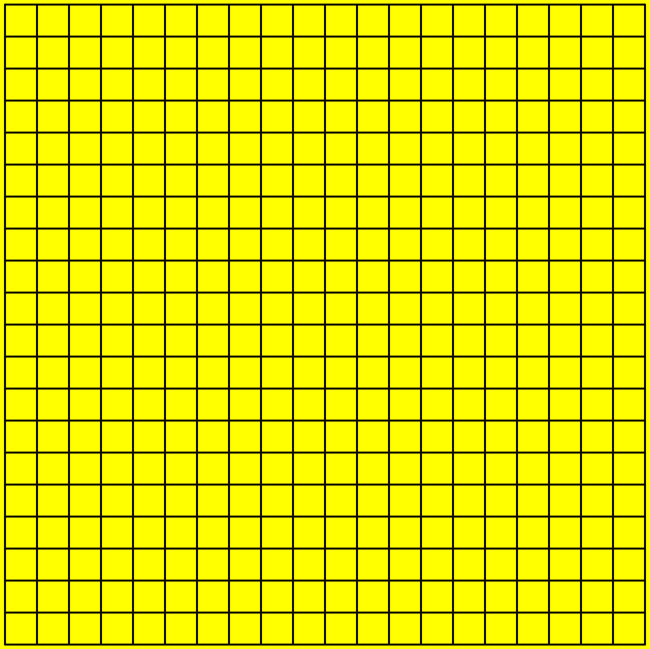

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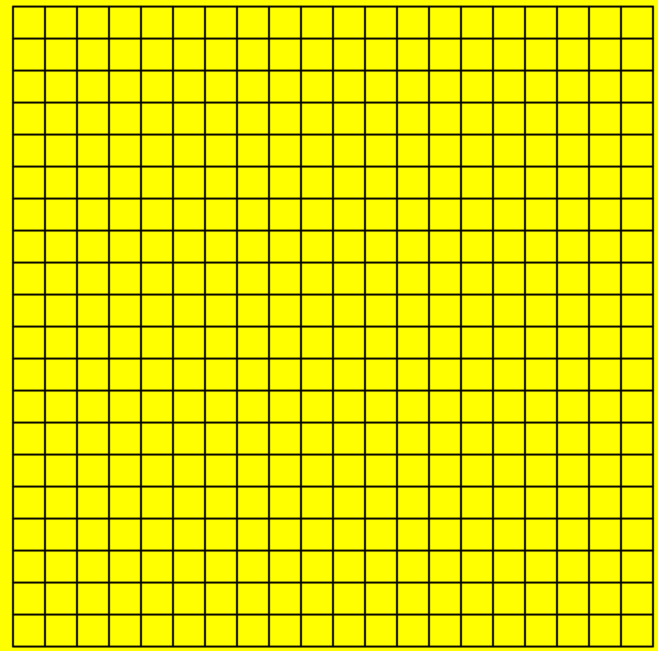

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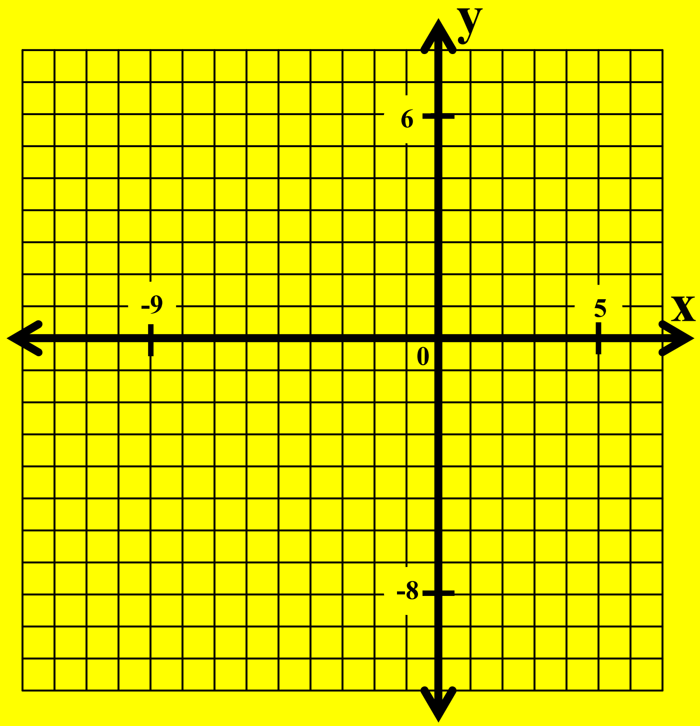

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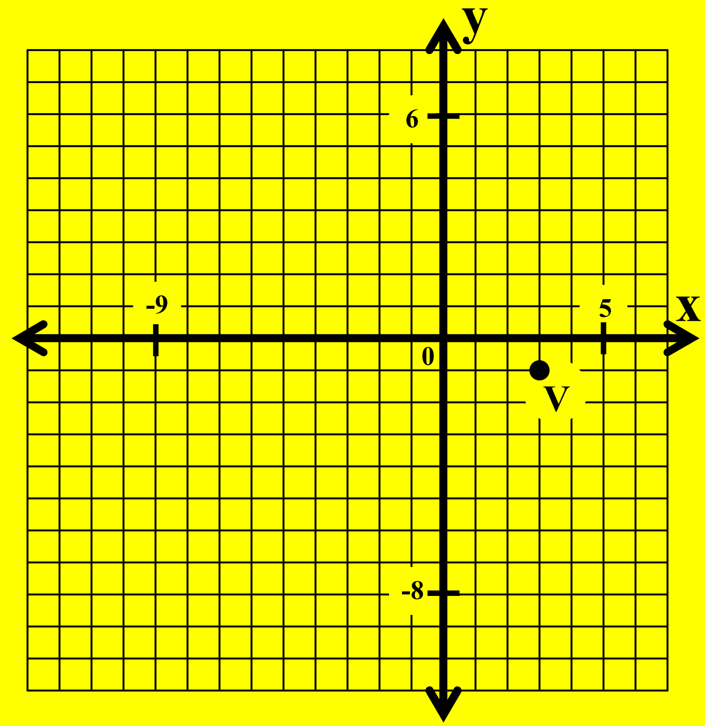

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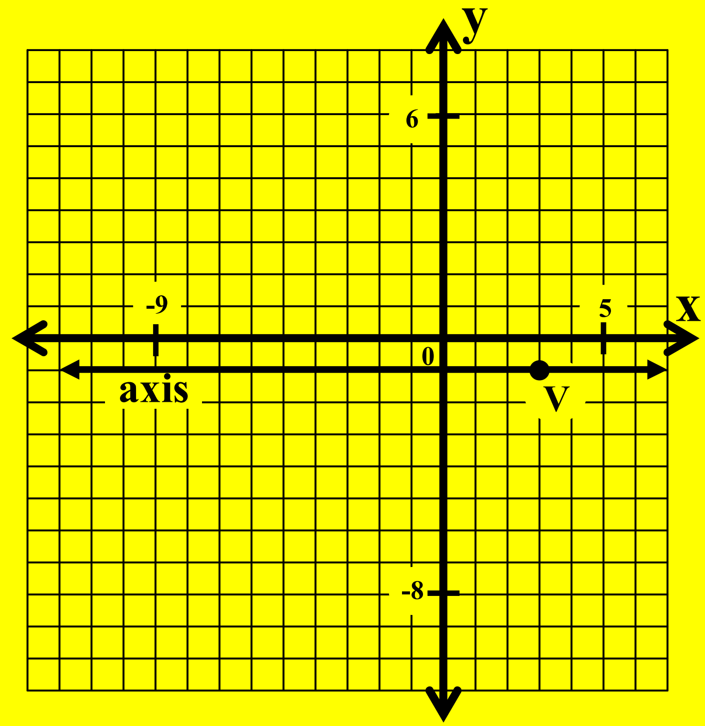

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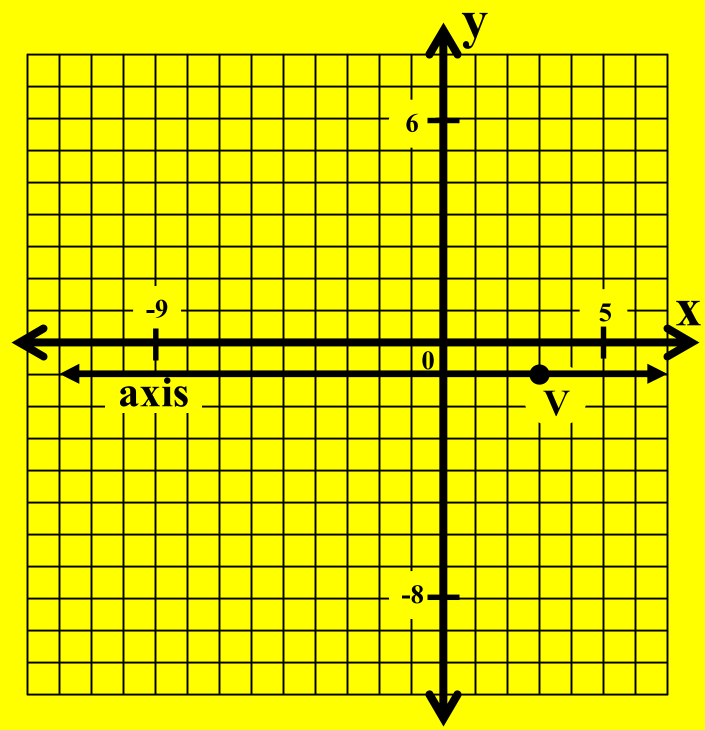

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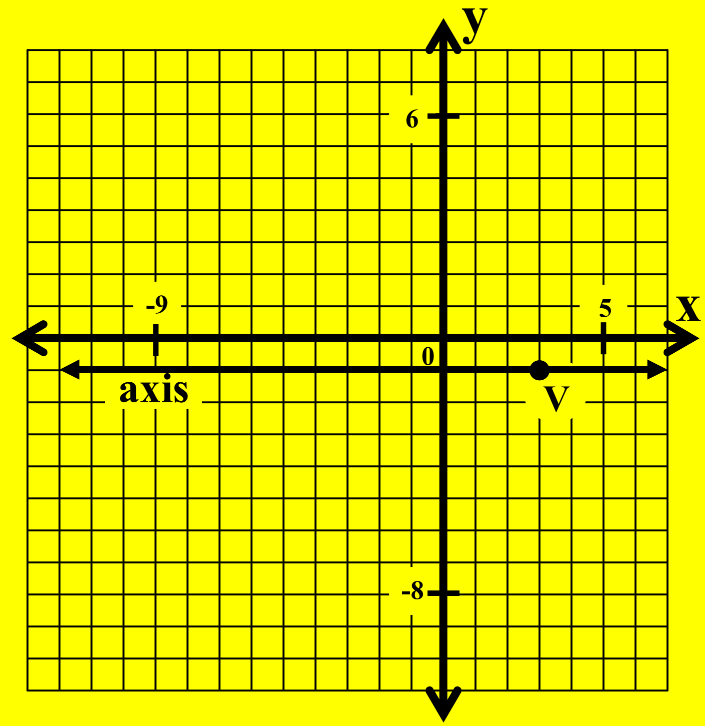

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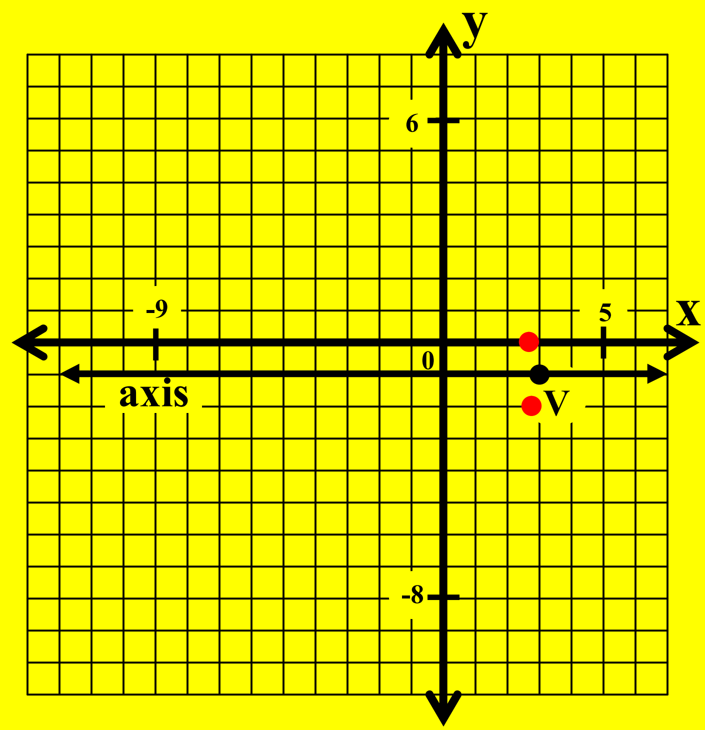

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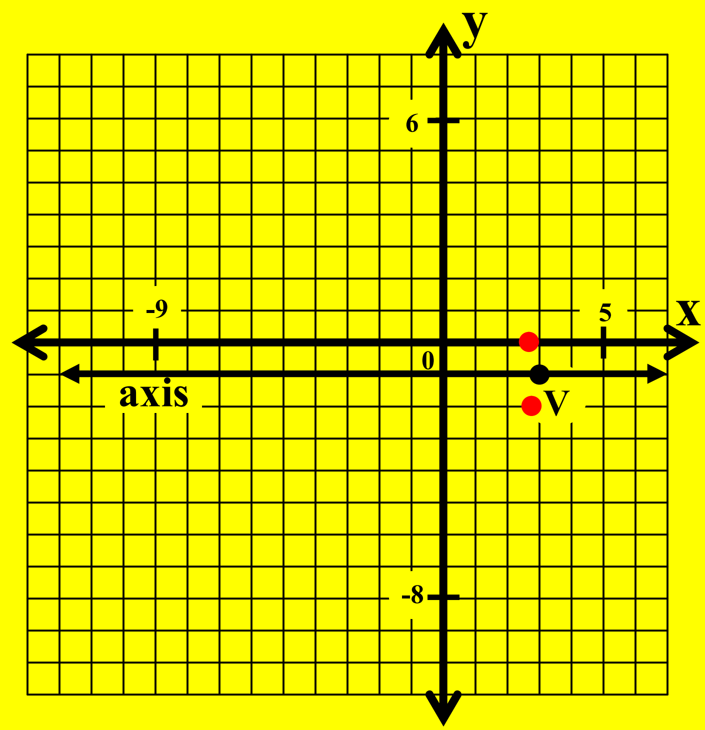

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Standard Form Equation

$h = 3 \quad k = -1$

V(3, -1)

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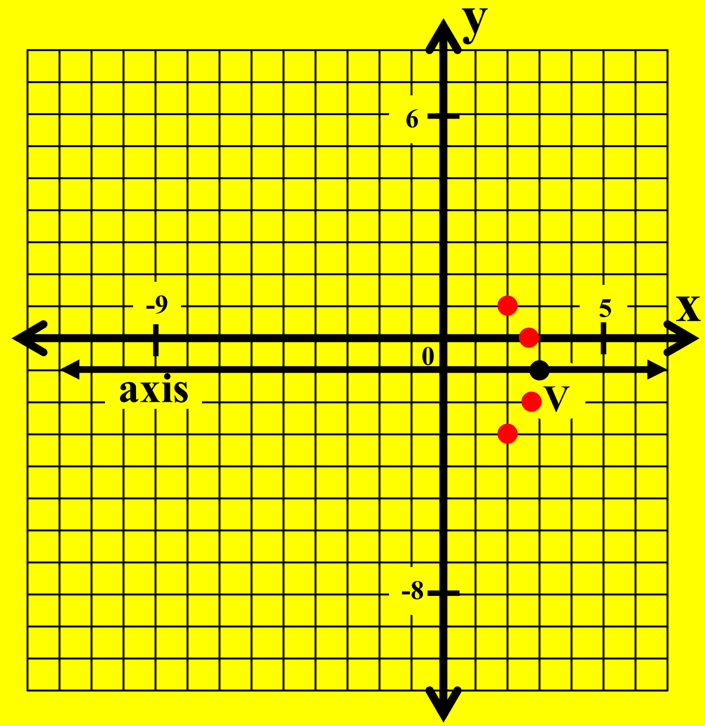

Type 2 Parabola

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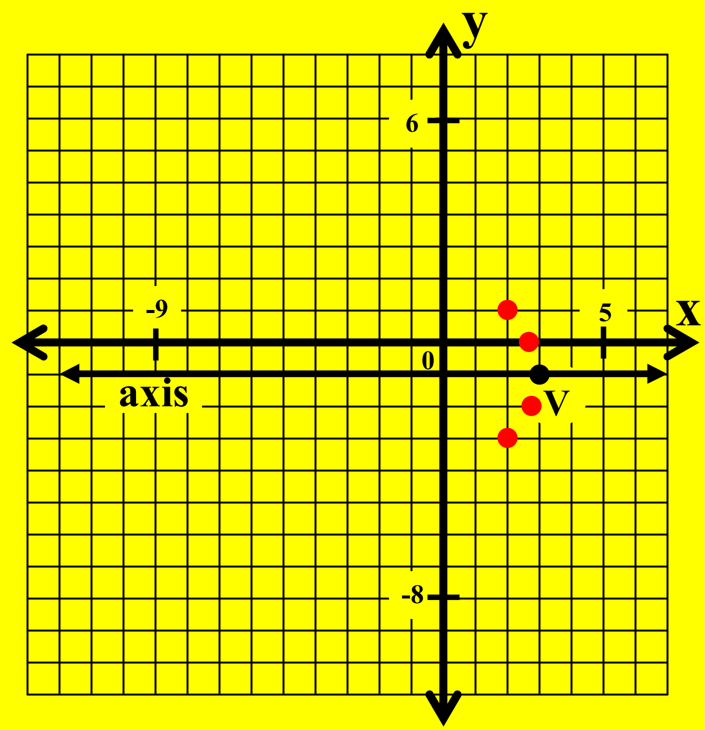

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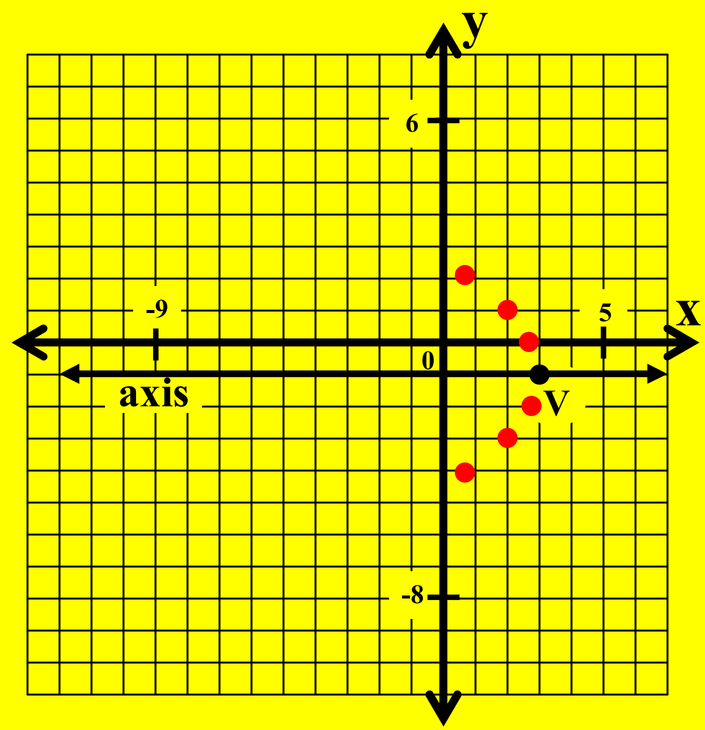

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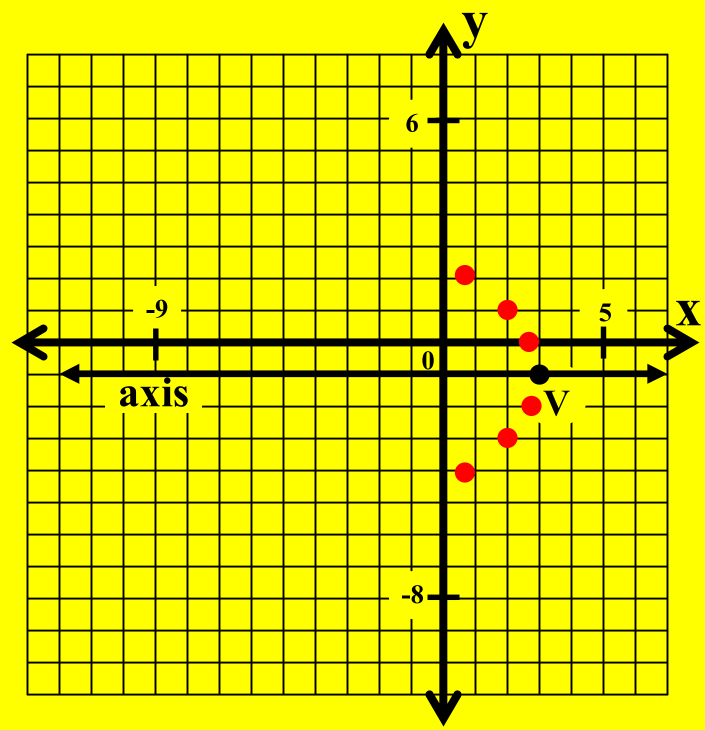

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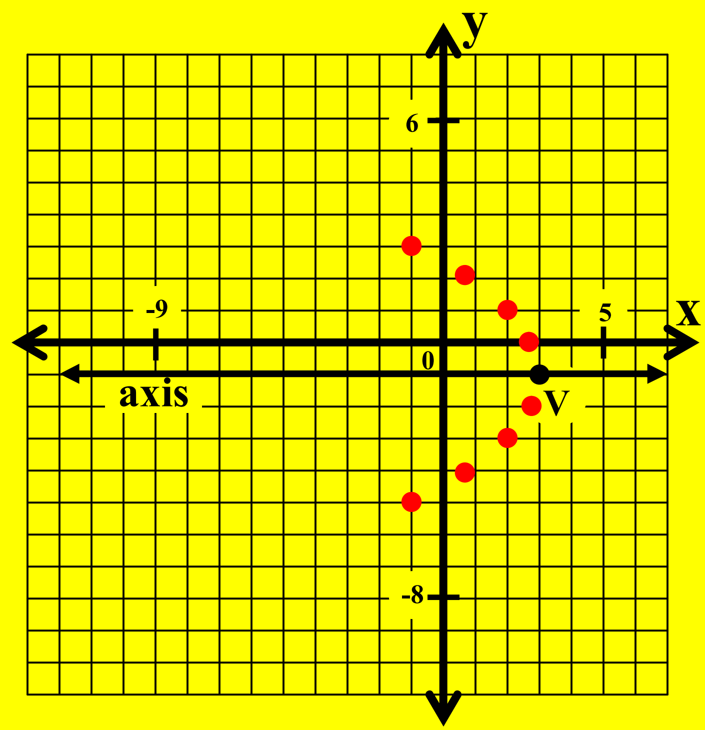

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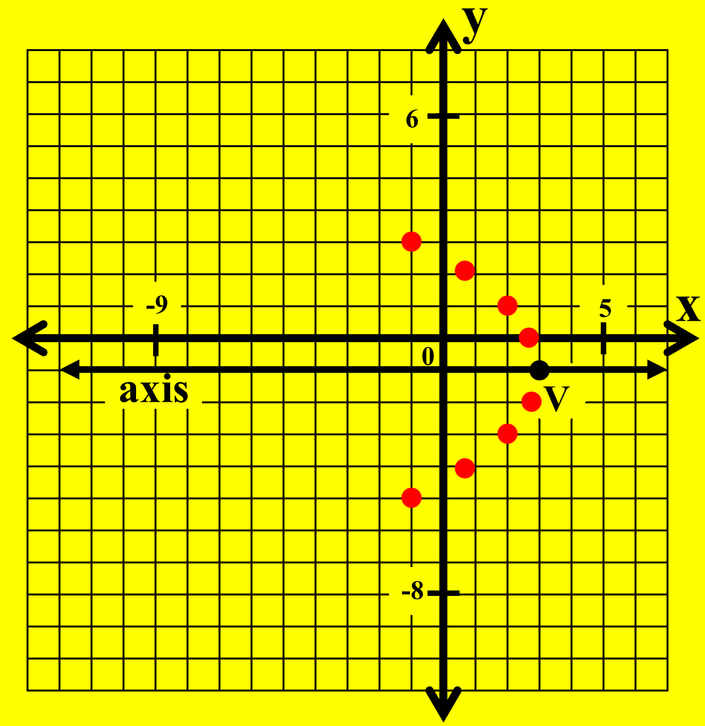

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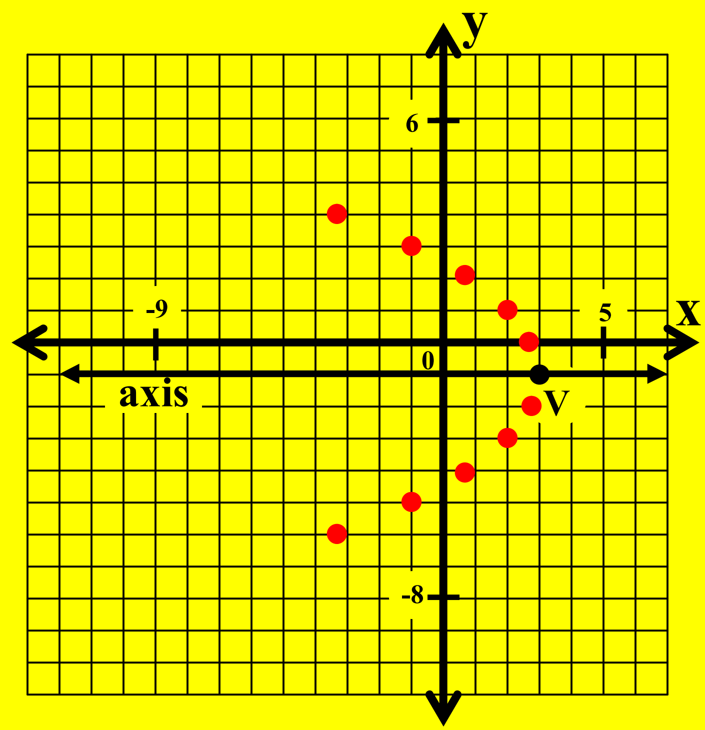

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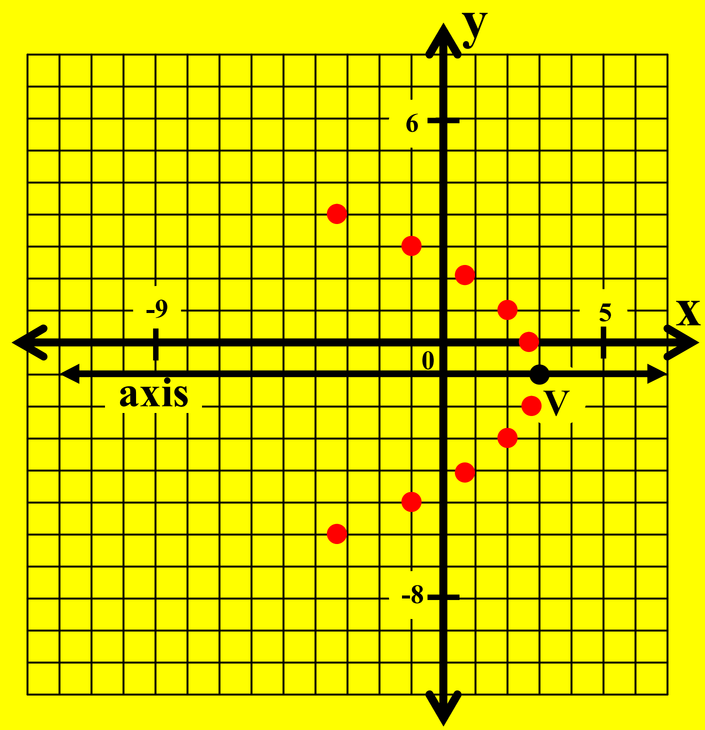

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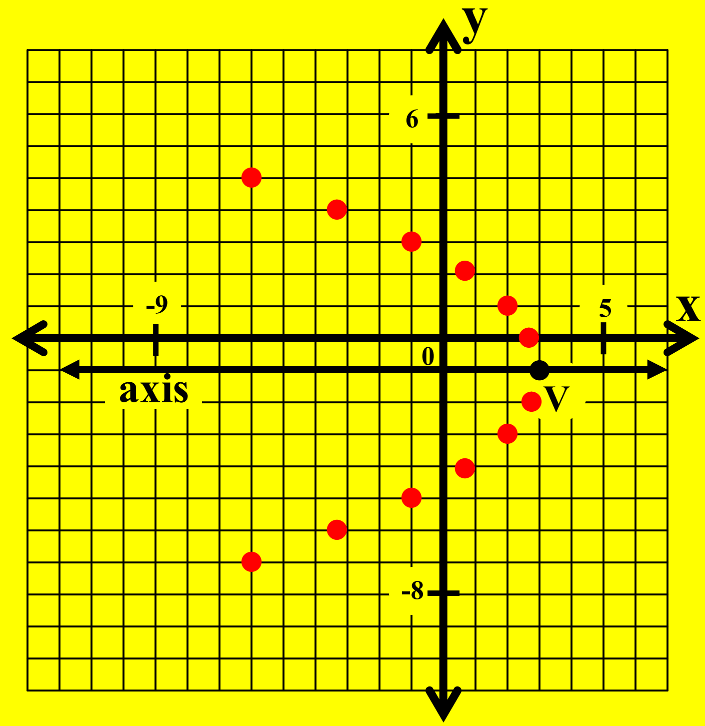

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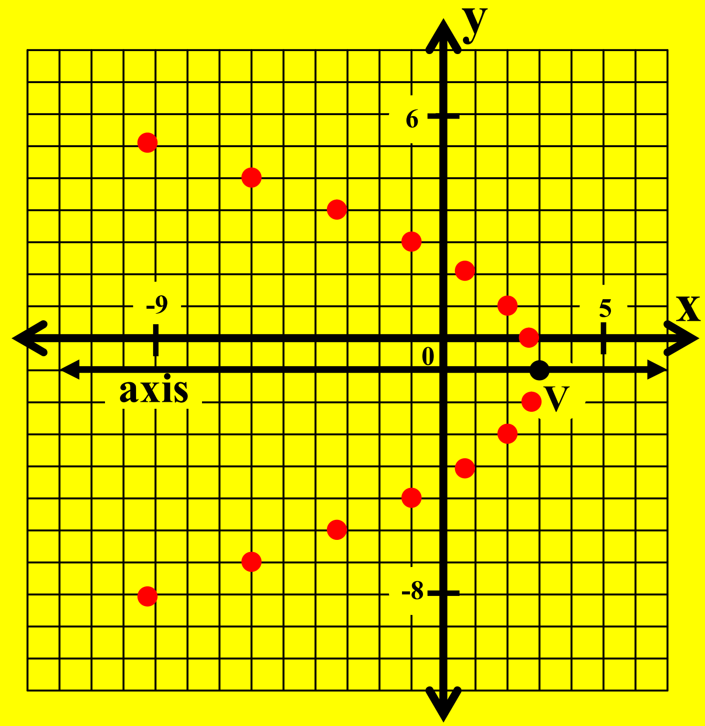

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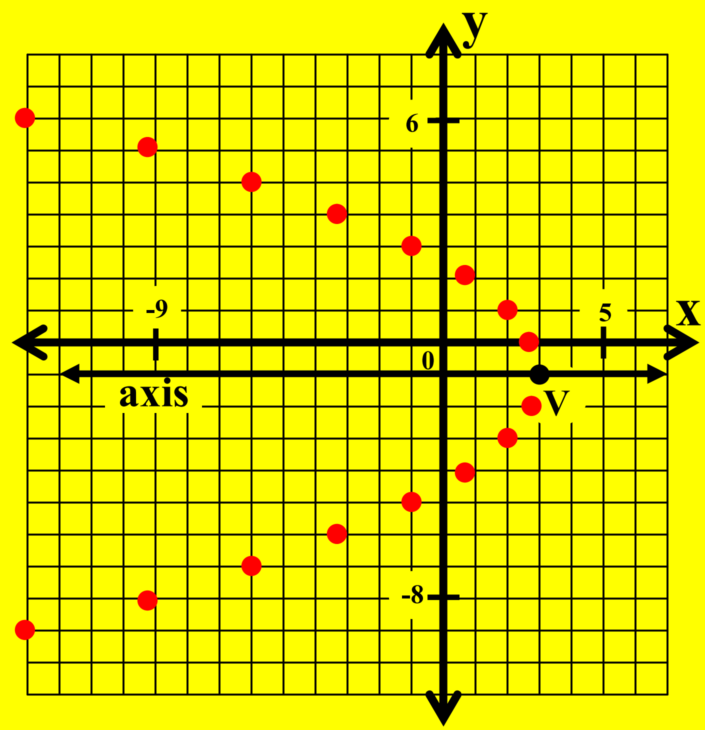

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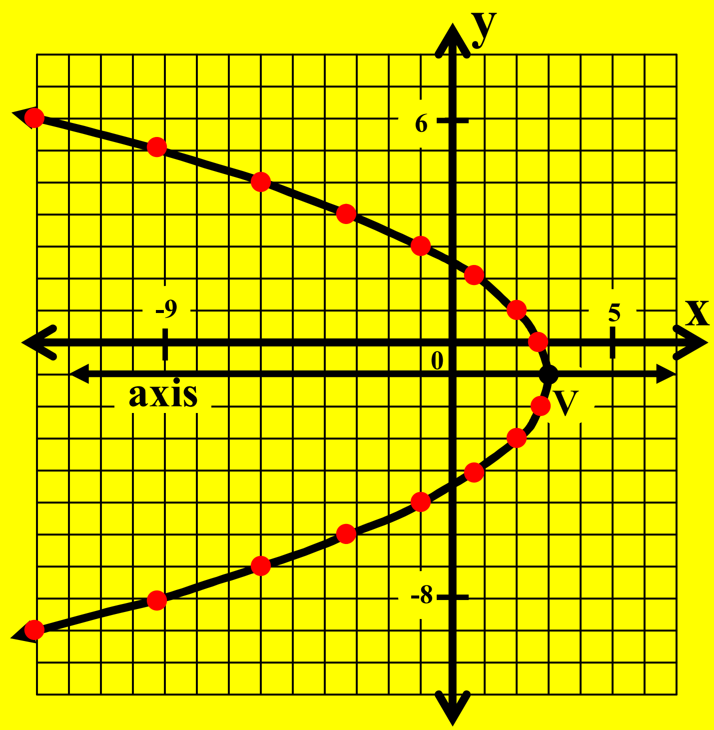

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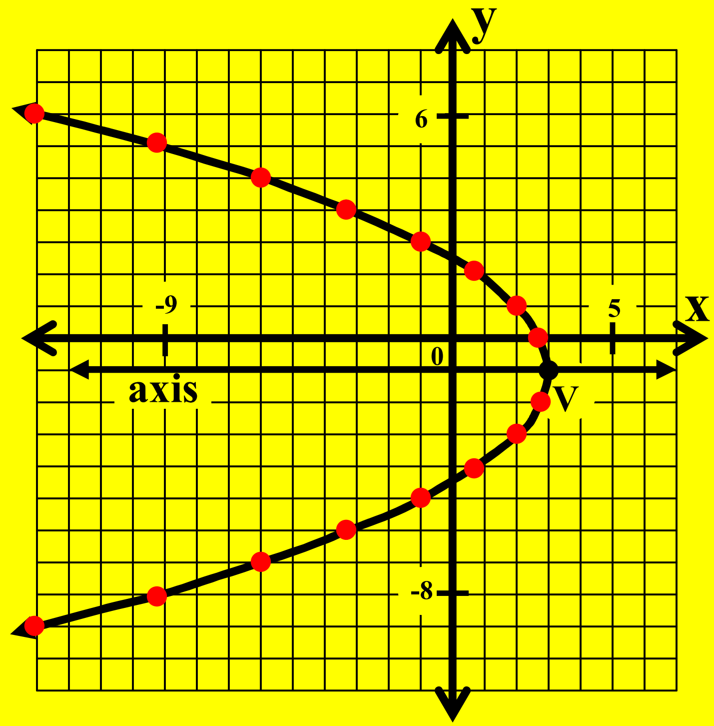

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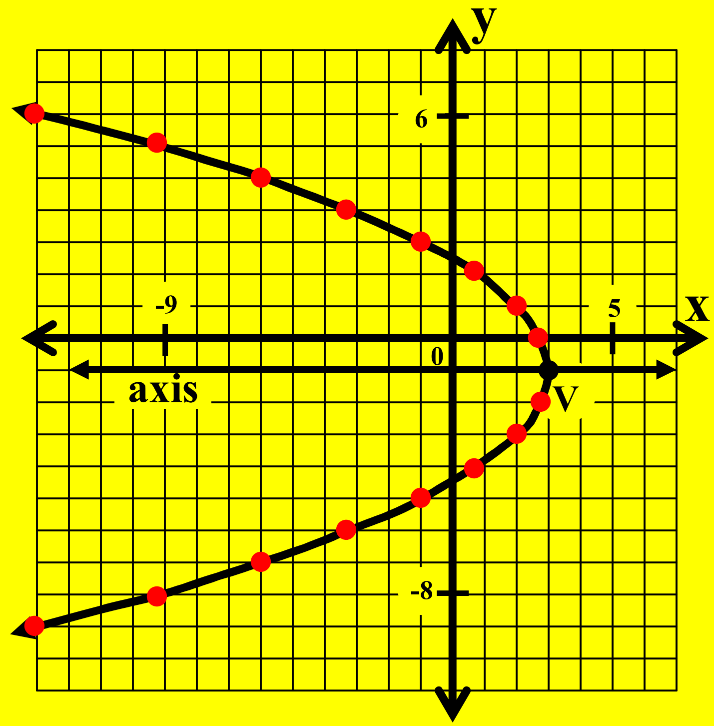

Type 2 Parabola

Standard Form Equation

$$x - h = a(y - k)^2$$

$$V(h,k) \quad a = \frac{1}{4p}$$

The directed distance from the vertex to the focus is p, where $a = \frac{1}{4p}$.

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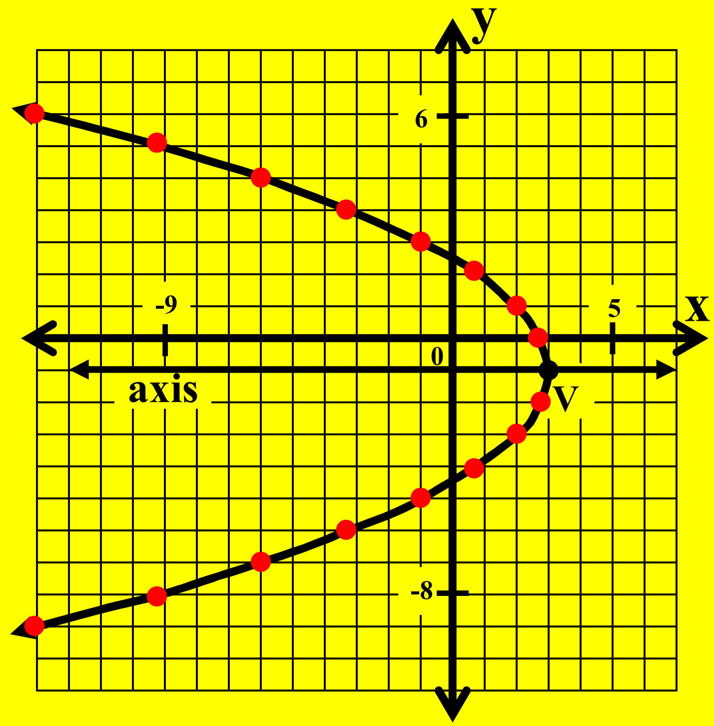

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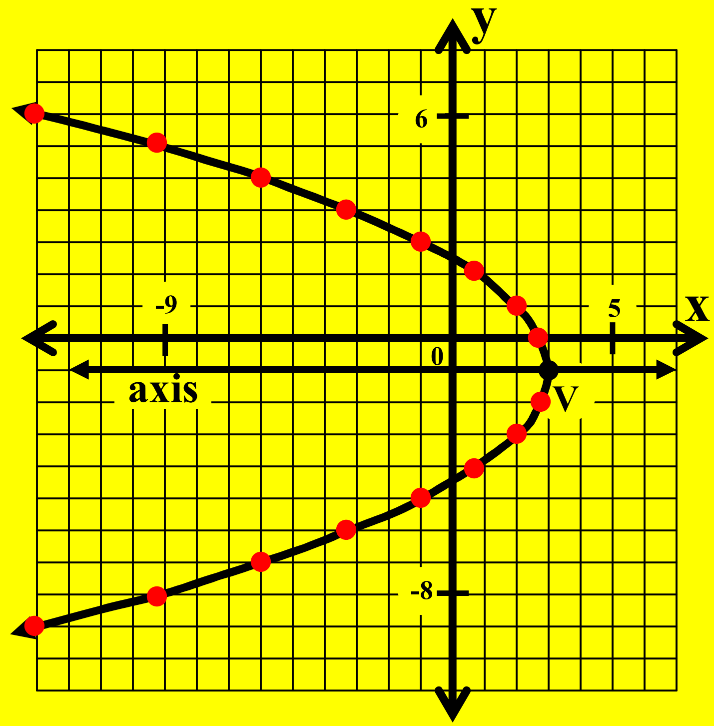

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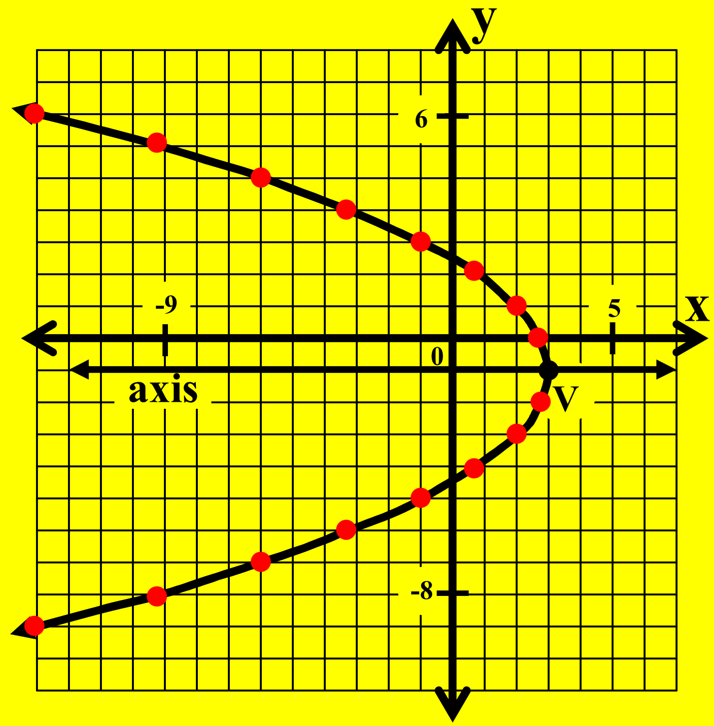

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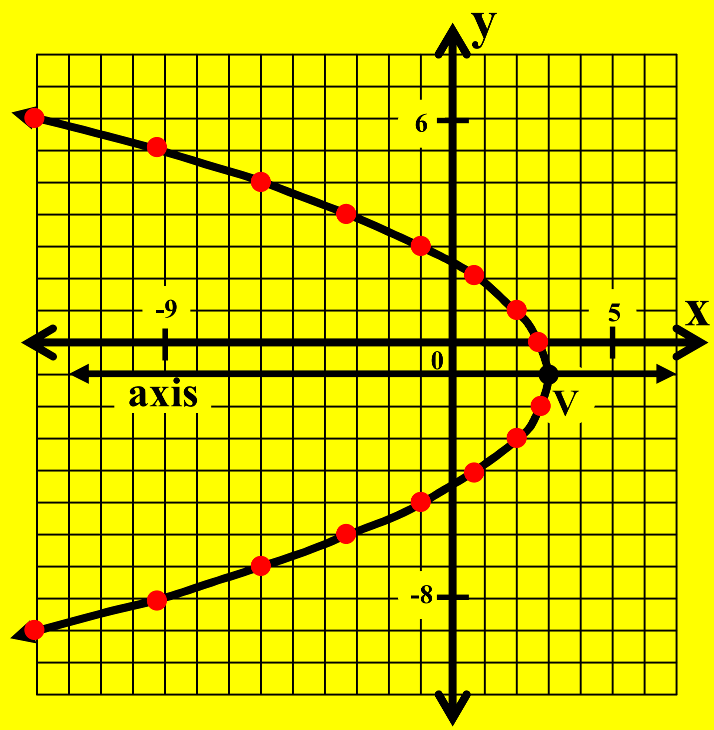

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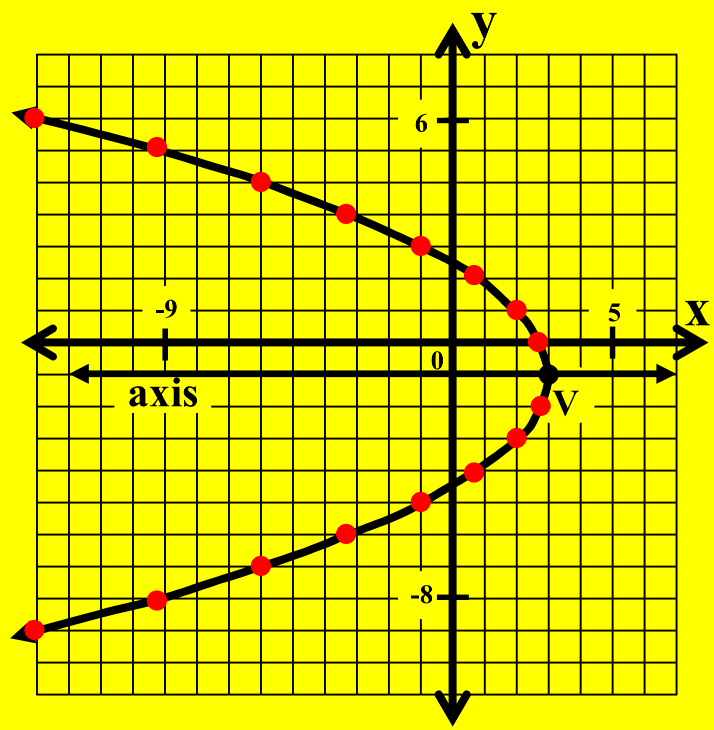

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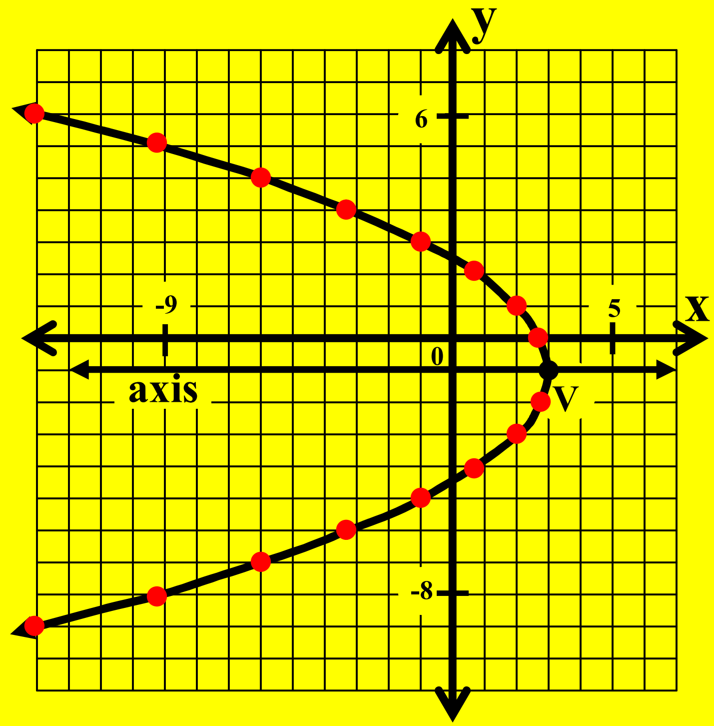

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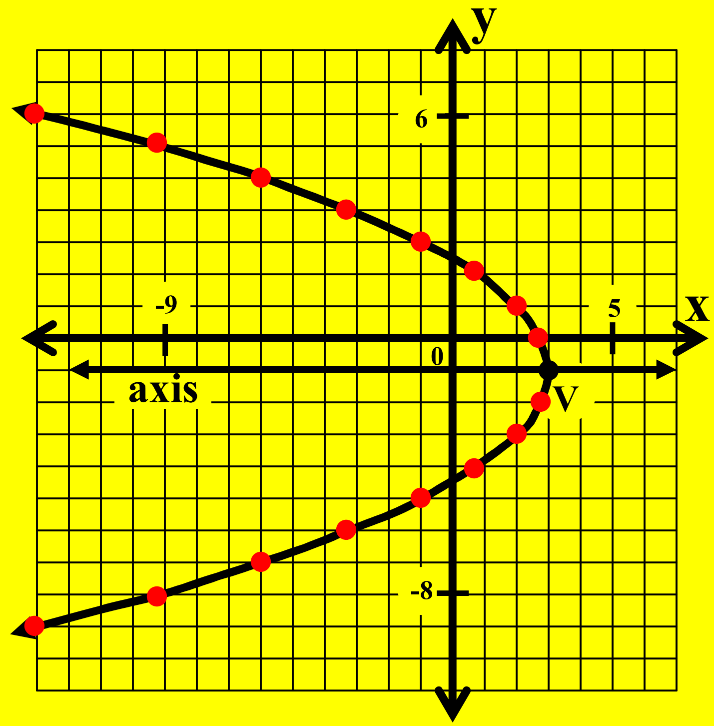

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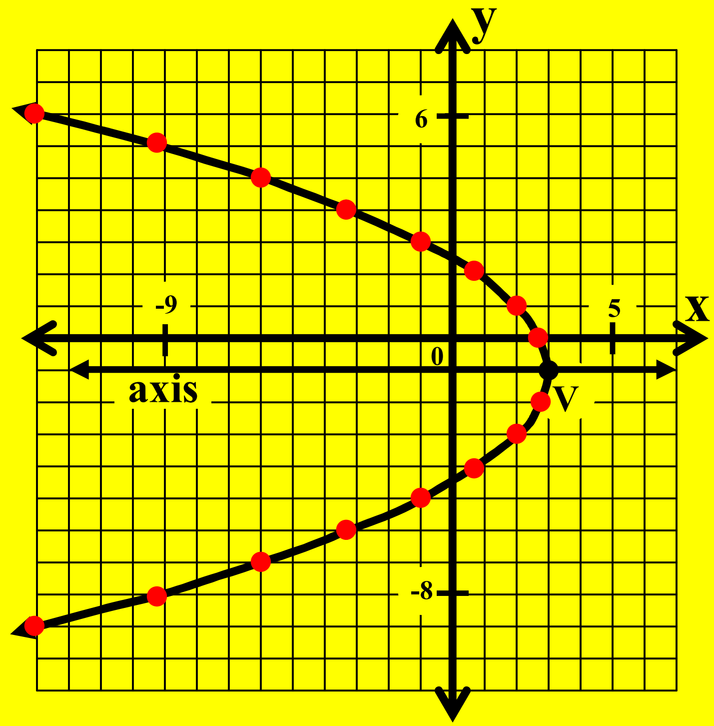

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Standard Form Equation

$$\frac{-1}{4} = \frac{1}{4p}$$

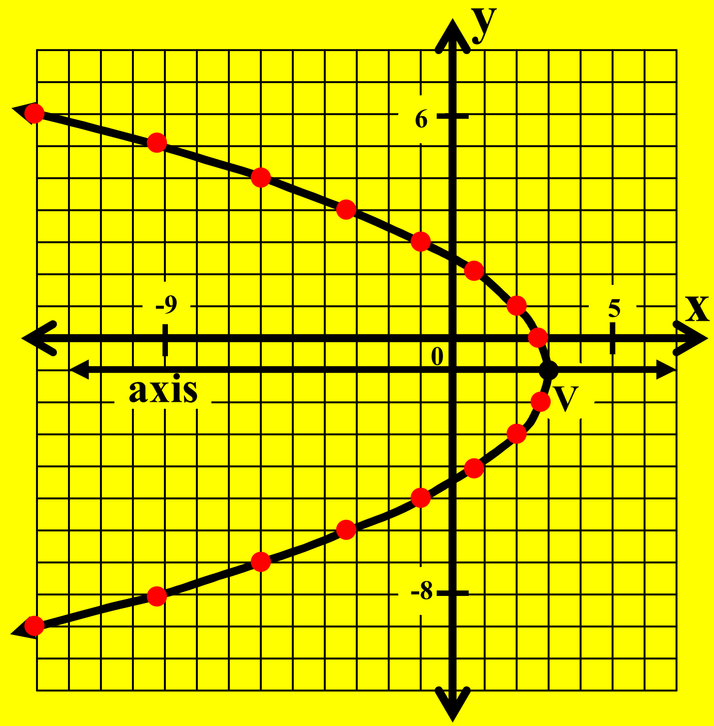
$p = -1$

$h = 3 \quad k = -1$

V(3, -1)

F(2,

The focus is 1 unit left of the vertex.



Type 2 Parabola

Standard Form Equation

$$x - h = a(y - k)^2$$

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Class Worksheet #3

Express each equation using 'standard form' and sketch a graph.

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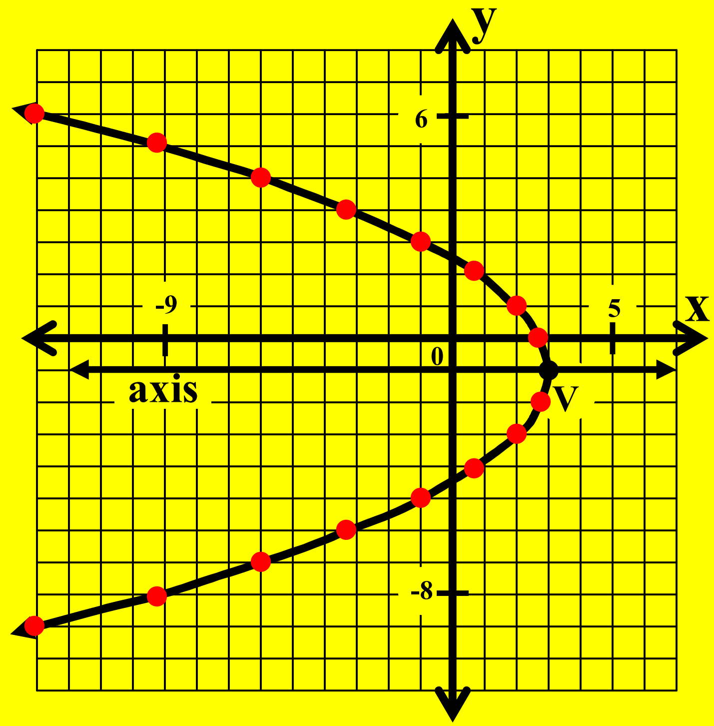

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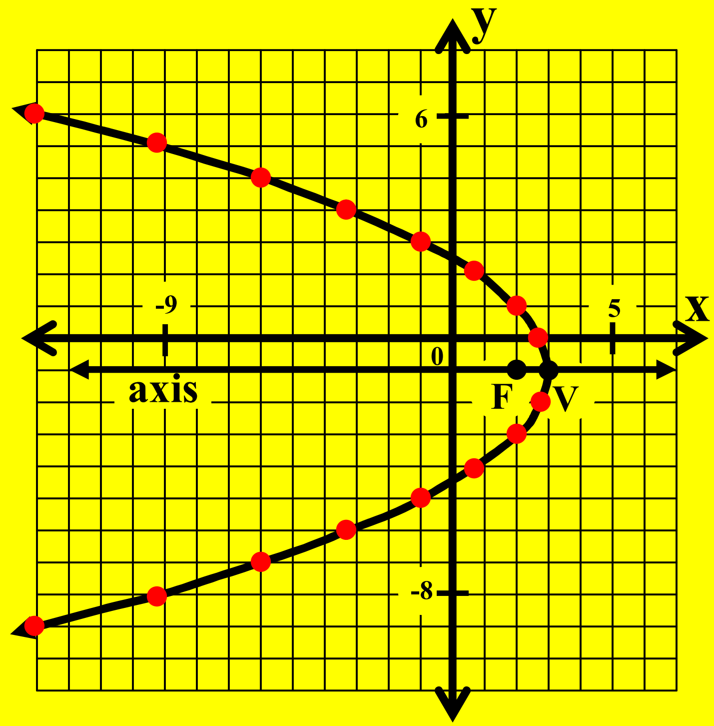

Type 2 Parabola

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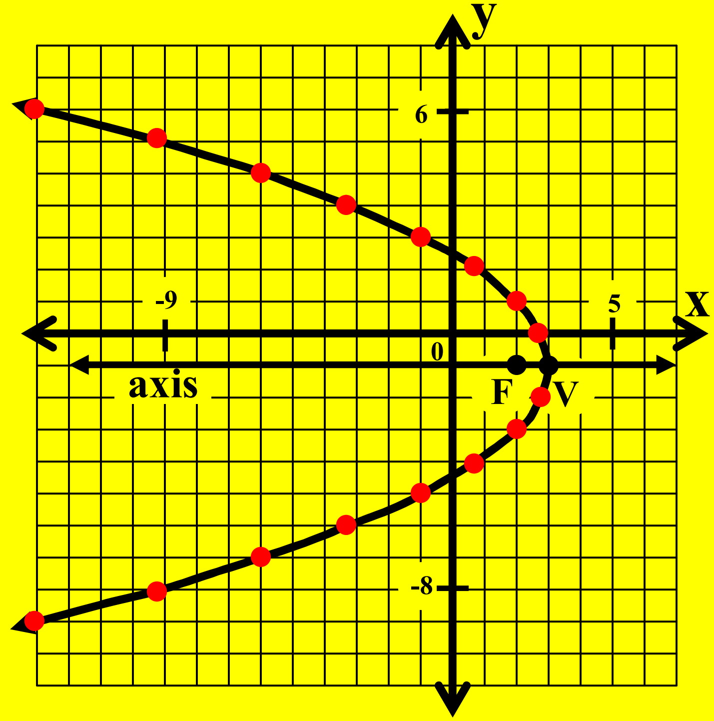

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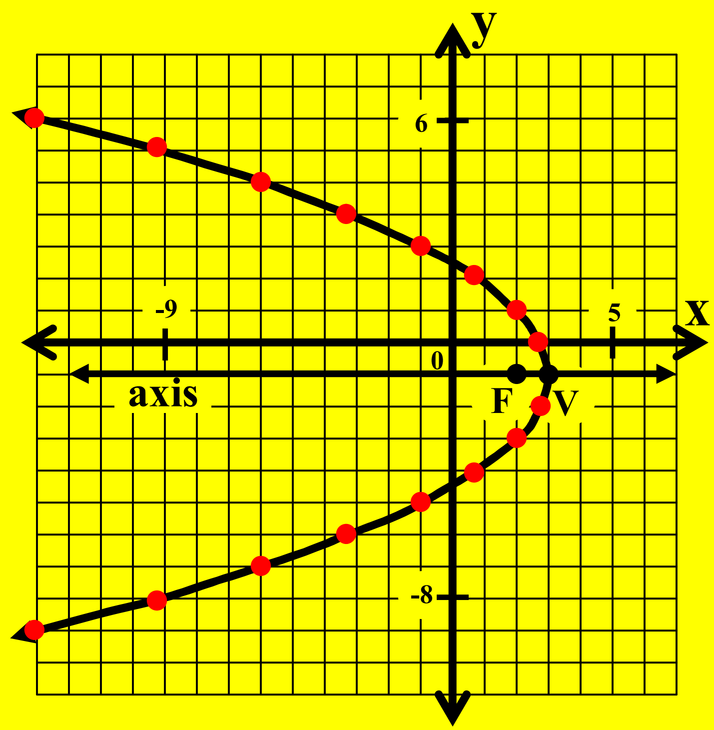

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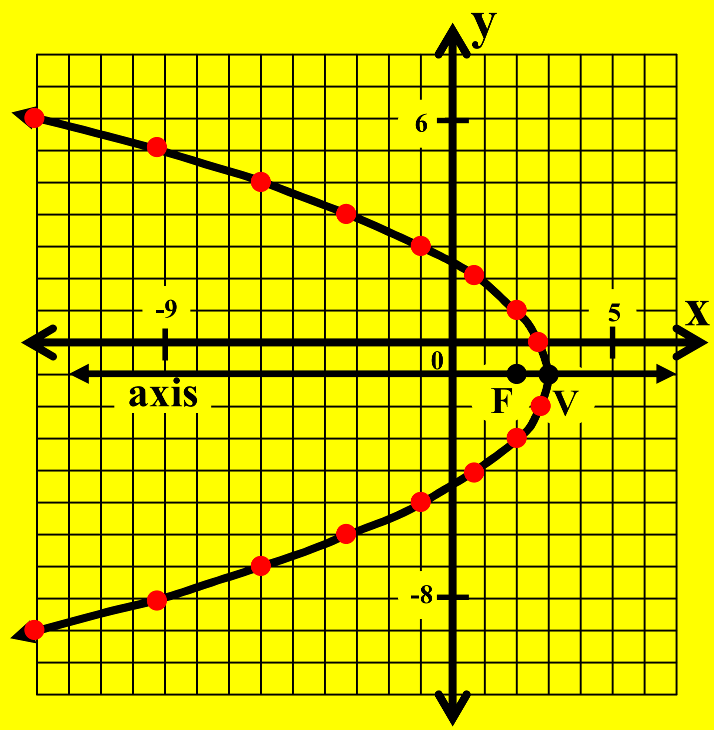

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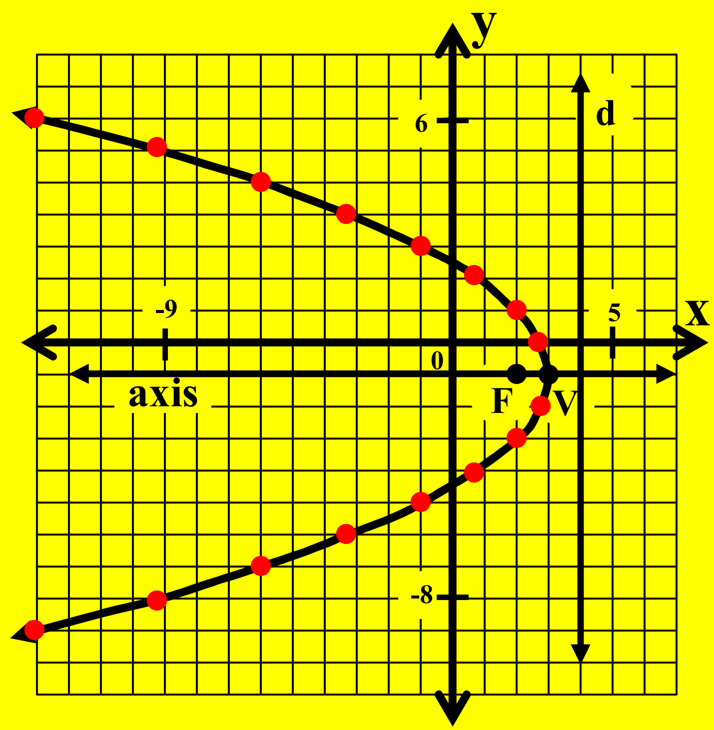

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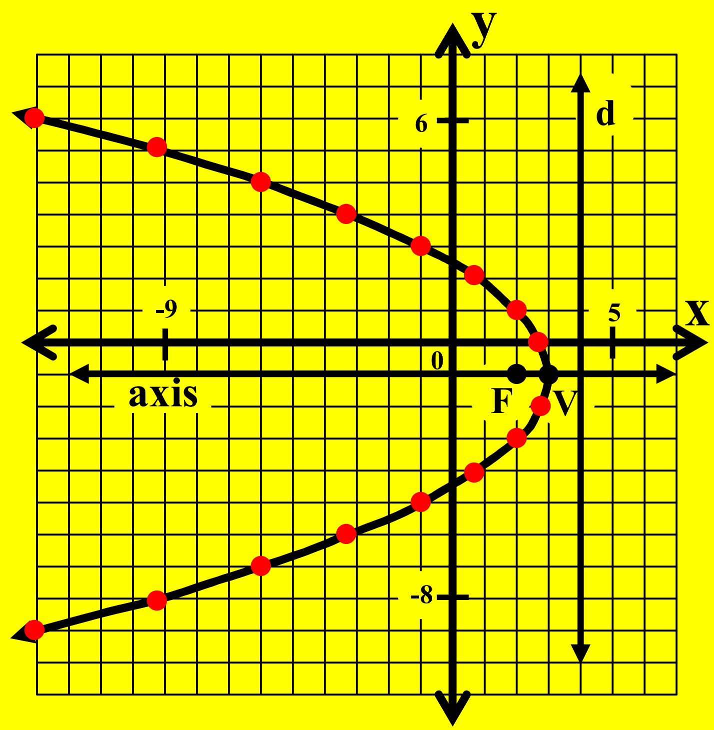

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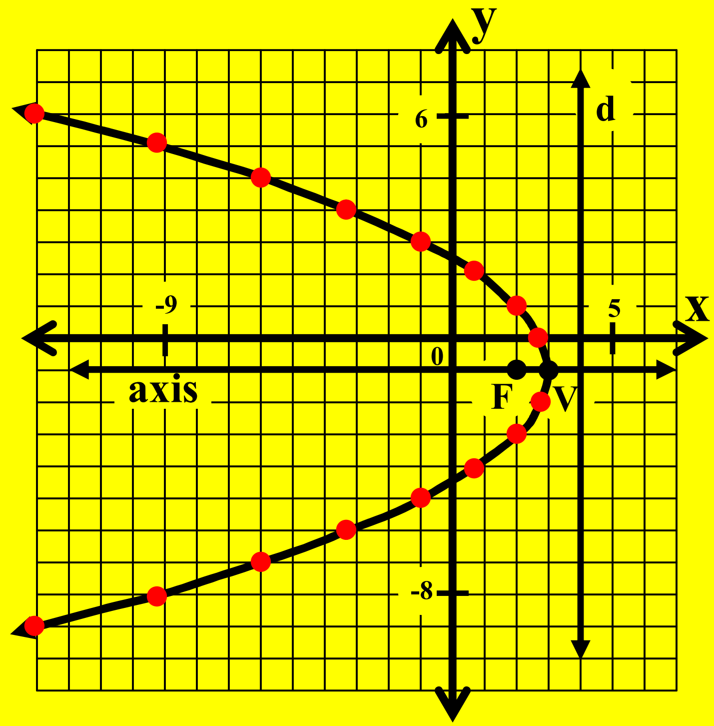

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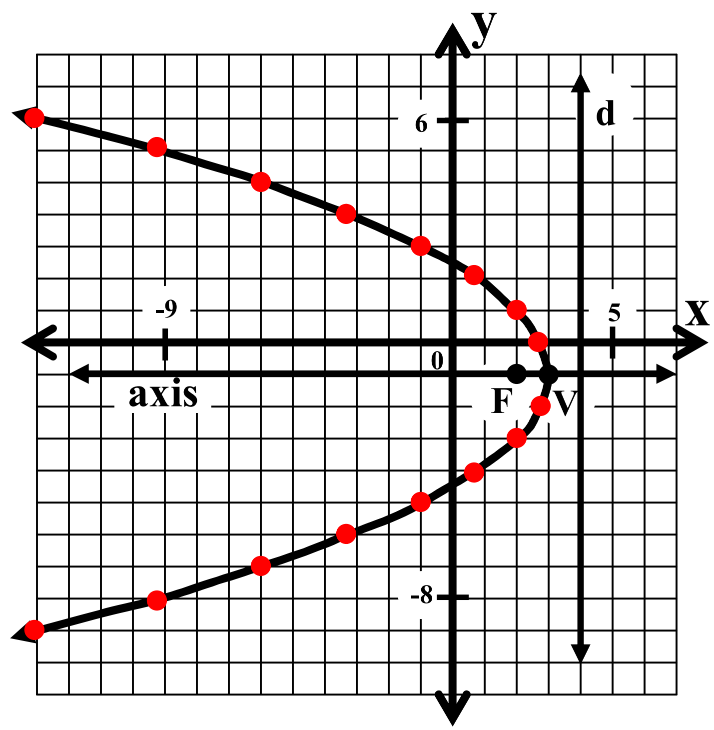

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