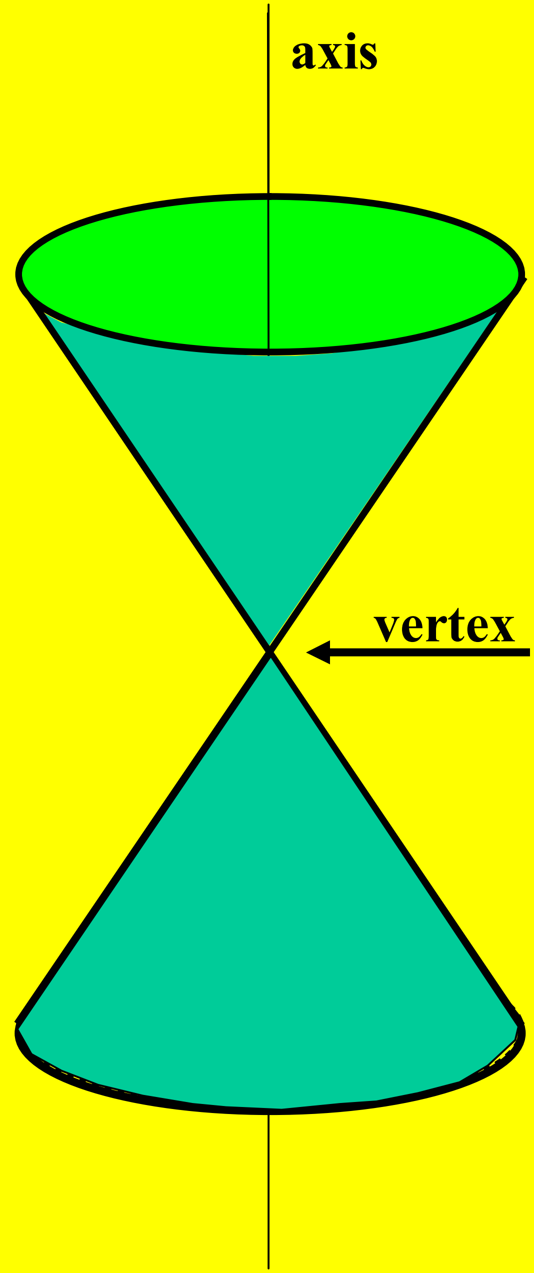
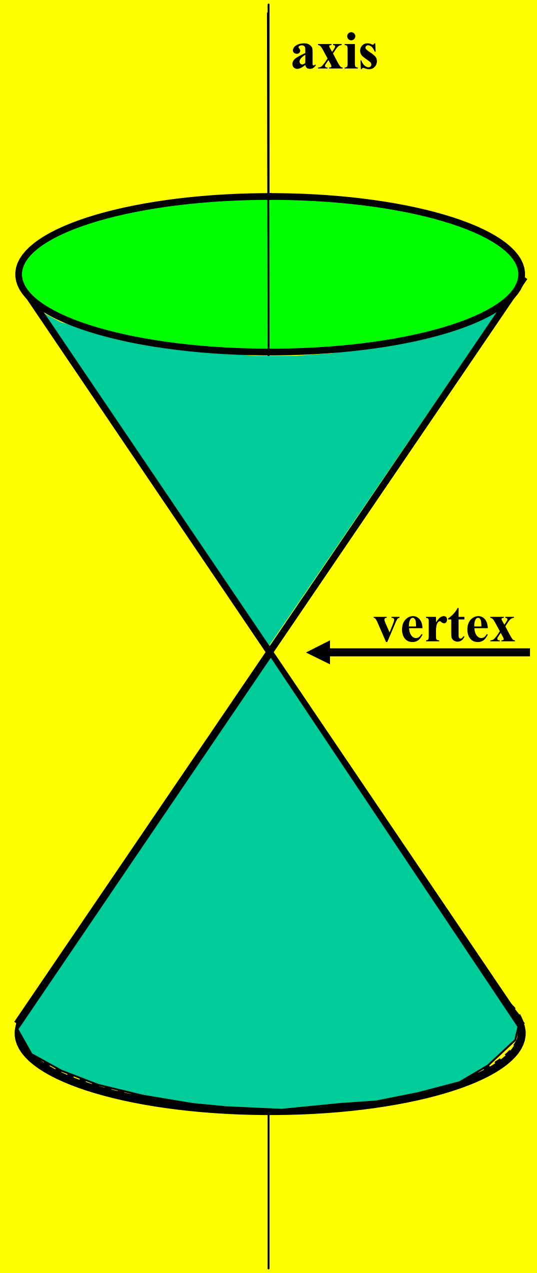
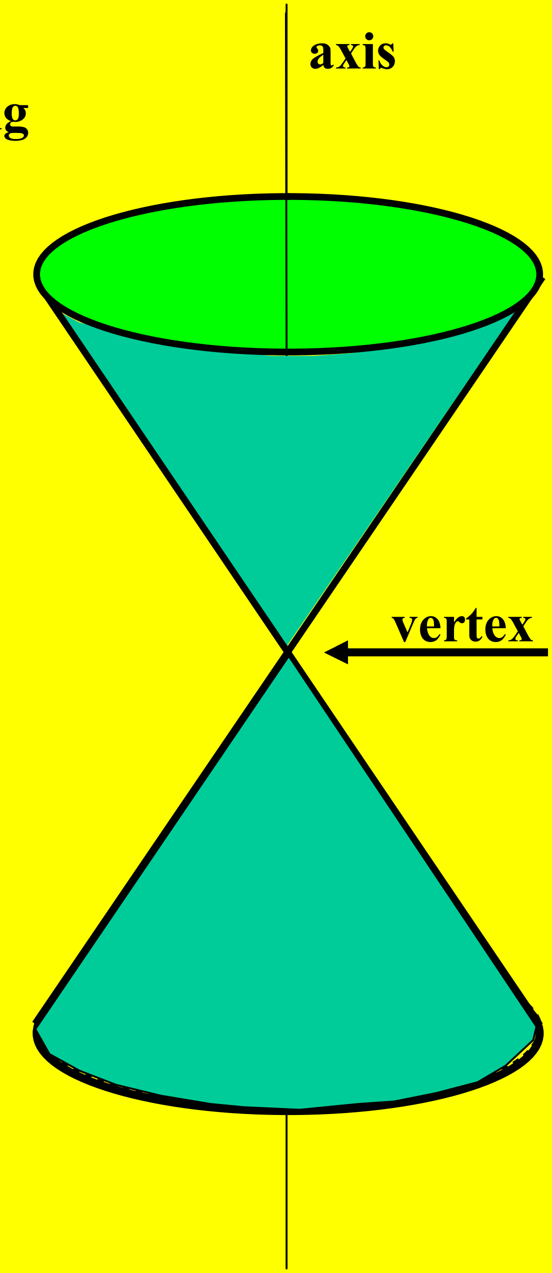
Algebra II
Lesson #5 Unit 7
Class Worksheet #5
For Worksheet #6


axis
vertex

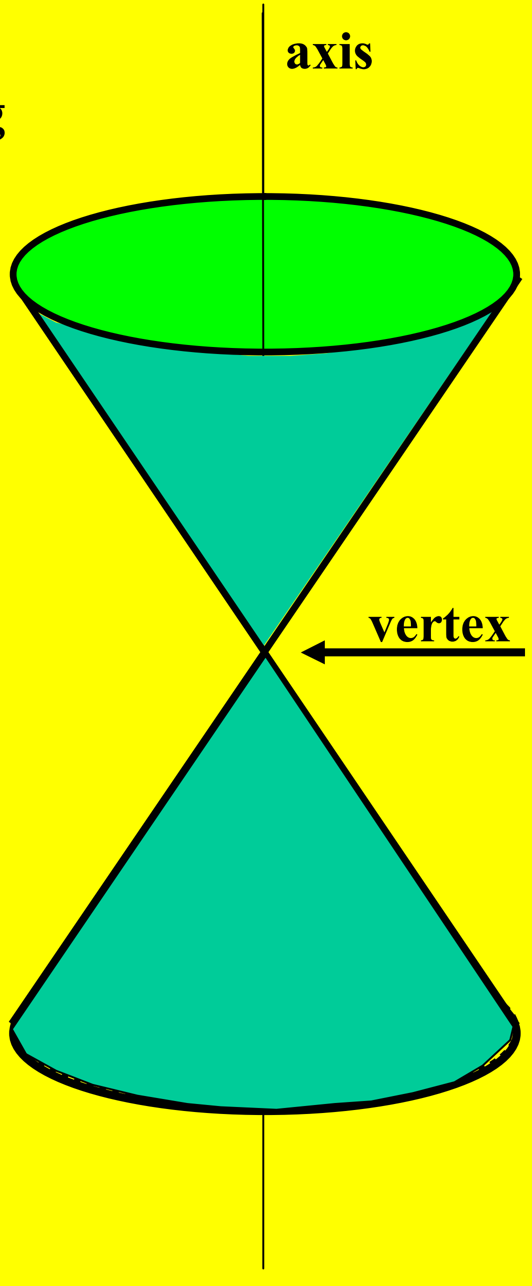
Circles, ellipses, hyperbolas and parabolas are called 'conic sections'.



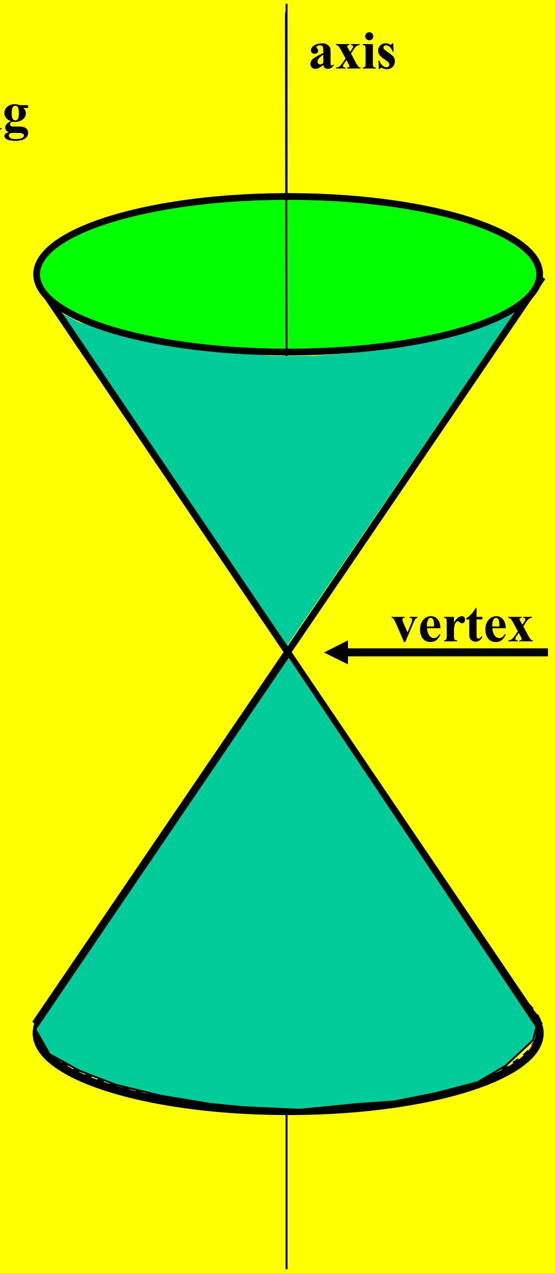
Circles, ellipses, hyperbolas and parabolas are called ‘conic sections’. What you are looking at here is a ‘double-napped cone’.



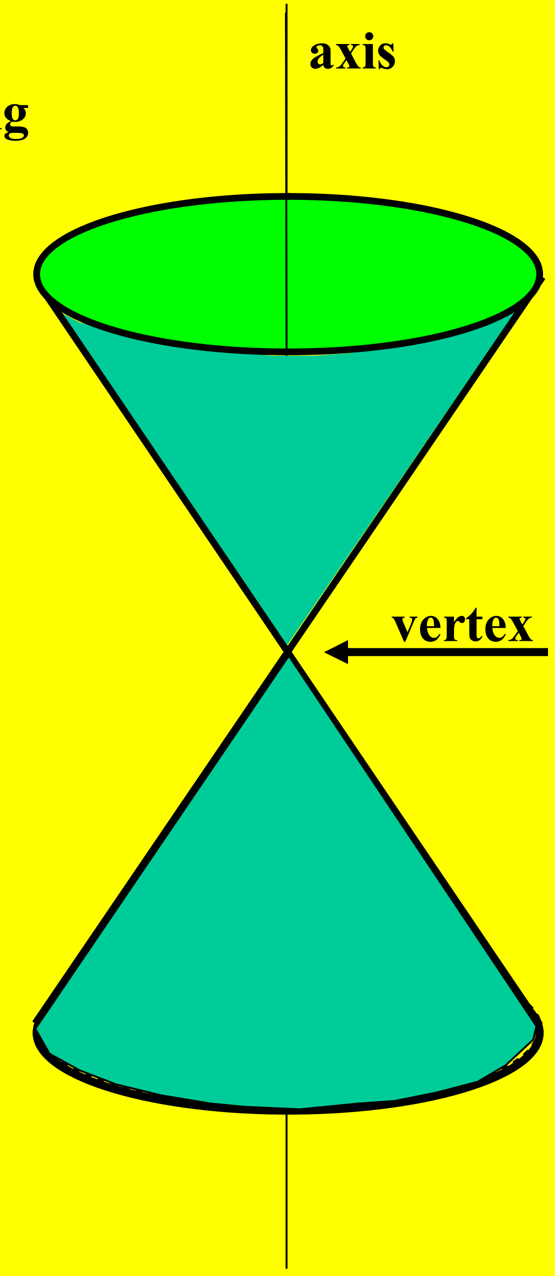
Circles, ellipses, hyperbolas and parabolas are called 'conic sections'. What you are looking at here is a 'double-napped cone'. The vertical line up through the center is the axis.



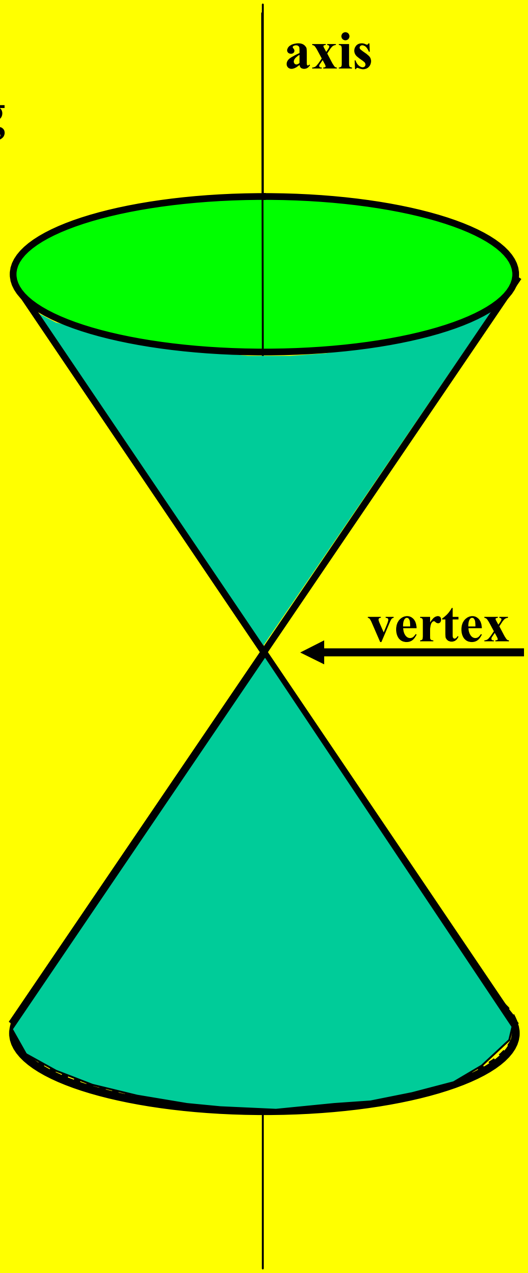
Circles, ellipses, hyperbolas and parabolas are called ‘conic sections’. What you are looking at here is a ‘double-napped cone’. The vertical line up through the center is the axis. The point where the two nappes meet is the vertex.



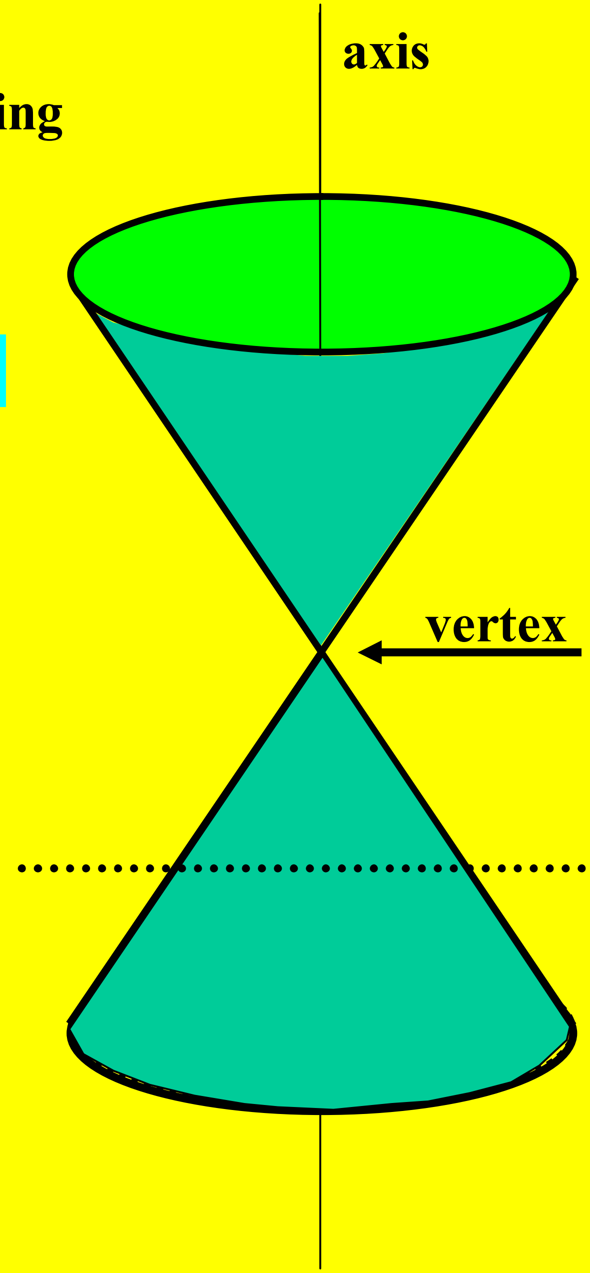
Circles, ellipses, hyperbolas and parabolas are called ‘conic sections’. What you are looking at here is a ‘double-napped cone’. The vertical line up through the center is the axis. The point where the two nappes meet is the vertex. If a plane intersects the cone, without passing through the vertex, then the intersection is a circle, an ellipse, a parabola, or a hyperbola.



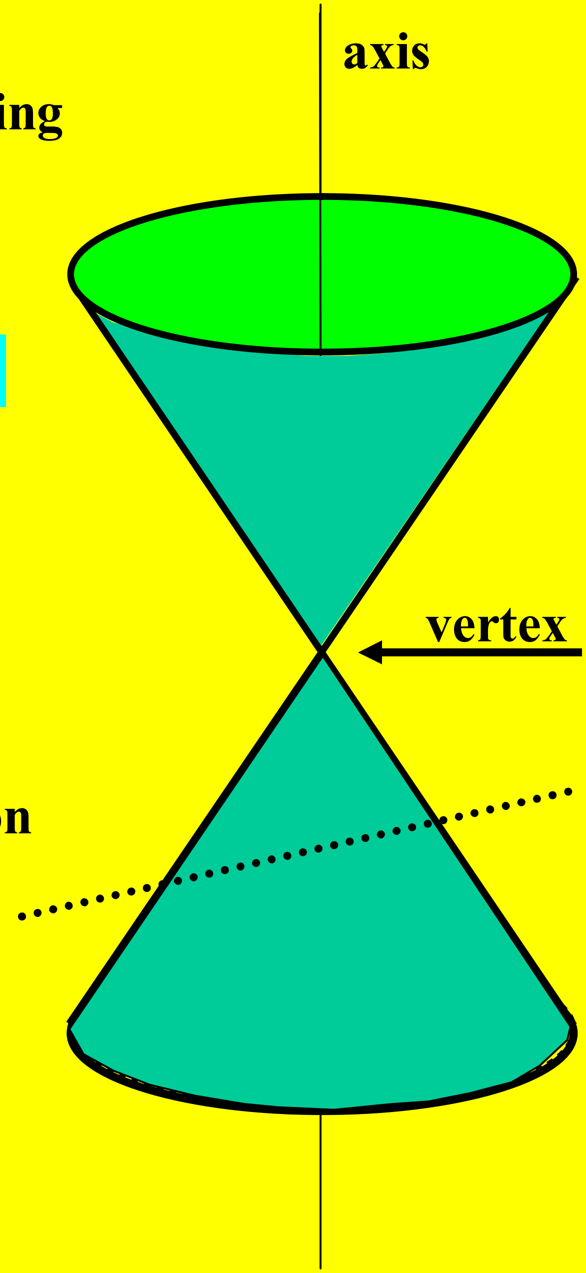
Circles, ellipses, hyperbolas and parabolas are called ‘conic sections’. What you are looking at here is a ‘double-napped cone’. The vertical line up through the center is the axis. The point where the two nappes meet is the vertex. If a plane intersects the cone, without passing through the vertex, then the intersection is a circle, an ellipse, a parabola, or a hyperbola. That is why these shapes are referred to as conic sections.



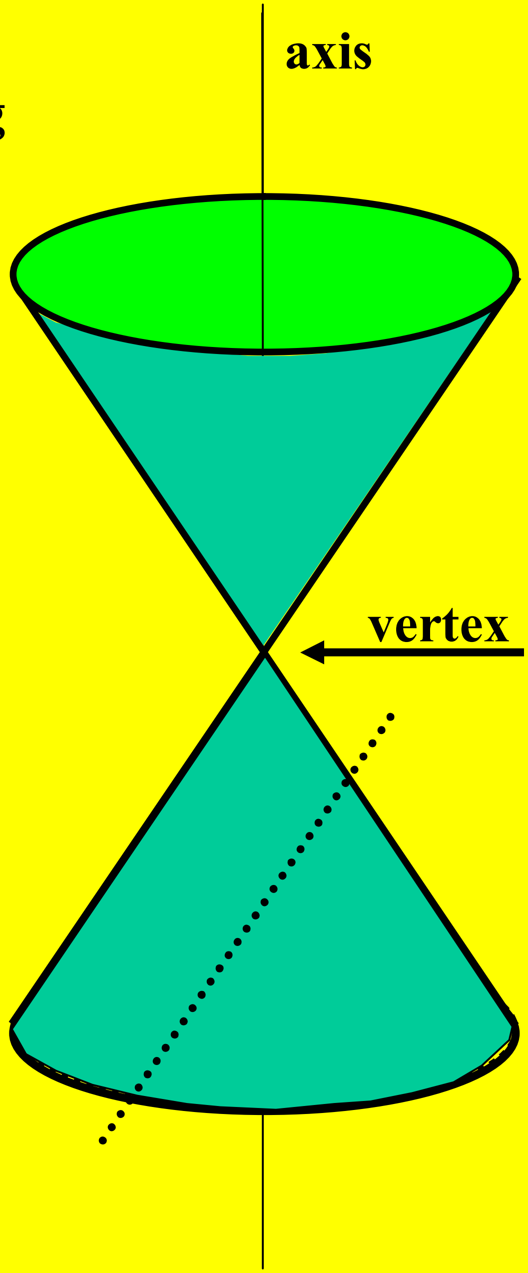
Circles, ellipses, hyperbolas and parabolas are called 'conic sections'. What you are looking at here is a 'double-napped cone'. The vertical line up through the center is the axis. The point where the two nappes meet is the vertex. If a plane intersects the cone, without passing through the vertex, then the intersection is a circle, an ellipse, a parabola, or a hyperbola. That is why these shapes are referred to as <u>conic sections</u>. If the plane is horizontal, then the intersection is a circle.



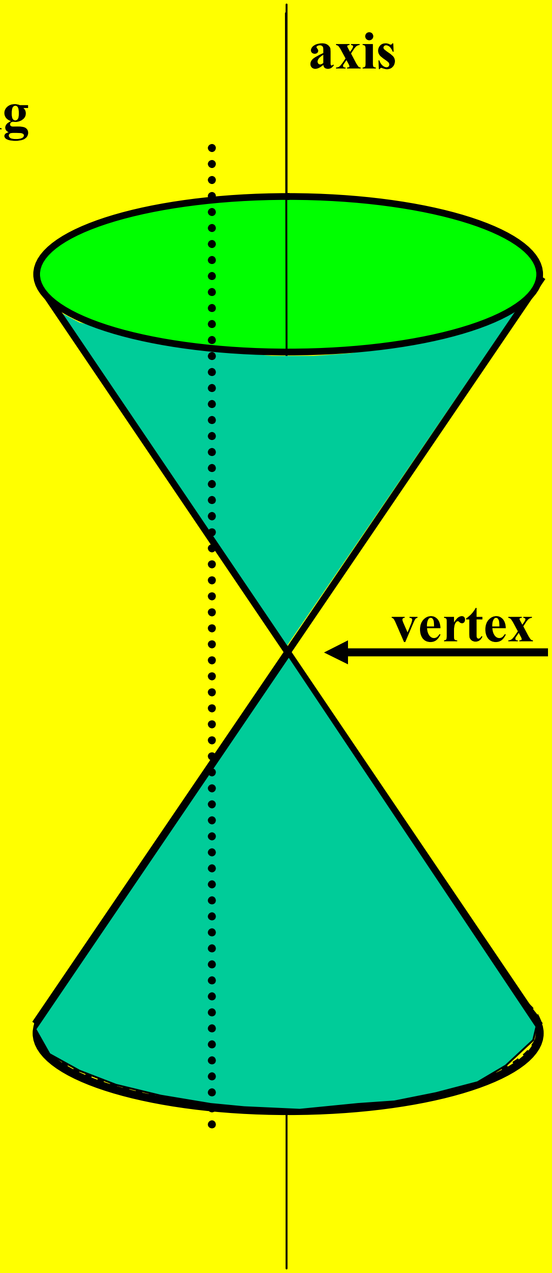
Circles, ellipses, hyperbolas and parabolas are called 'conic sections'. What you are looking at here is a 'double-napped cone'. The vertical line up through the center is the axis. The point where the two nappes meet is the vertex. If a plane intersects the cone, without passing through the vertex, then the intersection is a circle, an ellipse, a parabola, or a hyperbola. That is why these shapes are referred to as <u>conic sections</u>. If the plane is horizontal, then the intersection is a circle. If the plane is 'tilted upward' (less than the upward angle of the cone), then the intersection is an ellipse.



Circles, ellipses, hyperbolas and parabolas are called ‘conic sections’. What you are looking at here is a ‘double-napped cone’. The vertical line up through the center is the axis. The point where the two nappes meet is the vertex. If a plane intersects the cone, without passing through the vertex, then the intersection is a circle, an ellipse, a parabola, or a hyperbola. That is why these shapes are referred to as <u>conic sections</u>. If the plane is horizontal, then the intersection is a circle. If the plane is ‘tilted upward’ (less than the upward angle of the cone), then the intersection is an ellipse. If the ‘angle of tilt’ matches that of the cone, then the intersection is a parabola.



Circles, ellipses, hyperbolas and parabolas are called ‘conic sections’. What you are looking at here is a ‘double-napped cone’. The vertical line up through the center is the axis. The point where the two nappes meet is the vertex. If a plane intersects the cone, without passing through the vertex, then the intersection is a circle, an ellipse, a parabola, or a hyperbola. That is why these shapes are referred to as <u>conic sections</u>. If the plane is horizontal, then the intersection is a circle. If the plane is ‘tilted upward’ (less than the upward angle of the cone), then the intersection is an ellipse. If the ‘angle of tilt’ matches that of the cone, then the intersection is a parabola. Finally, if the angle of tilt is greater than that of the cone, all the way up to 90 degrees, then the intersection is a hyperbola.



Algebra 2 Class Worksheet #5 Unit 7

Identify each equation as that of a circle, ellipse, hyperbola, or parabola. Express the equation in standard form and sketch its graph.

1. $x^2 + y^2 - 6x + 2y - 15 = 0$

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This is the general form equation of a <u>circle</u>.

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This is the general form equation of a circle.

Rearrange the terms.

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x^2

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$x^2 - 6x + y^2$

Rearrange the terms.

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$x^2 - 6x + y^2 + 2y$

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$x^2 - 6x + y^2 + 2y$

Rearrange the terms. Add 15 to both sides.

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Complete the Square.

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1. $x^2 + y^2 - 6x + 2y - 15 = 0$

$x^2 - 6x + y^2 + 2y = 15$

$(x^2 - 6x \qquad) + (y^2 + 2y \qquad) = 15$

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$x^2 - 6x + y^2 + 2y = 15$

$(x^2 - 6x + 9) + (y^2 + 2y \quad) = 15$

Complete the Square.

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$(x$

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$(x - 3)$

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$(x - 3)^2$

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$(x - 3)^2 +$

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$(x^2 - 6x + 9) + (y^2 + 2y + 1) = 15 + 9 + 1$

$(x - 3)^2 + (y + 1)^2 = 25$

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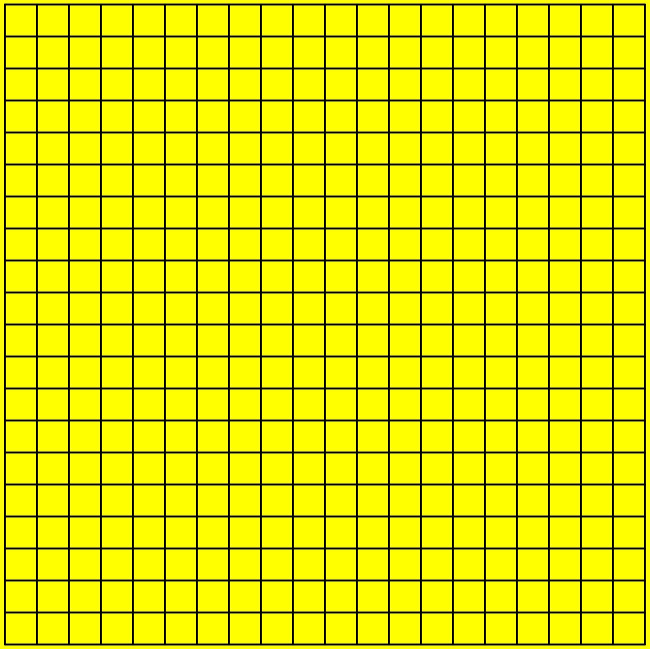

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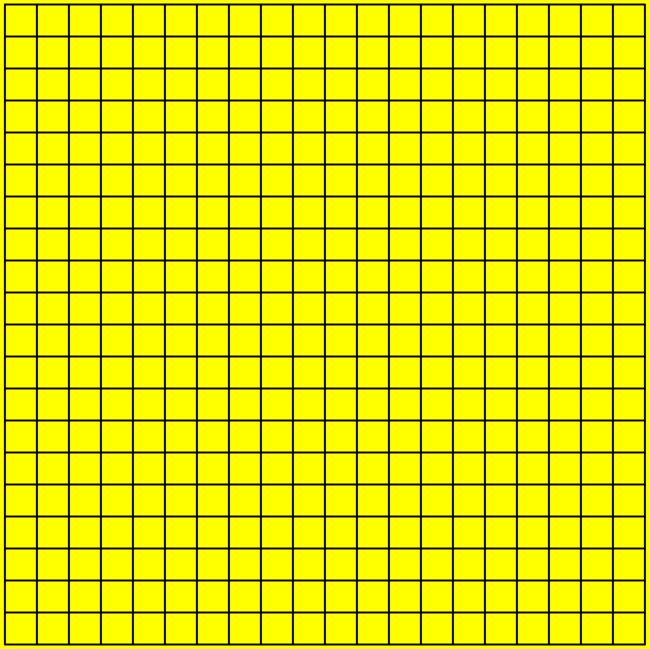
$$(x - 3)^2 + (y + 1)^2 = 25$$

$$(x - h)^2$$



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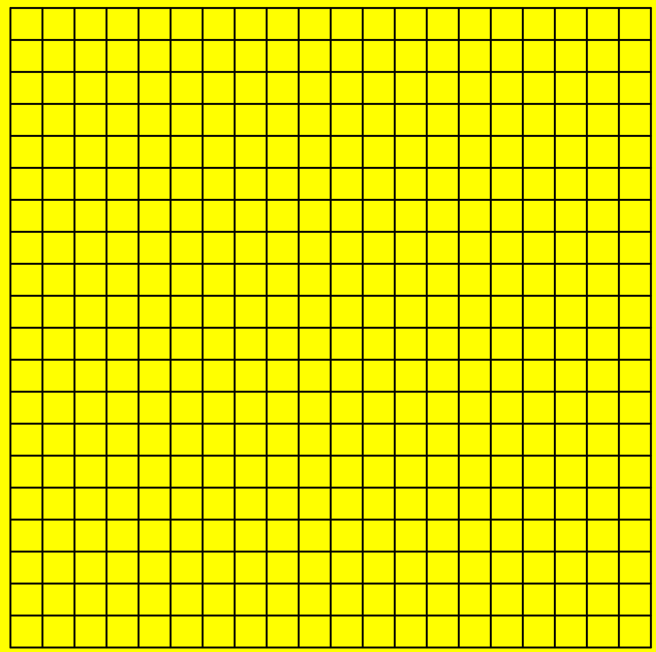
$(x - h)^2 +$



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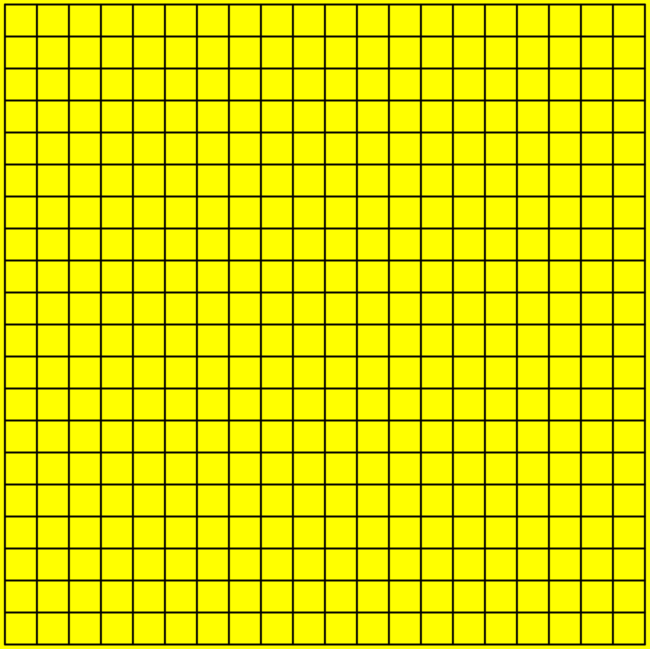

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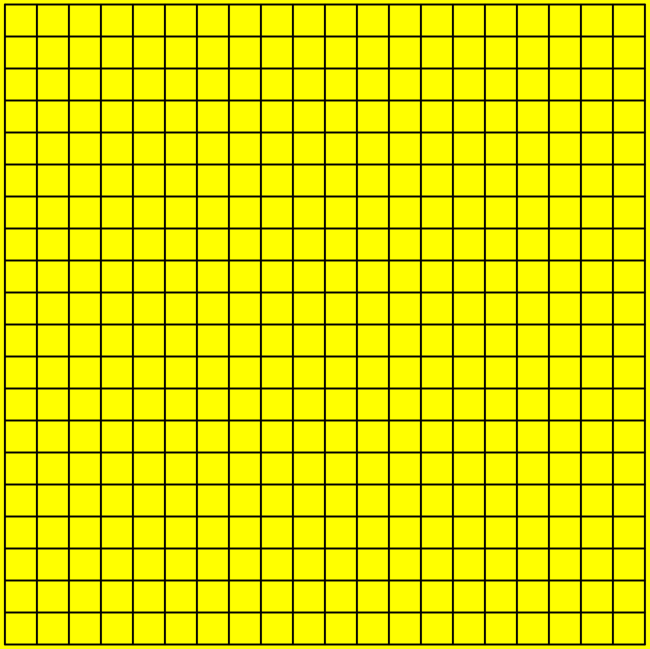

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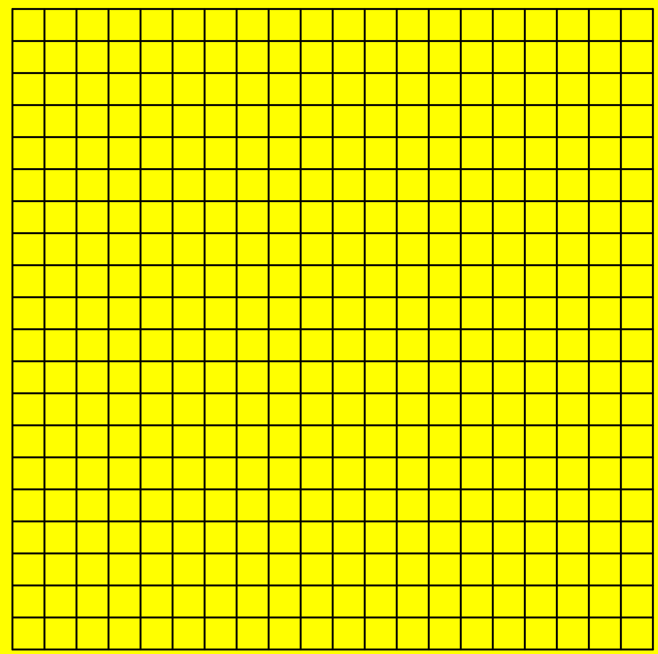

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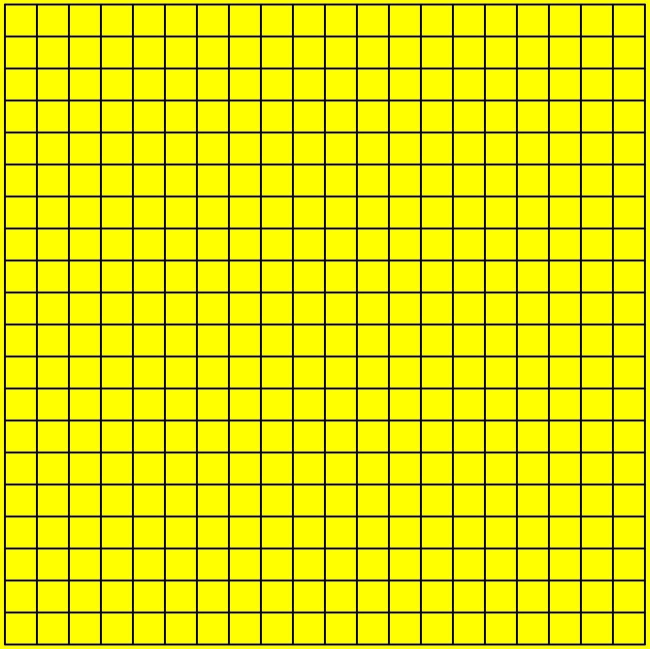

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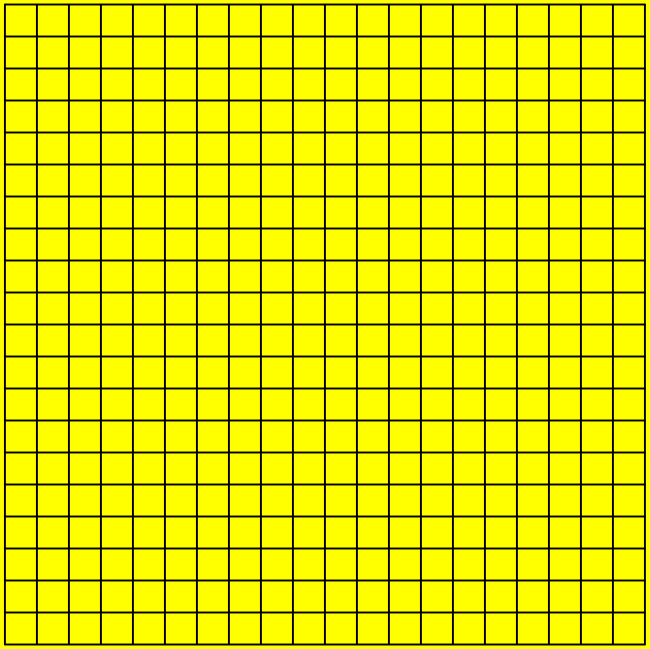

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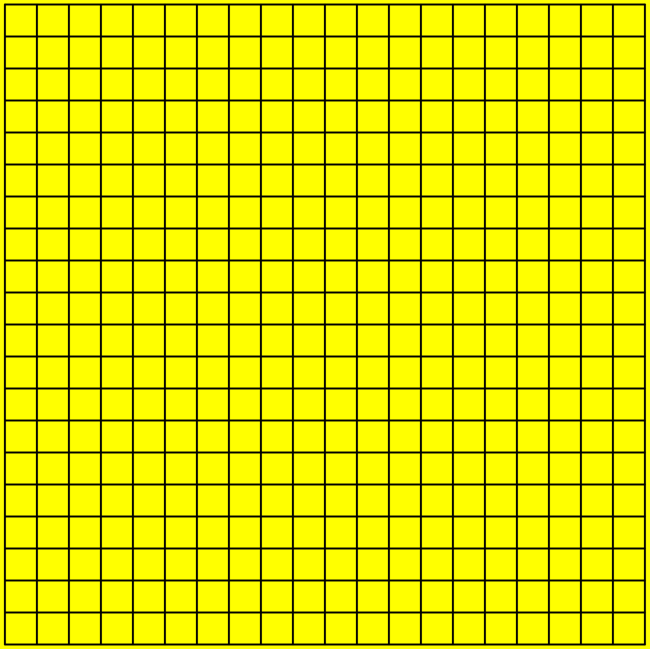

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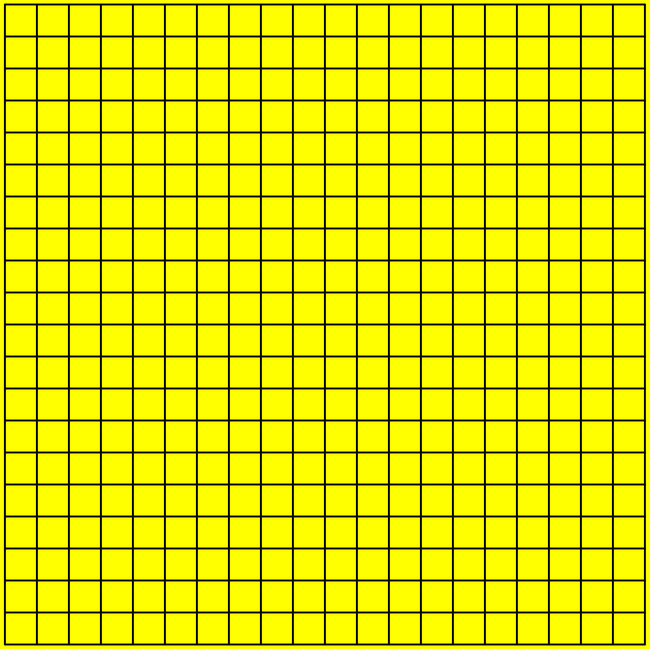

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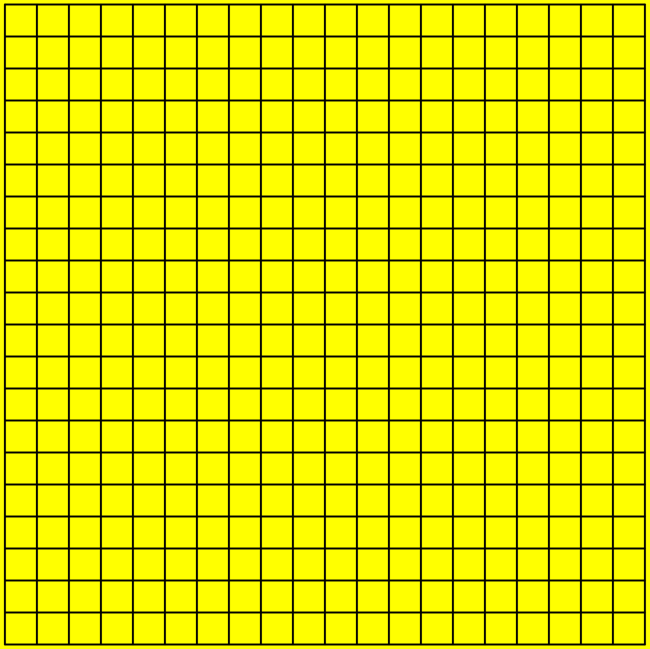

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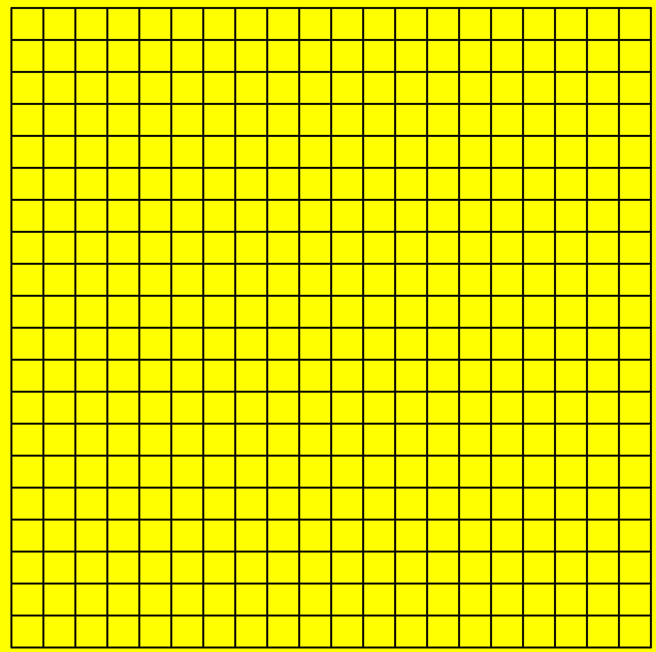

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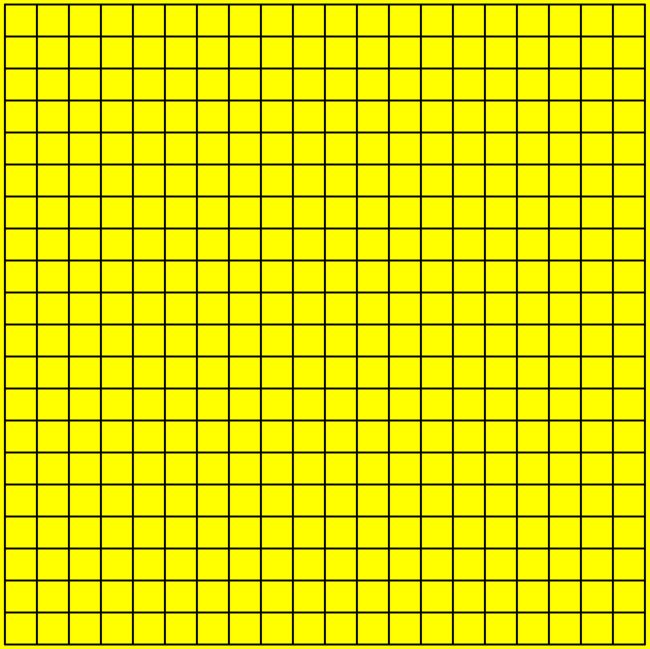

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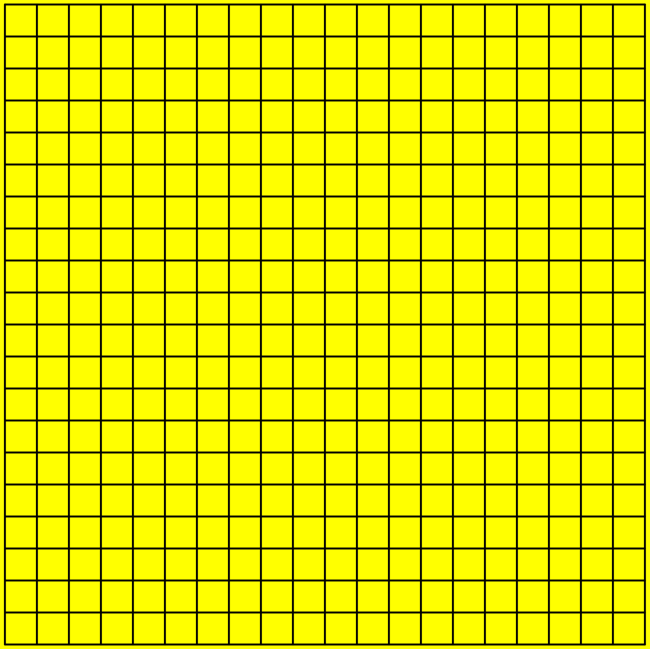

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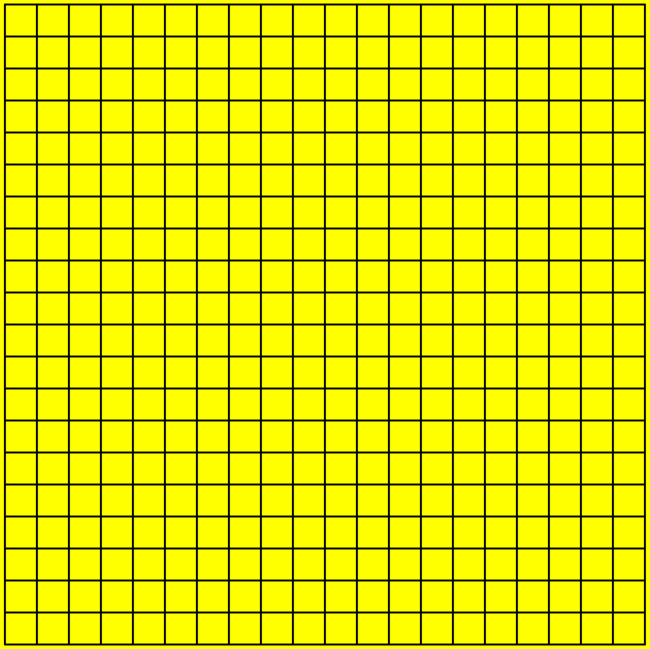

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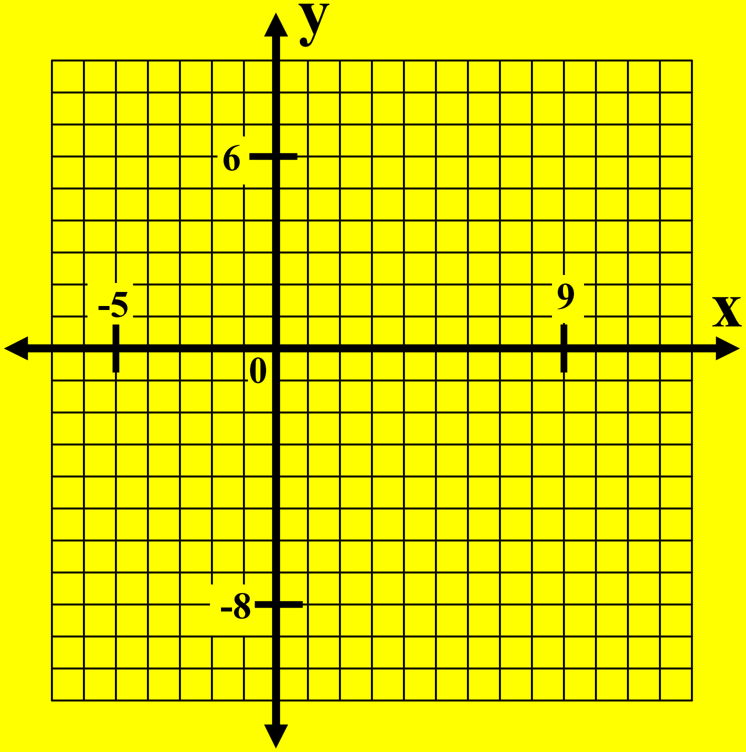

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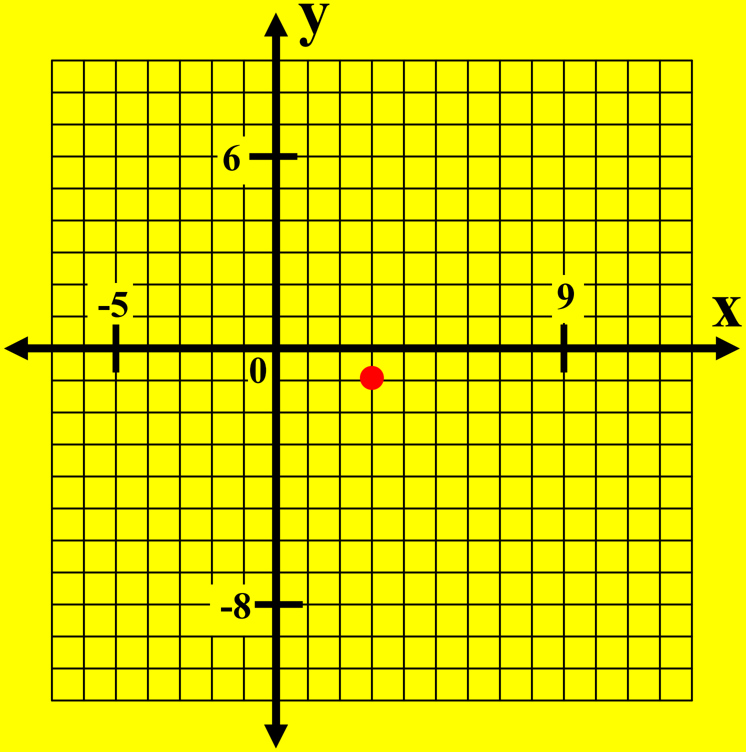

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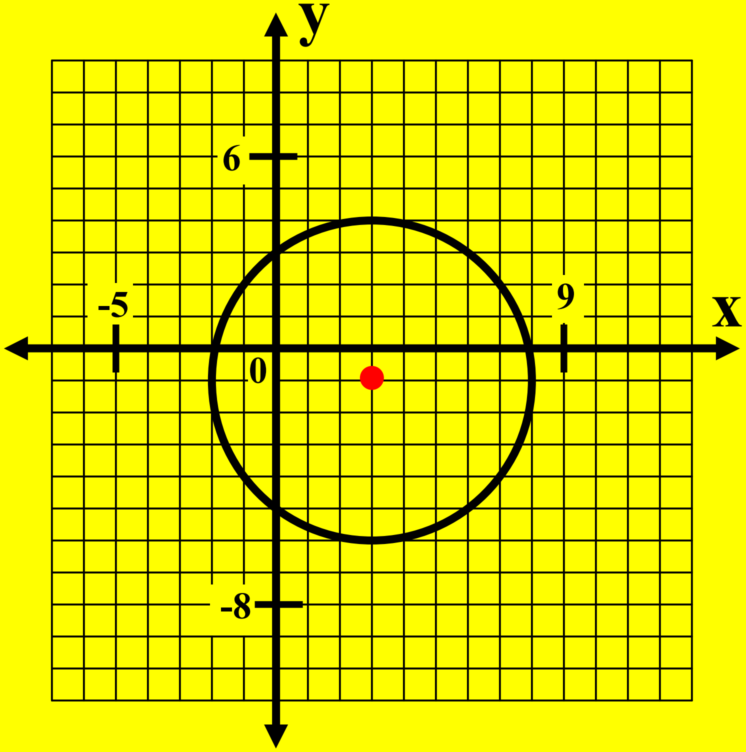

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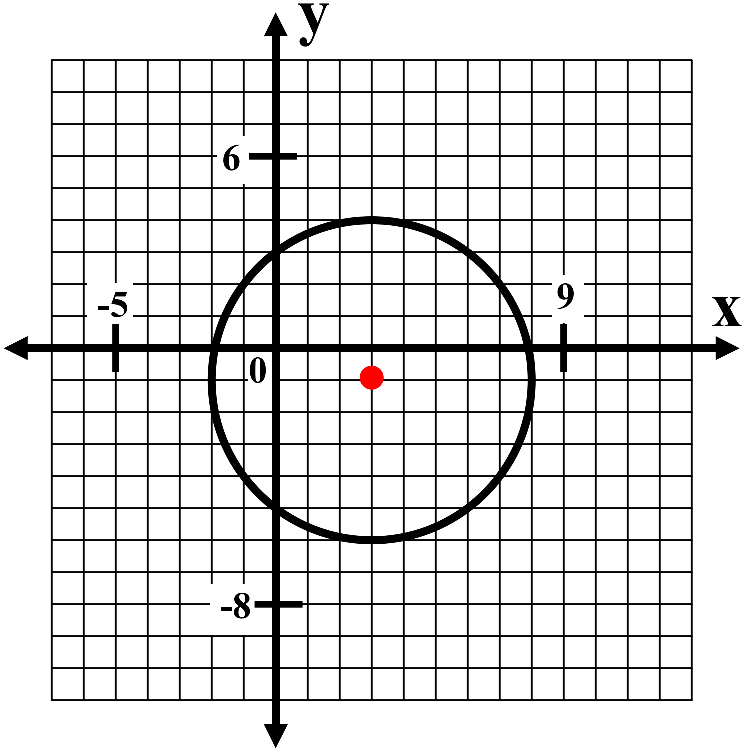

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Rearrange the terms of the equation.

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$16x^2 + 64x + 9y^2 - 54y = -1$

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Complete the square.

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2. $16x^2 + 9y^2 + 64x - 54y + 1 = 0$

This is the general form equation of an ellipse.

$16x^2 + 64x + 9y^2 - 54y = -1$

$16(x^2 + 4x\ ) + 9(y^2 - 6y\ ) = -1$

$16(x^2 + 4x \qquad) + 9(y^2 - 6y \qquad) = -1$

Complete the square.

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2. $16x^2 + 9y^2 + 64x - 54y + 1 = 0$

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Divide both sides by 144.

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Divide both sides by 144, and reduce to lowest terms.

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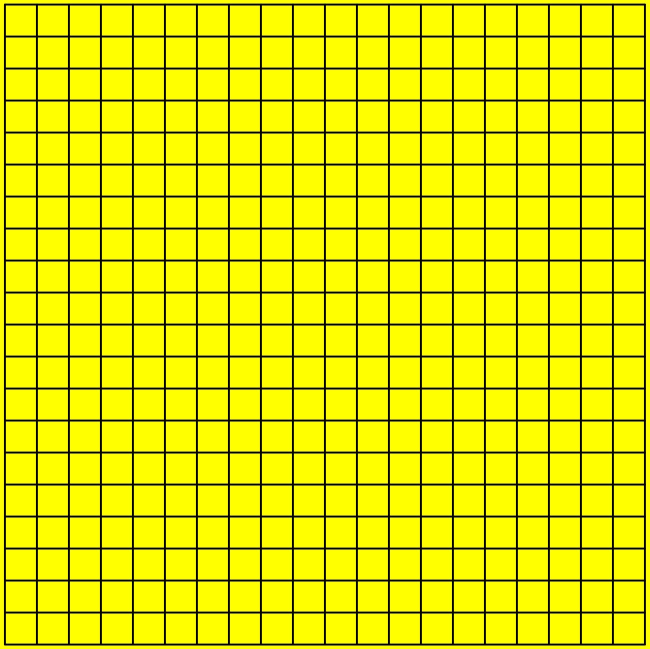

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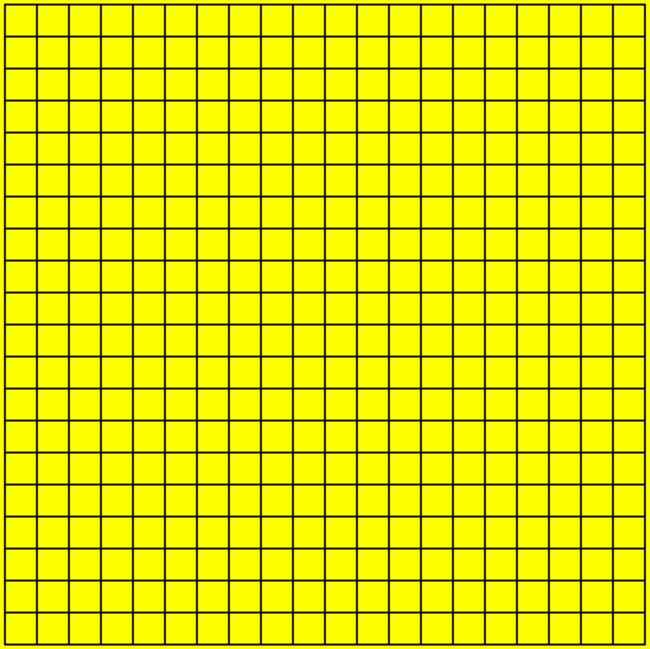
Type 2 Ellipse



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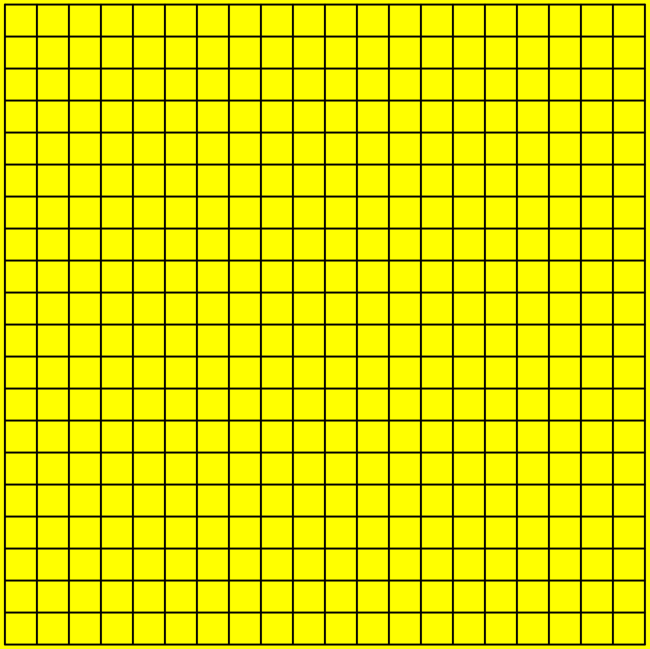
Type 2 Ellipse (major axis vertical)



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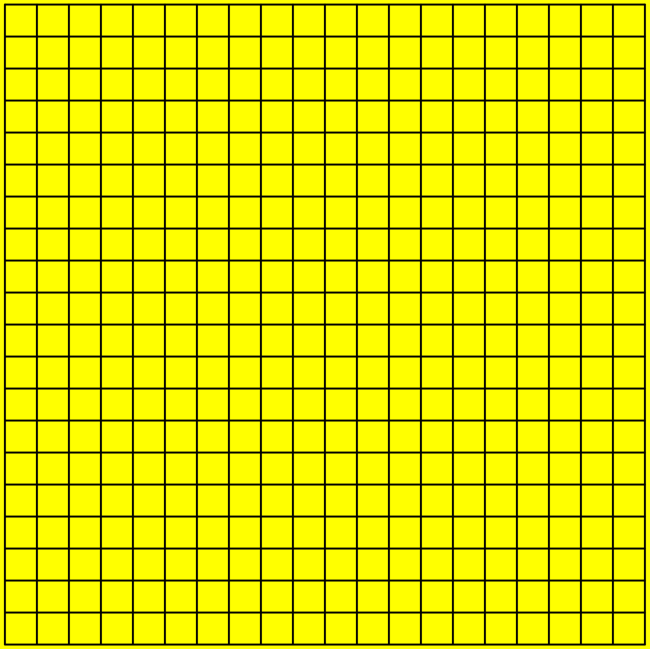

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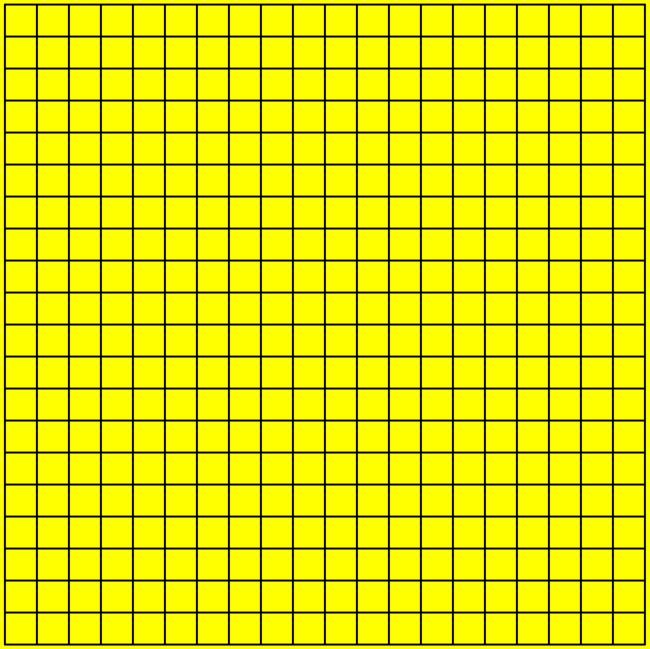
Type 2 Ellipse (major axis vertical)

h =



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Identify each equation as that of a circle, ellipse, hyperbola, or parabola. Express the equation in standard form and sketch its graph.

2. $16x^2 + 9y^2 + 64x - 54y + 1 = 0$

This is the general form equation of an ellipse.

$$16x^2 + 64x + 9y^2 - 54y = -1$$

$$16(x^2 + 4x\ \ ) + 9(y^2 - 6y\ \ ) = -1$$

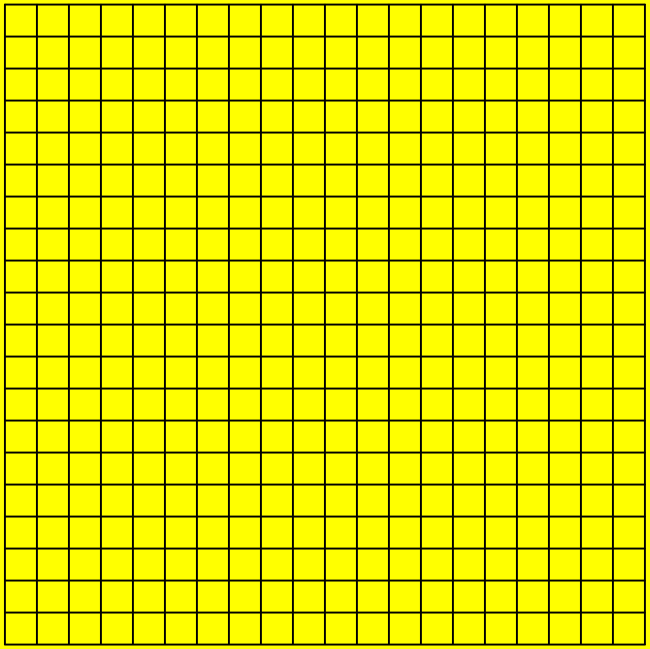
$$16(x^2 + 4x + 4) + 9(y^2 - 6y + 9) = -1 + 64 + 81$$

$$\frac{16(x+2)^2}{144} + \frac{9(y-3)^2}{144} = \frac{144}{144}$$

$$\boxed{\frac{(x+2)^2}{9} + \frac{(y-3)^2}{16} = 1}$$

Type 2 Ellipse (major axis vertical)

h = -2



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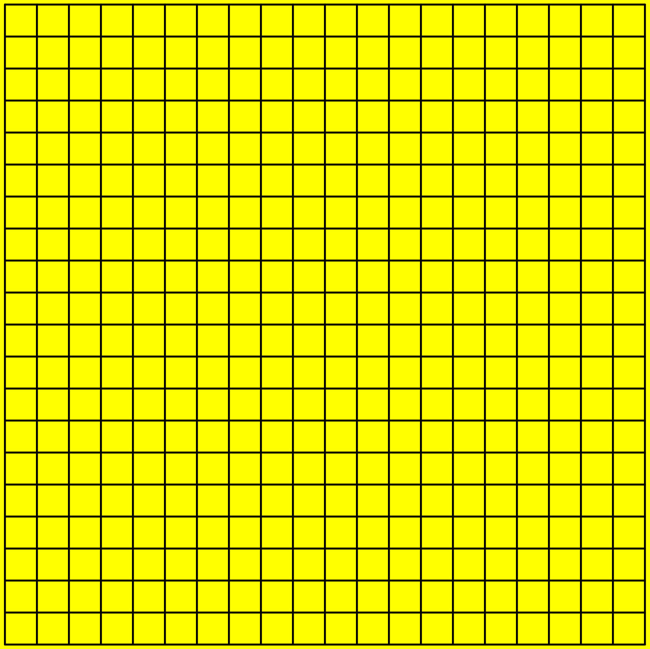
Type 2 Ellipse (major axis vertical)

$h = -2$ and



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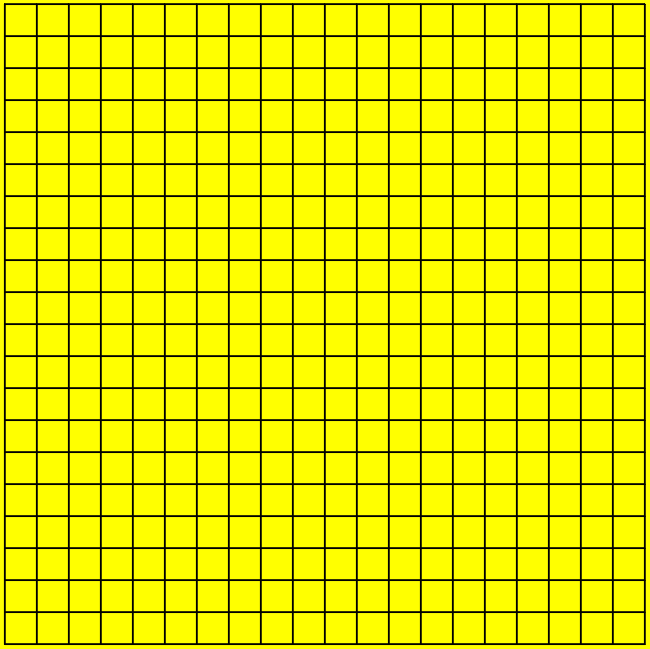
Type 2 Ellipse (major axis vertical)

h = -2 and k =



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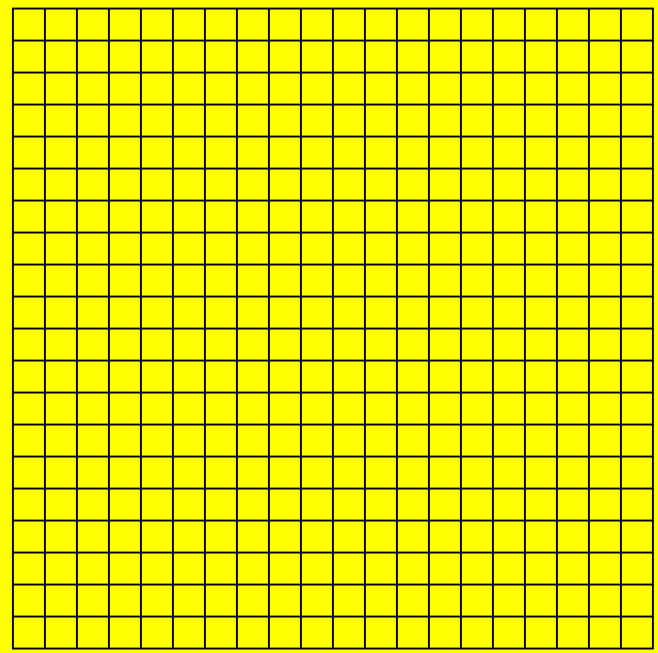
Type 2 Ellipse (major axis vertical)

h = -2 and k = 3



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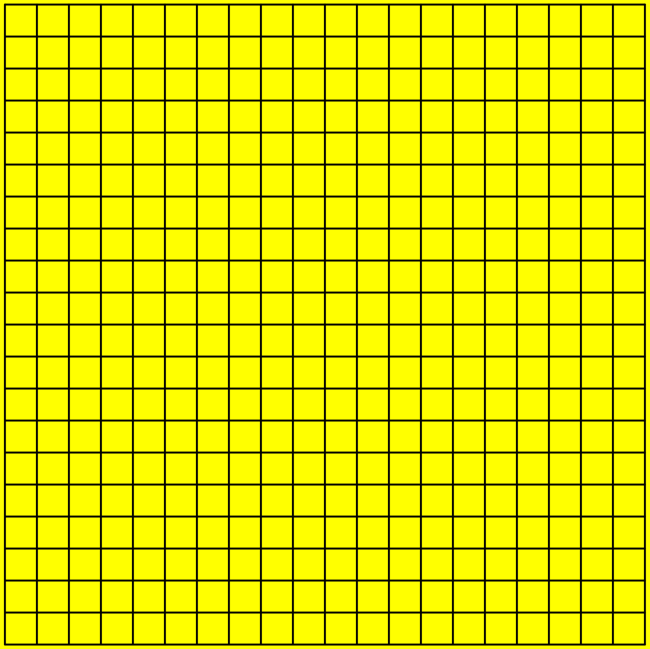
Type 2 Ellipse (major axis vertical)

$h = -2$ and $k = 3$



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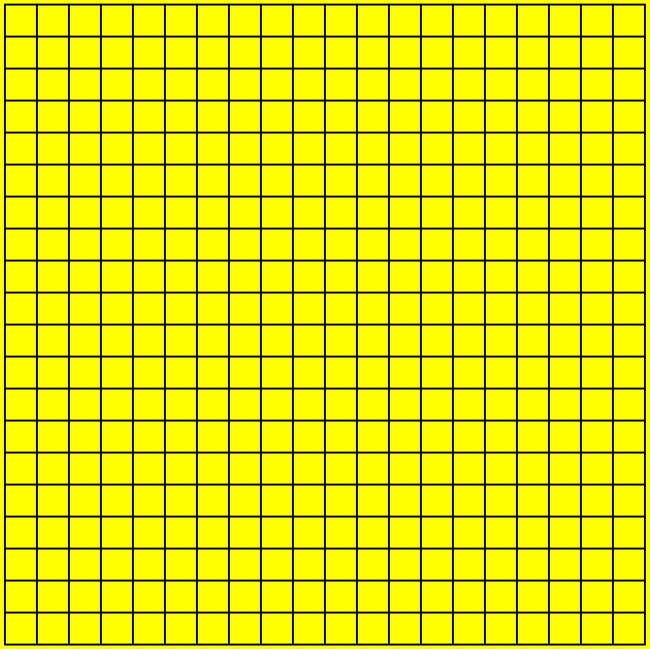
Type 2 Ellipse (major axis vertical)

$h = -2$ and $k = 3$ center (



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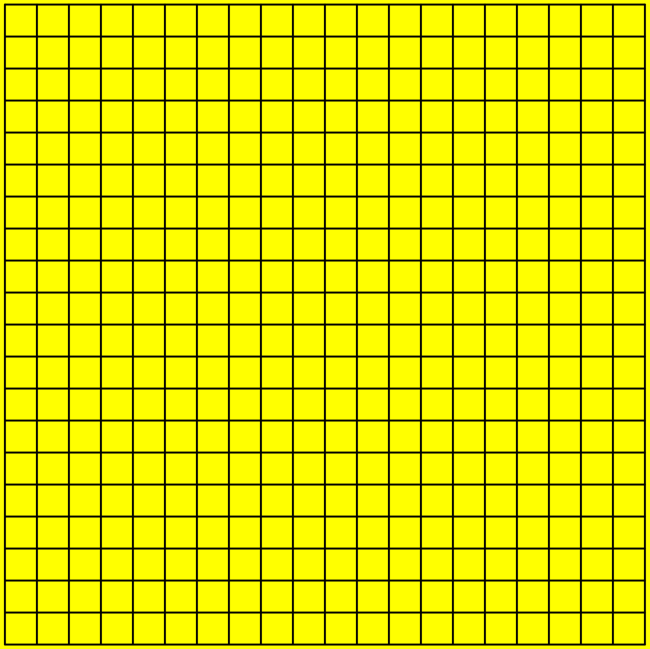
h = -2 and k = 3 **center (-2,**



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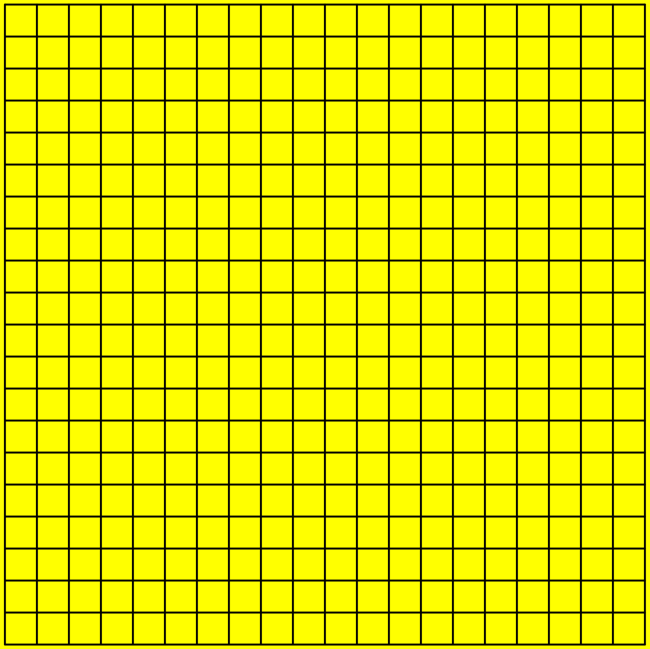

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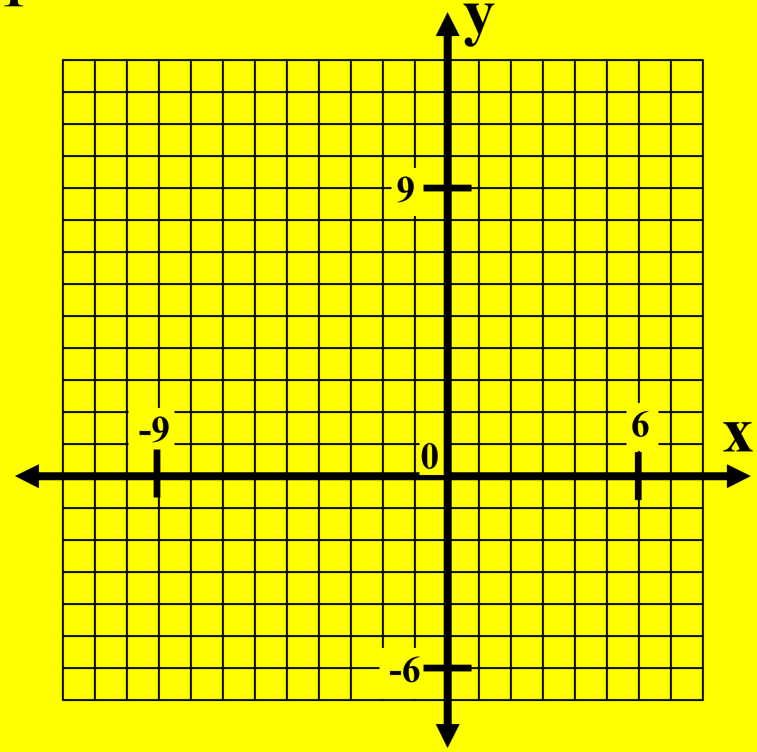

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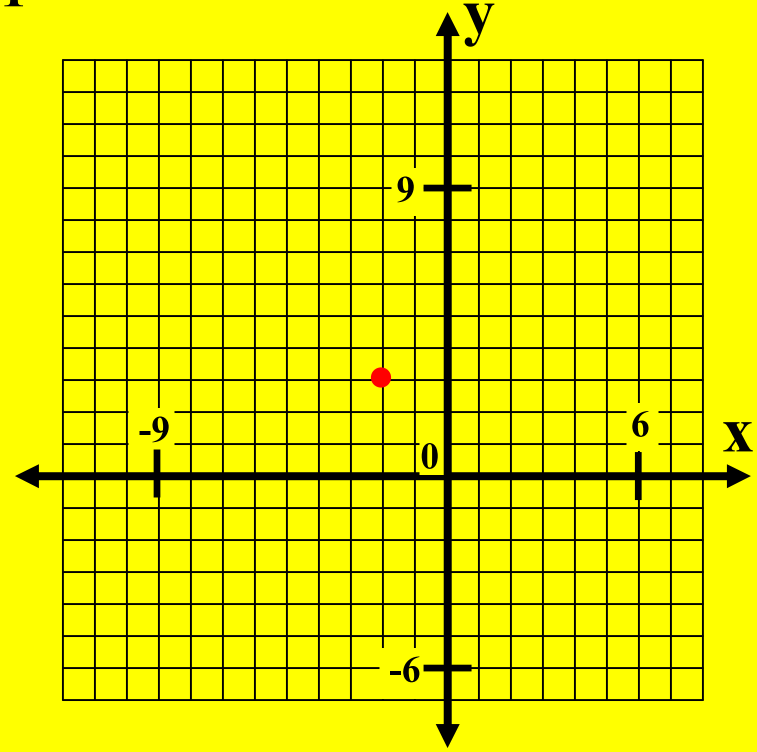

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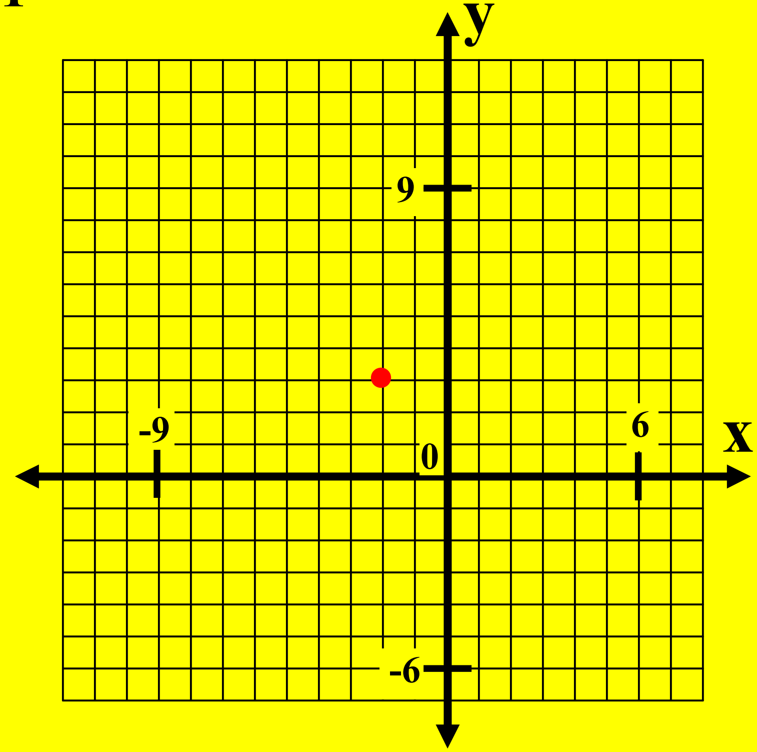

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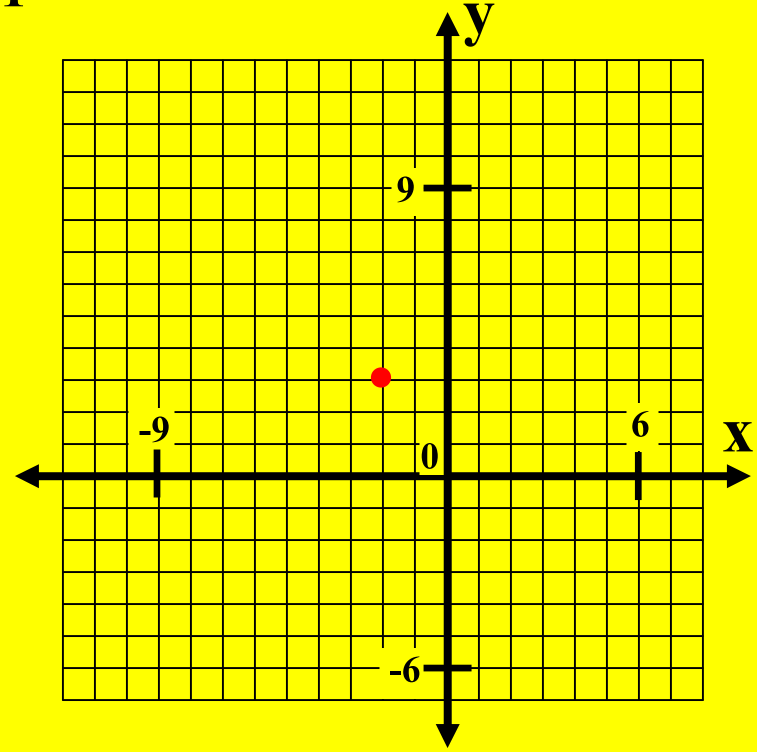

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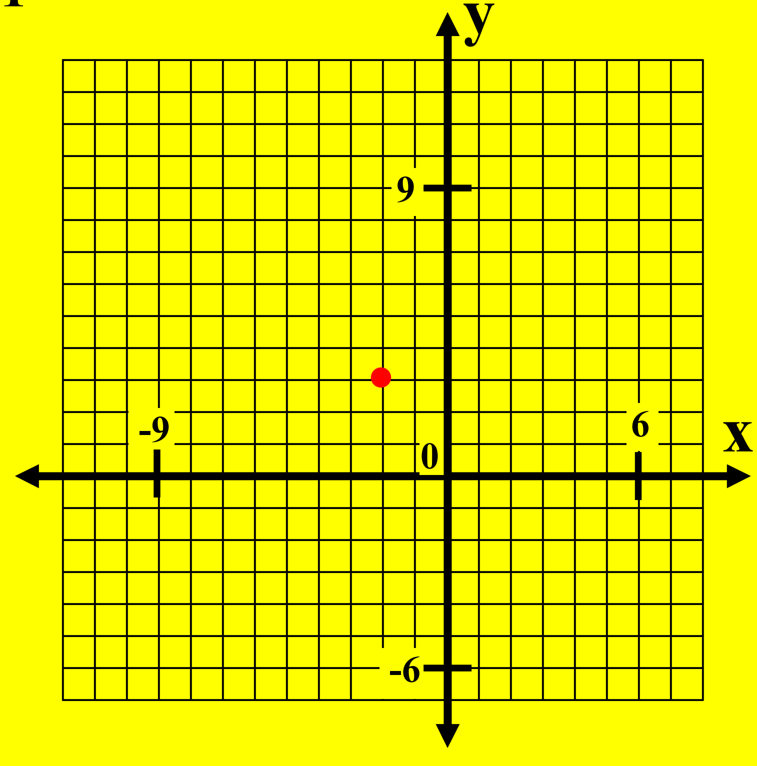

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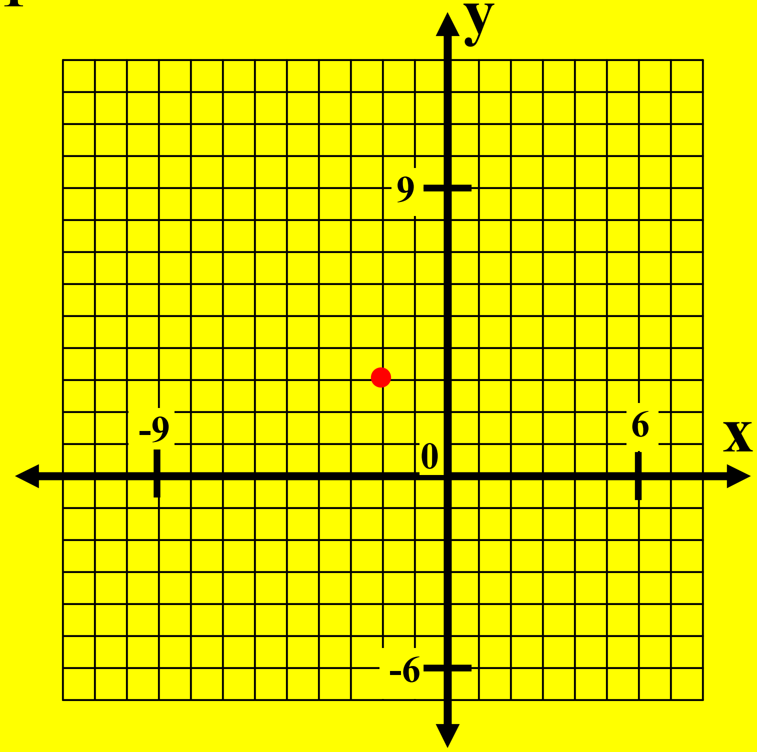

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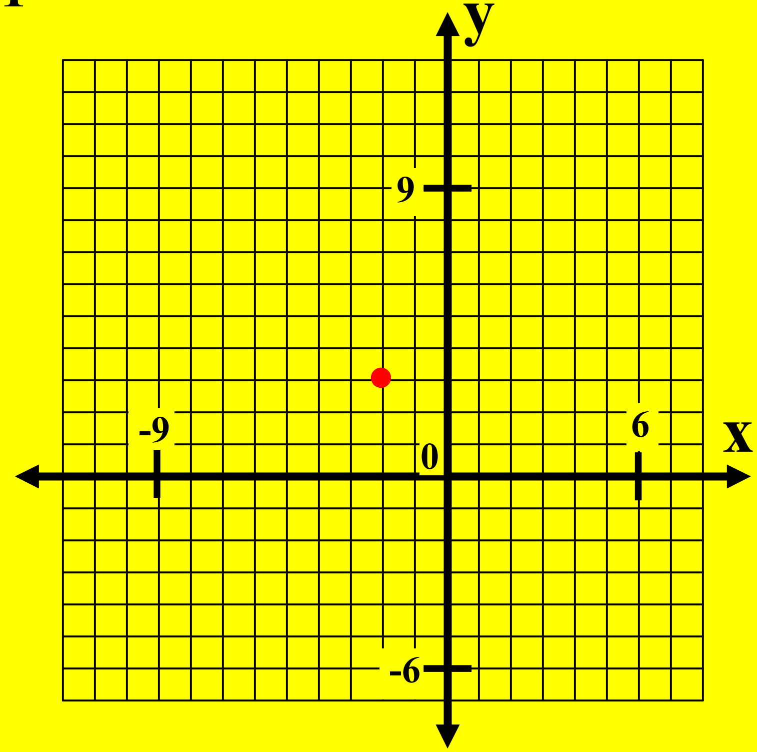

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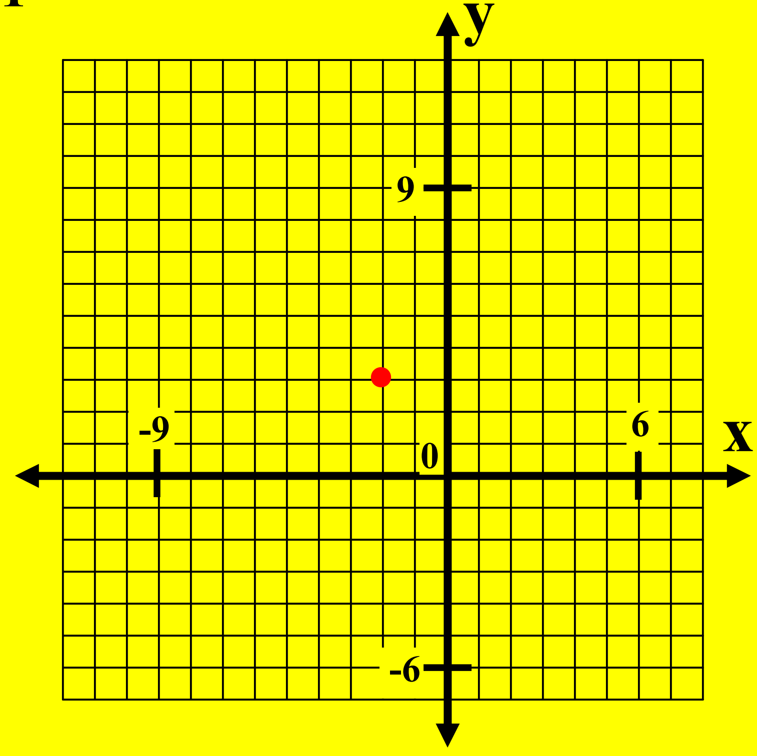

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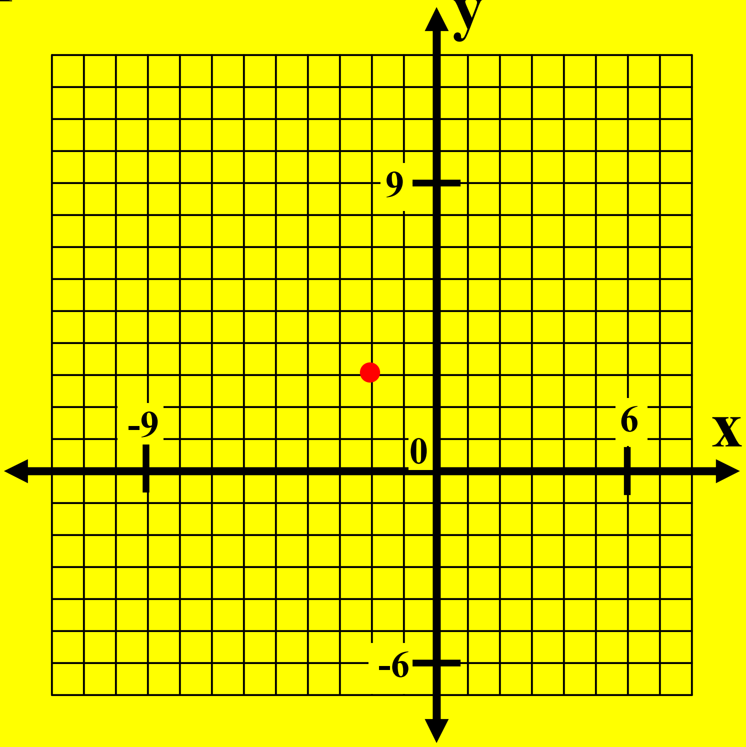

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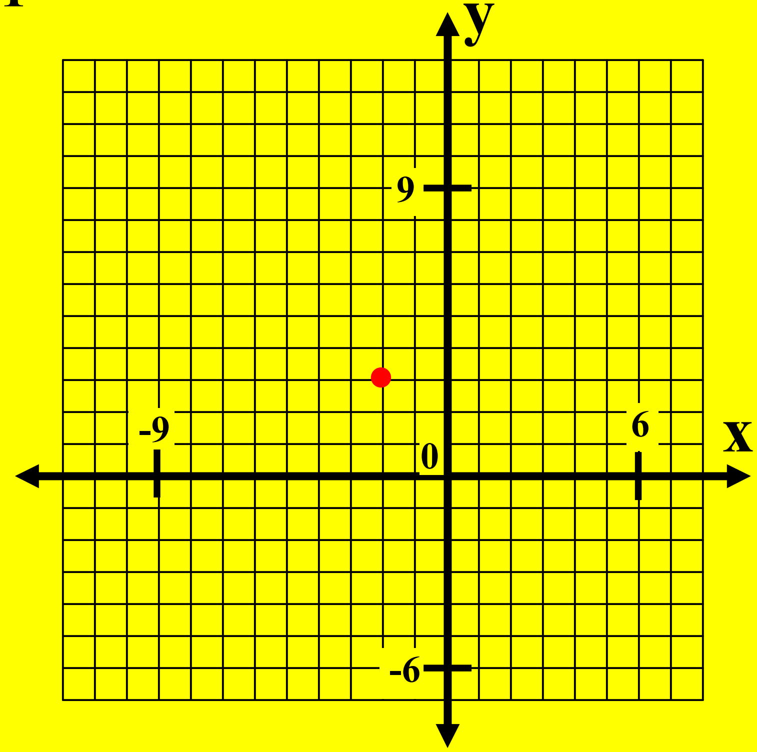

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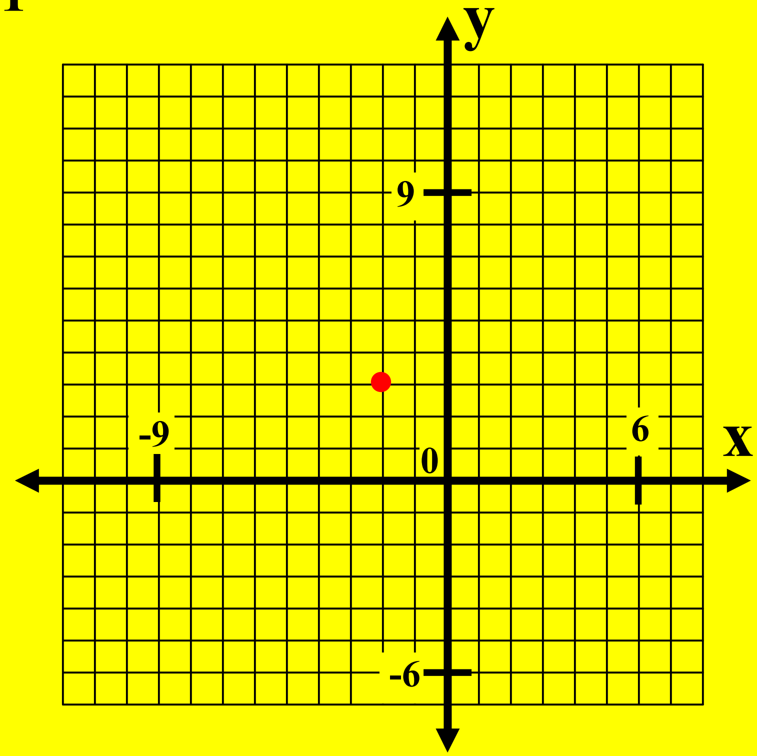

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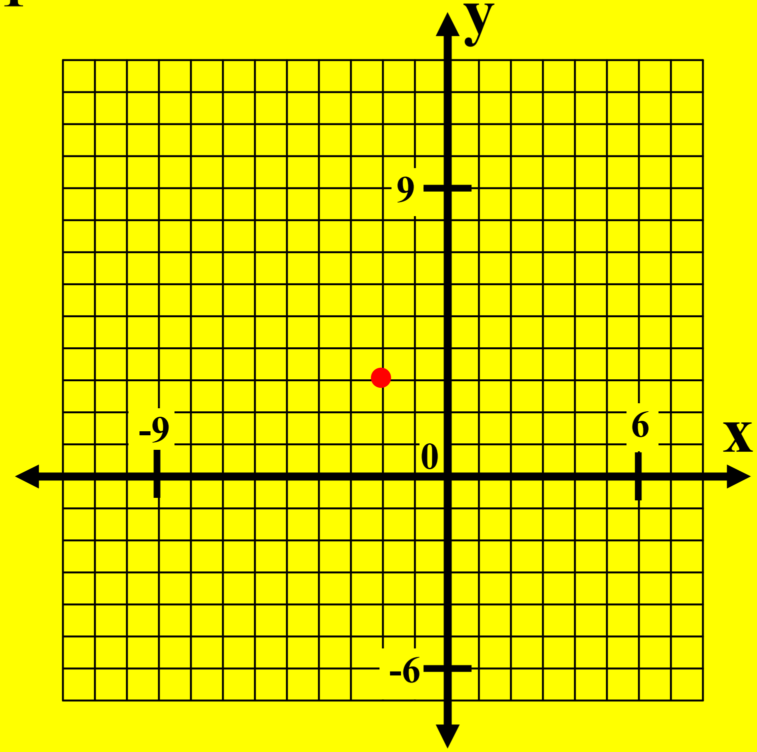

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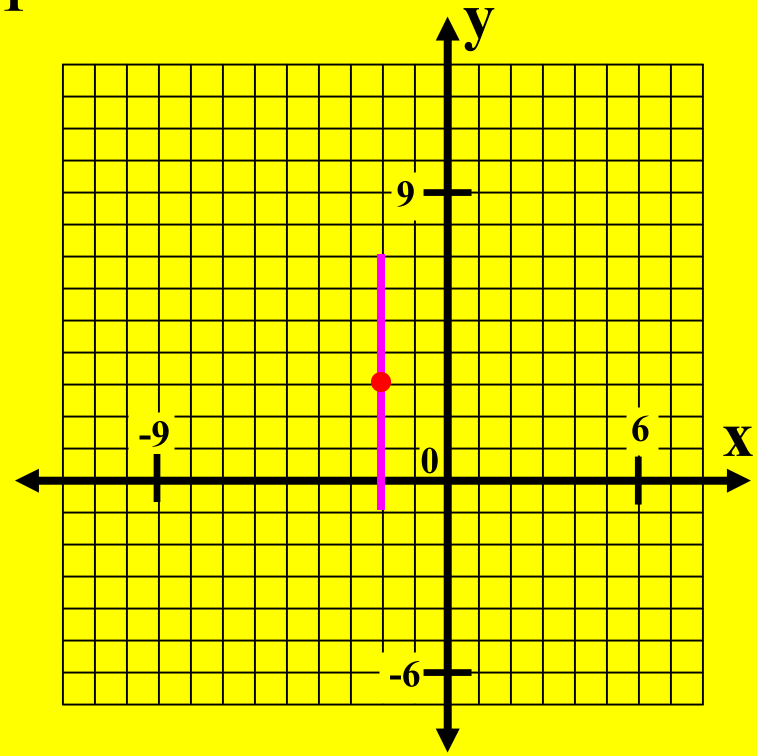

Type 2 Ellipse (major axis vertical)

$h = -2$ and $k = 3$ center $(-2, 3)$

$a^2 = 16$ and $b^2 = 9$ $a = 4$

Algebra 2 Class Worksheet #5 Unit 7

Identify each equation as that of a circle, ellipse, hyperbola, or parabola. Express the equation in standard form and sketch its graph.

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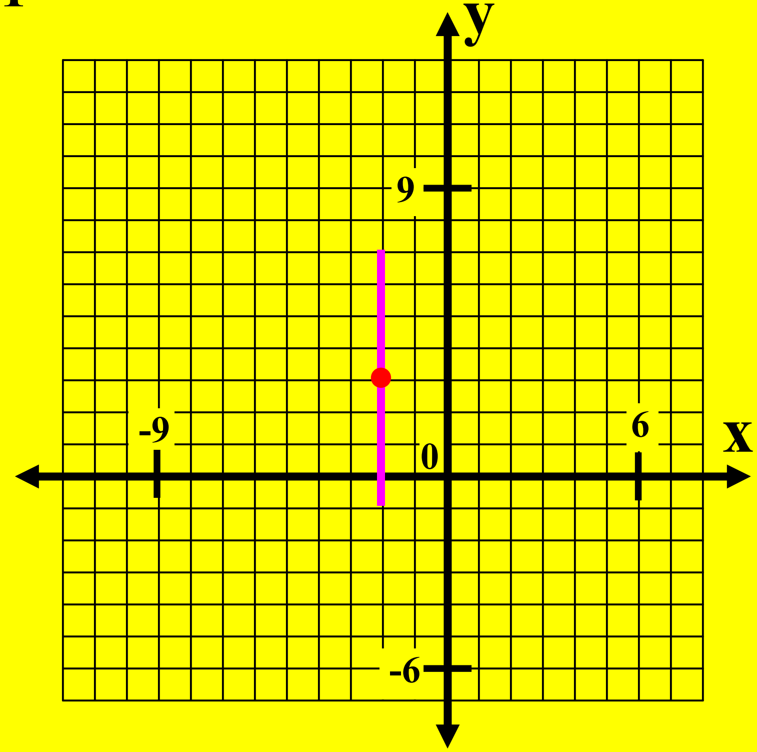

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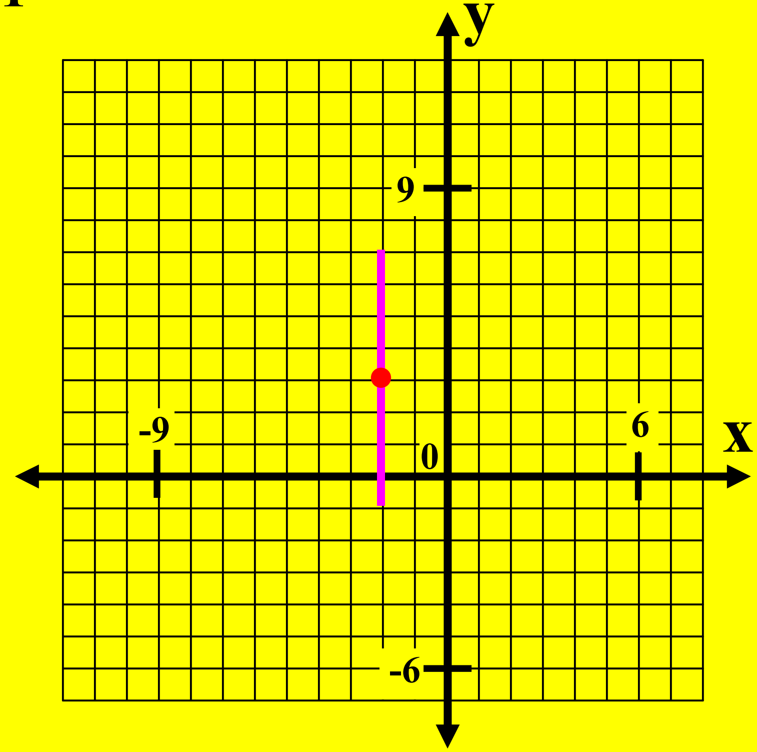

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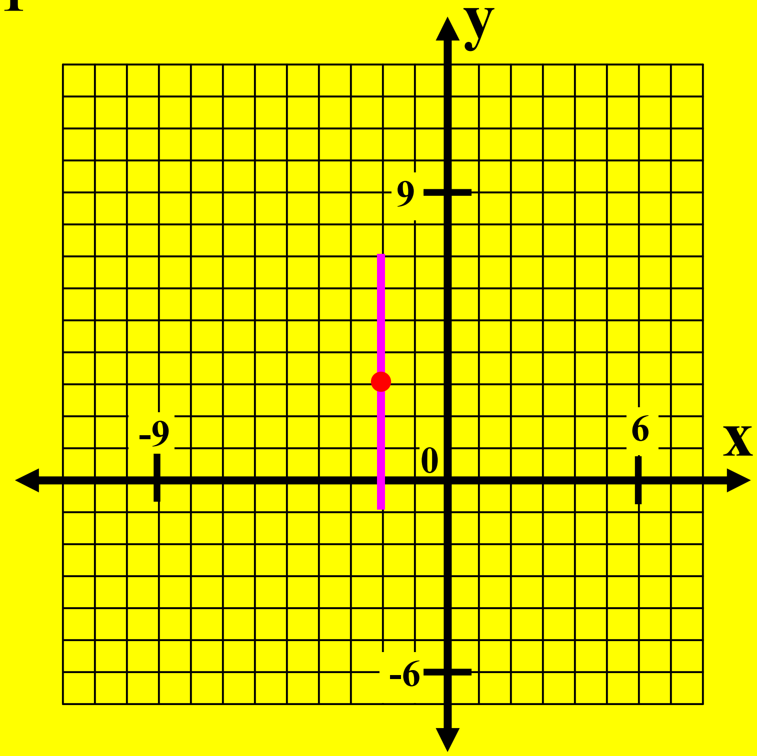

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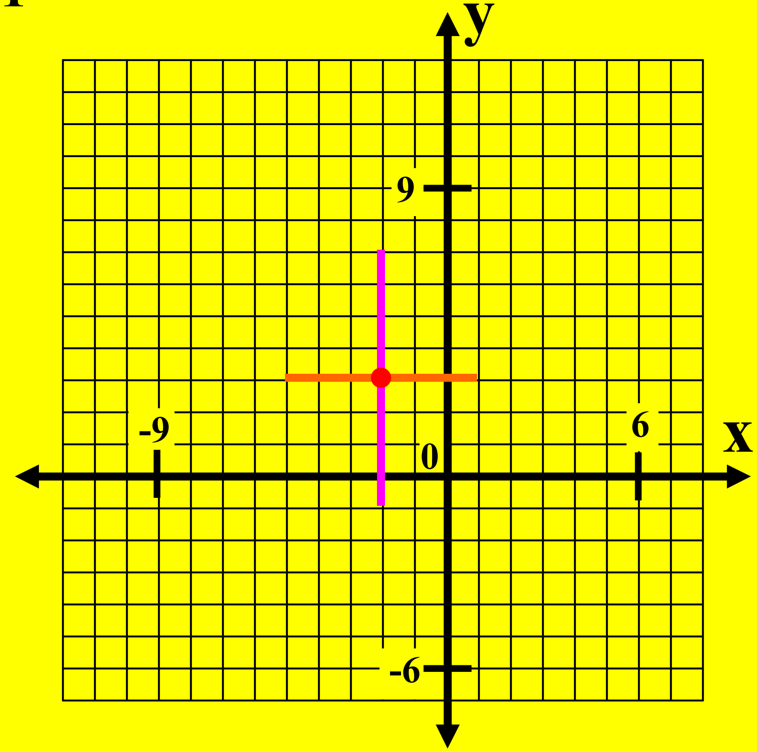

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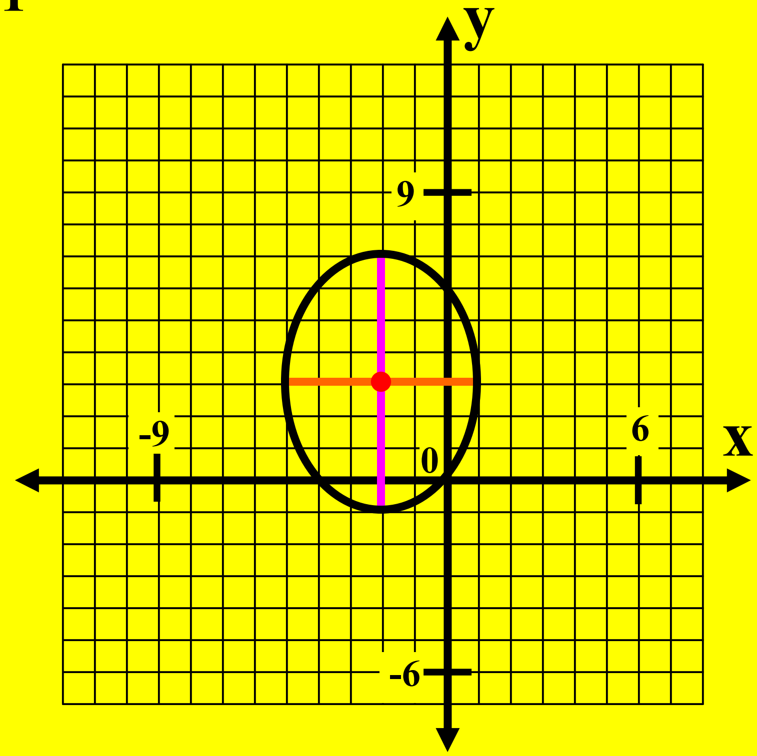

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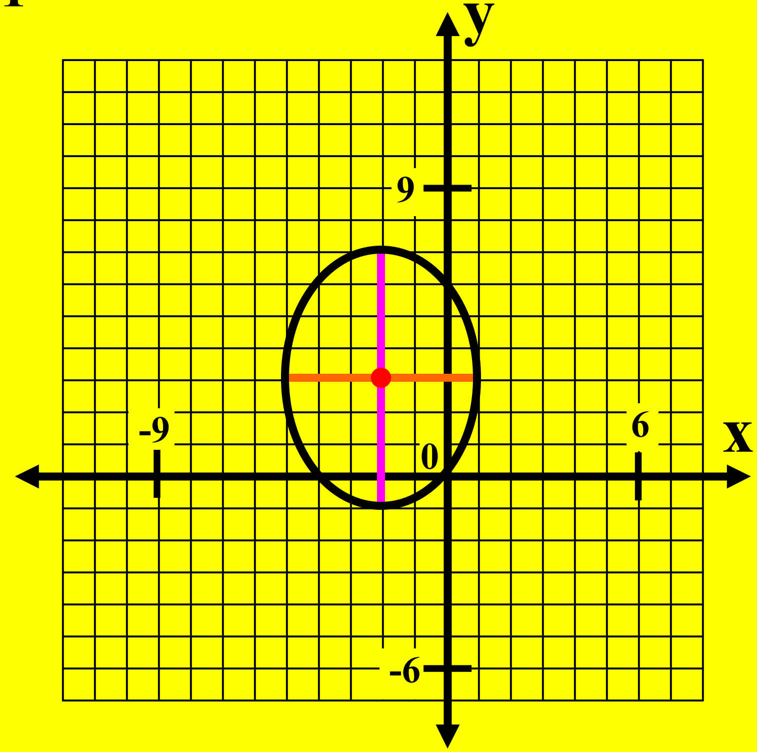

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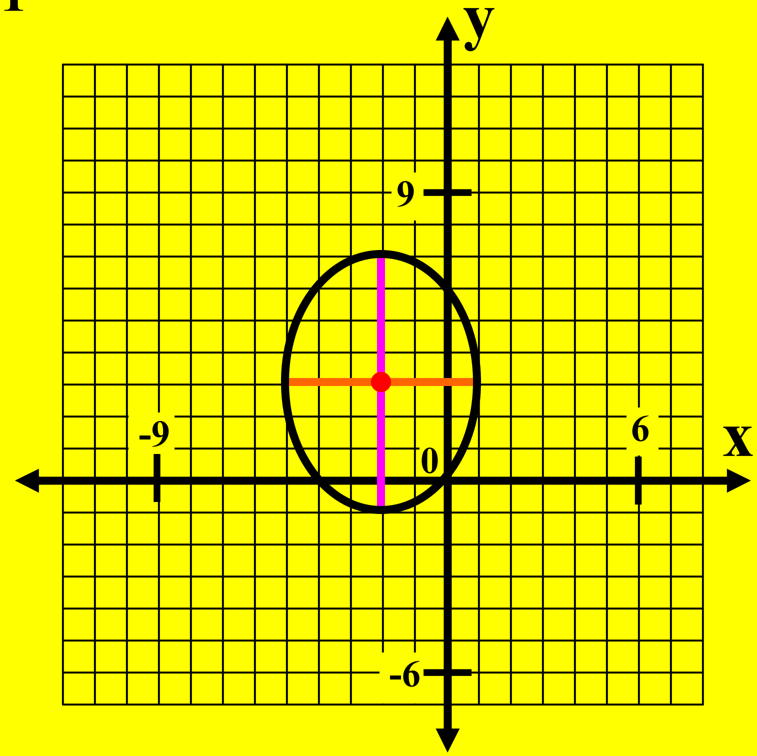

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$a^2 = 16$ and $b^2 = 9$ $a = 4$ and $b = 3$

$c = \sqrt{a^2 - b^2}$

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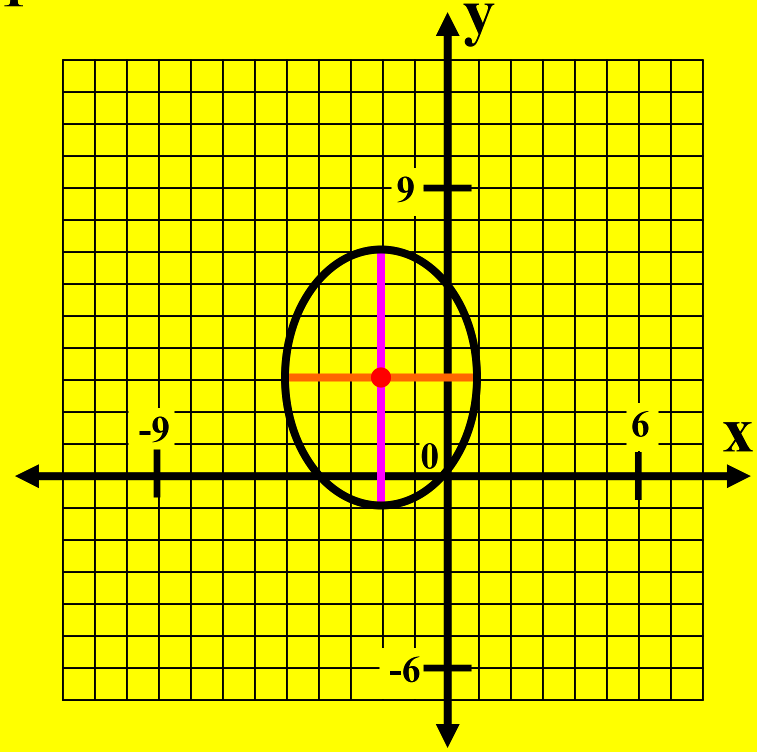

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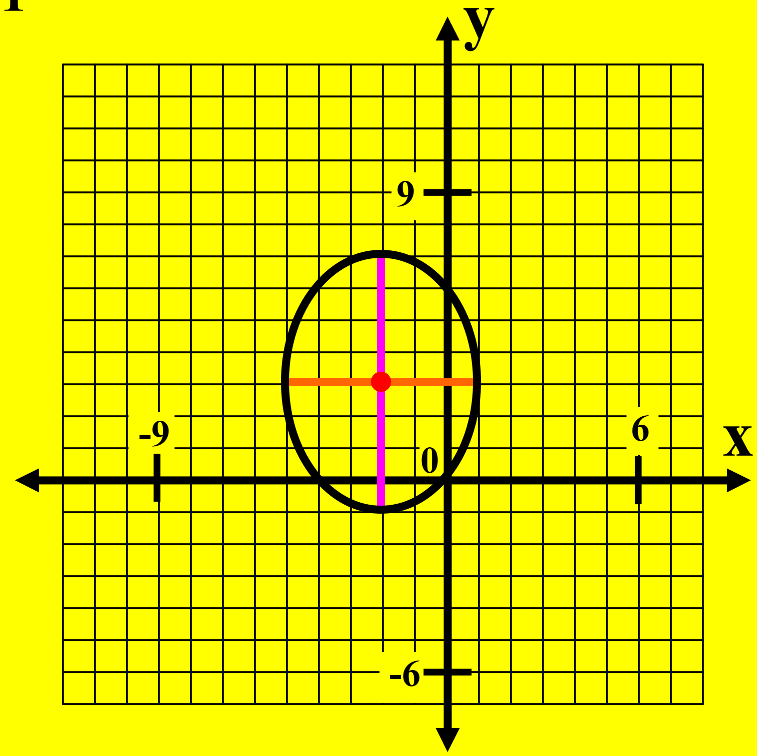

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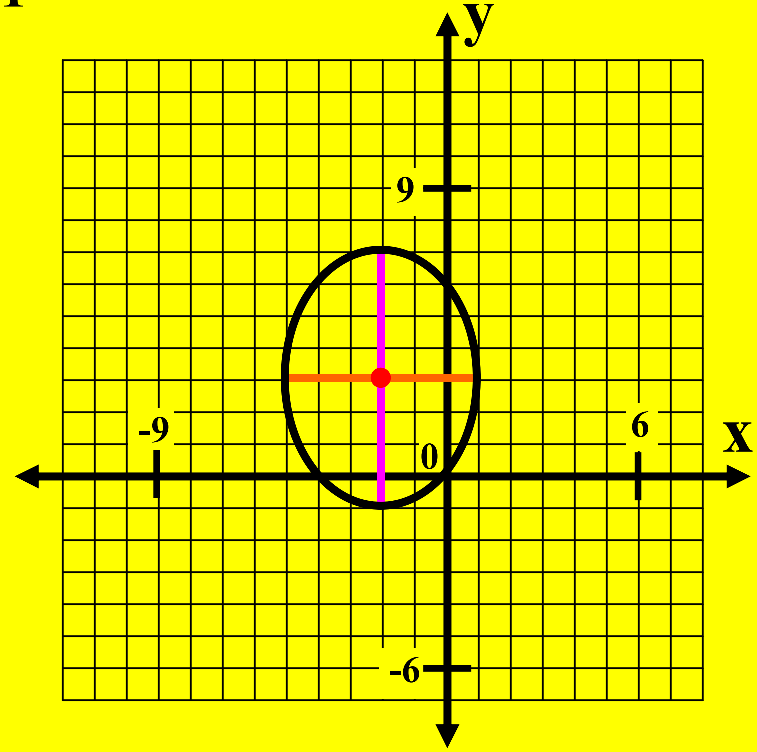

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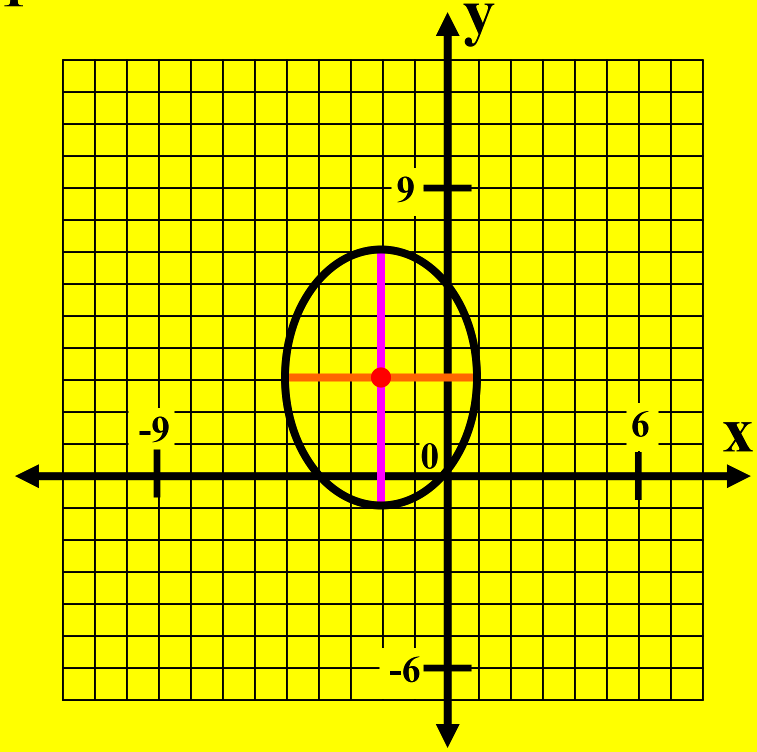

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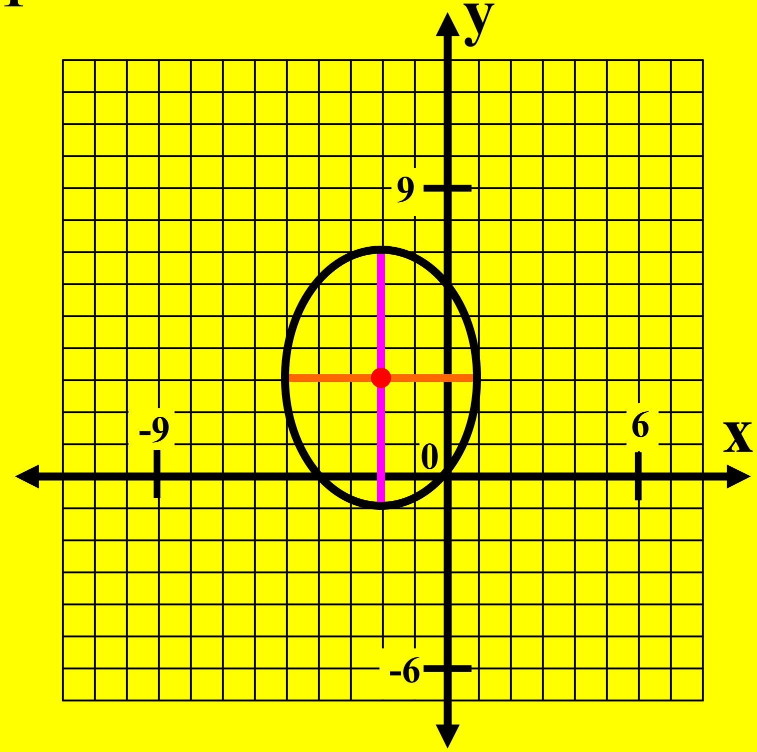

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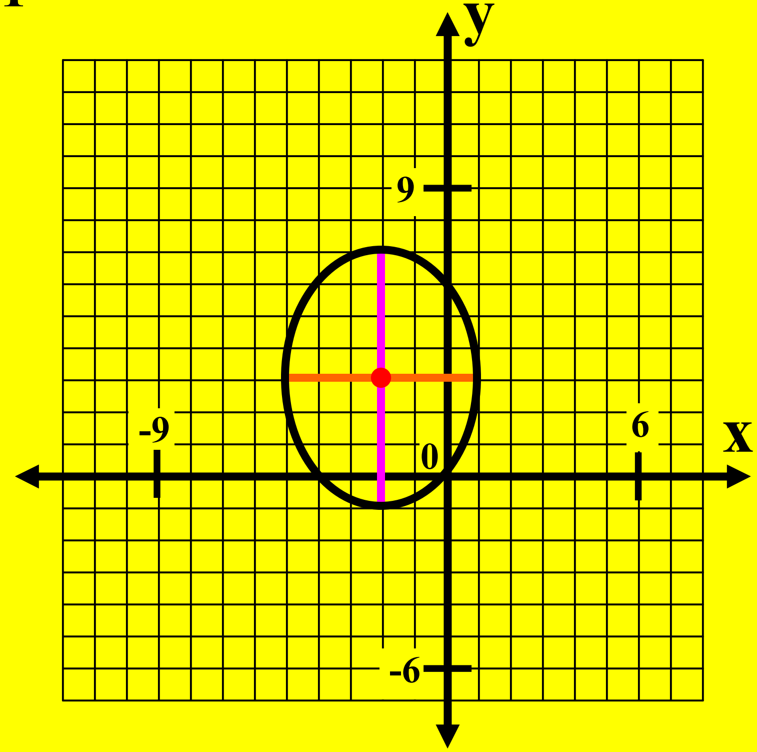

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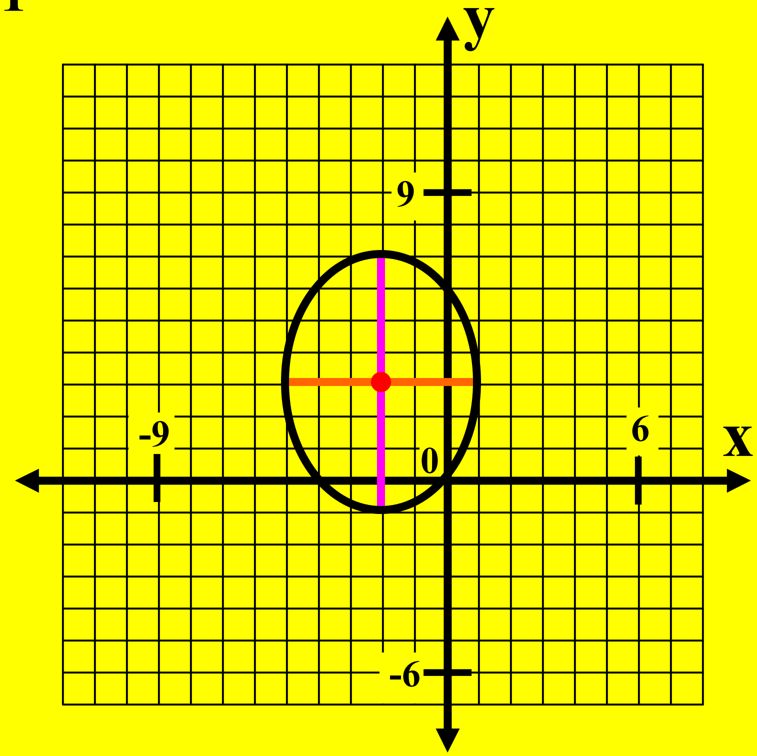

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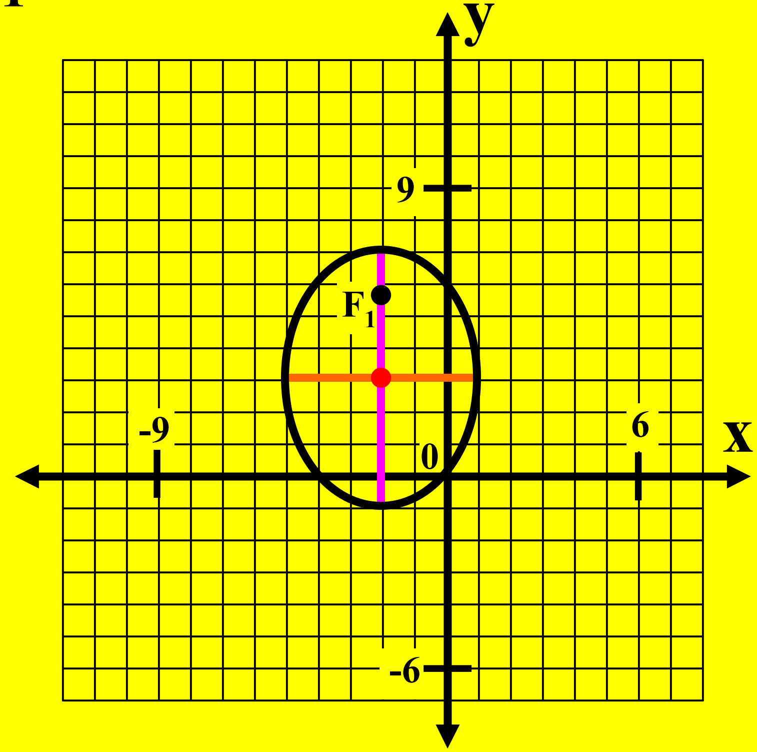

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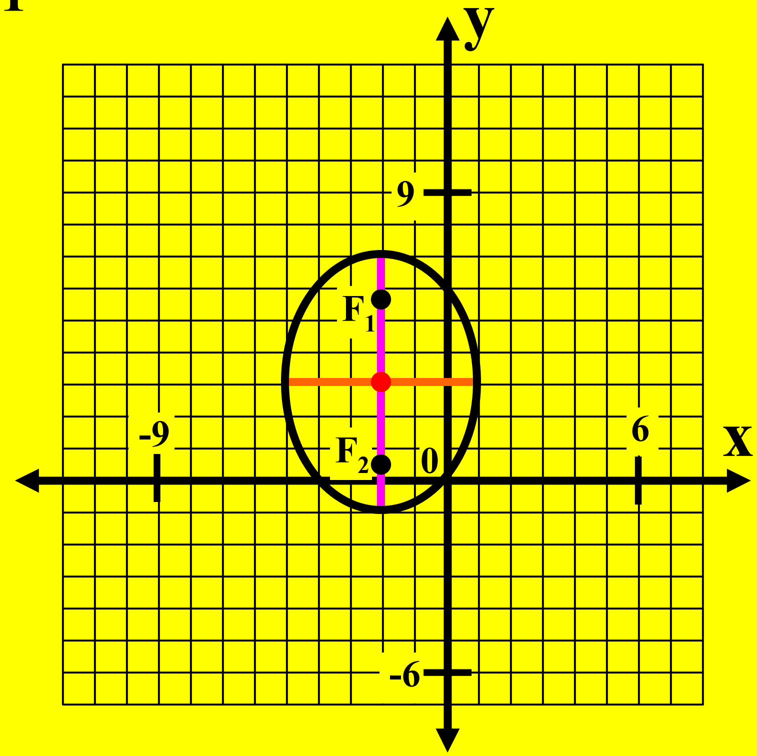

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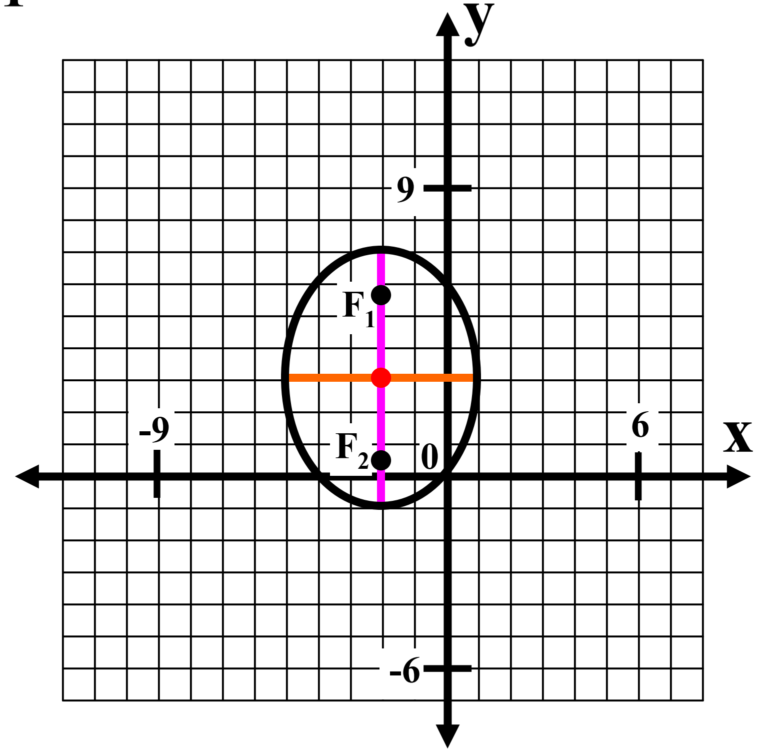

Algebra 2 Class Worksheet #5 Unit 7

Identify each equation as that of a circle, ellipse, hyperbola, or parabola. Express the equation in standard form and sketch its graph.

3. $9x^2 - 4y^2 - 54x - 8y + 41 = 0$

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3. $9x^2 - 4y^2 - 54x - 8y + 41 = 0$

This is the general form equation of an hyperbola.

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3. $9x^2 - 4y^2 - 54x - 8y + 41 = 0$

This is the general form equation of an <u>hyperbola</u>.

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Rearrange the terms of the equation.

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$9x^2$

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Rearrange the terms of the equation.

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Rearrange the terms of the equation.

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This is the general form equation of an <u>hyperbola</u>.

Rearrange the terms of the equation.

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Divide both sides by 36.

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Divide both sides by 36, and reduce to lowest terms.

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Divide both sides by 36, and reduce to lowest terms.

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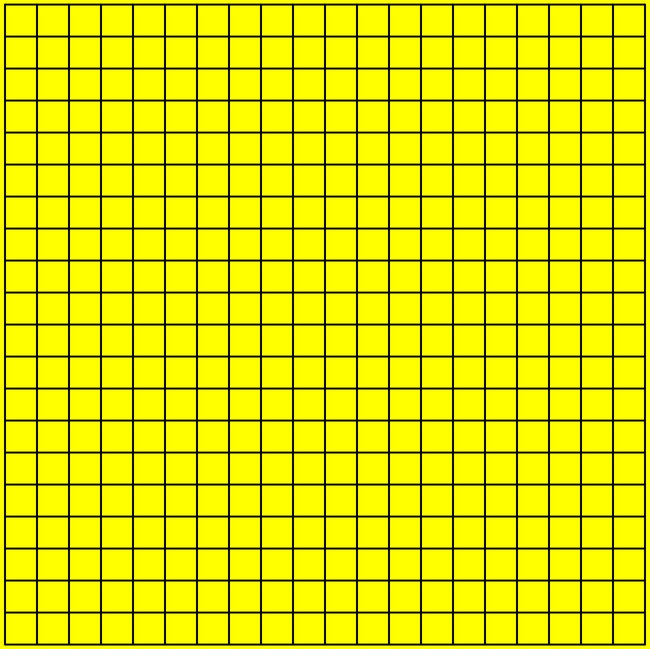

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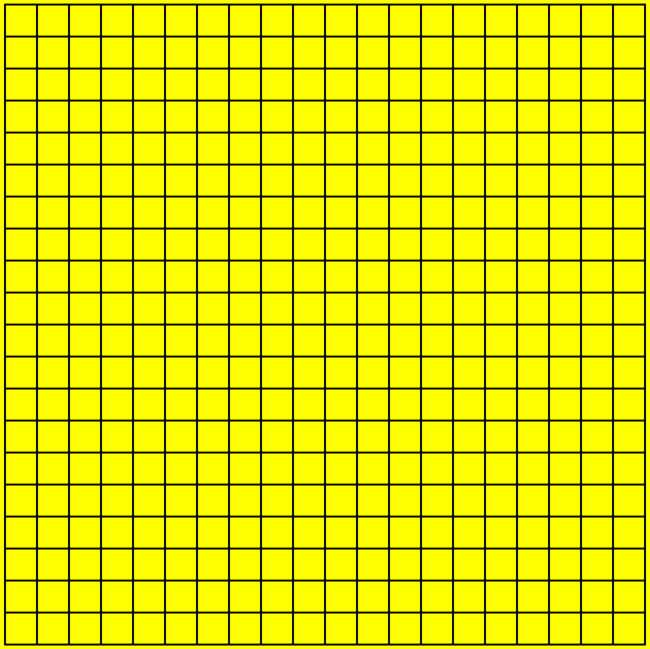

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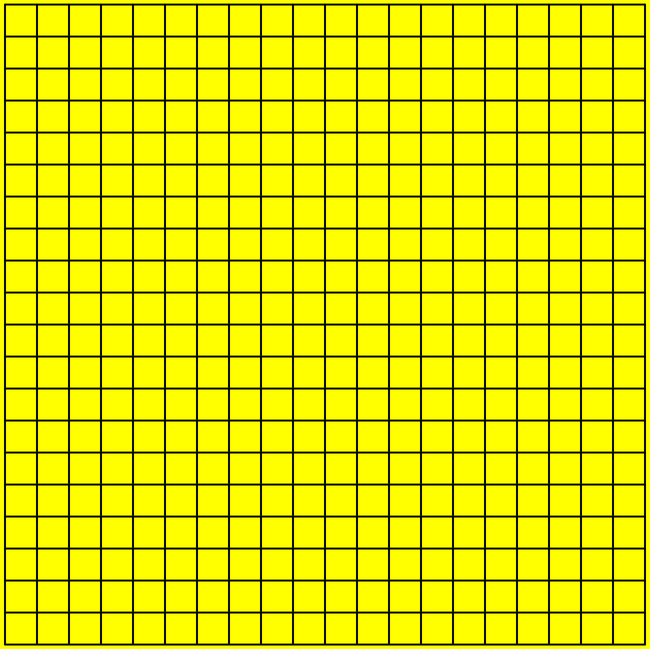

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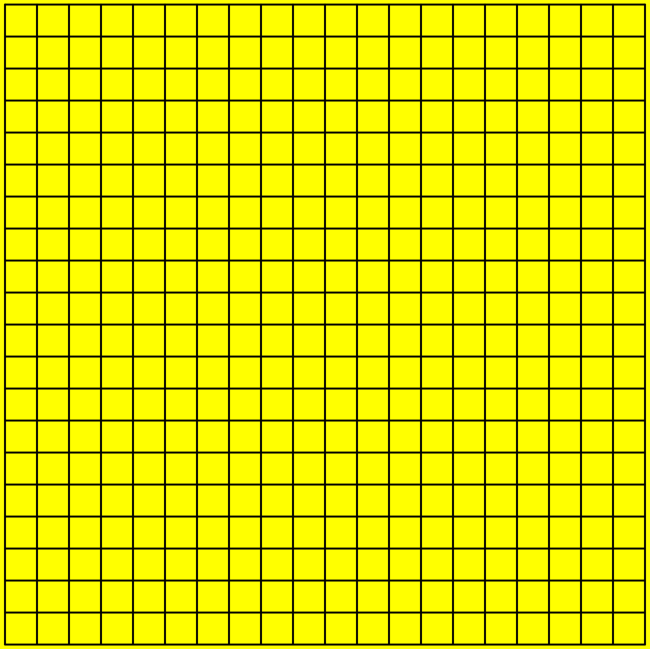

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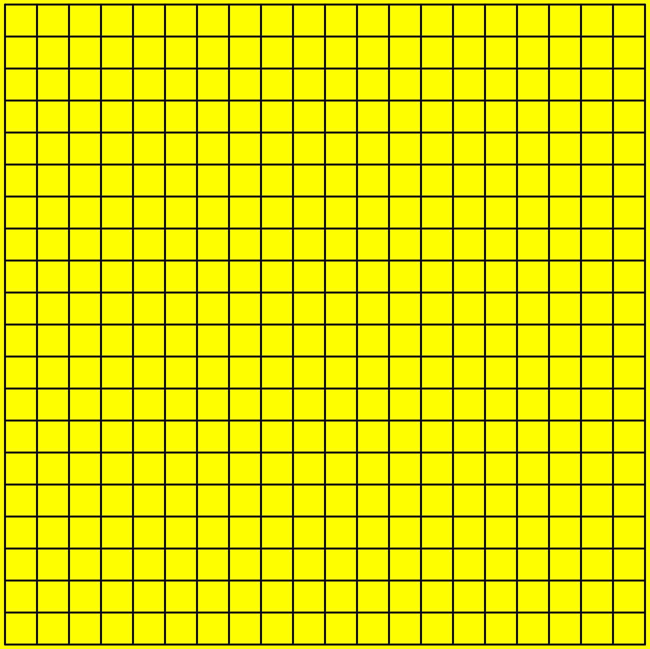

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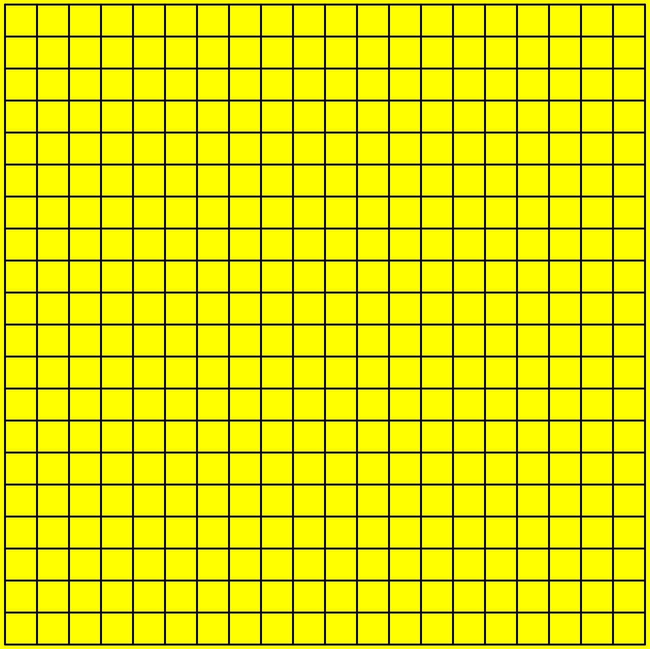

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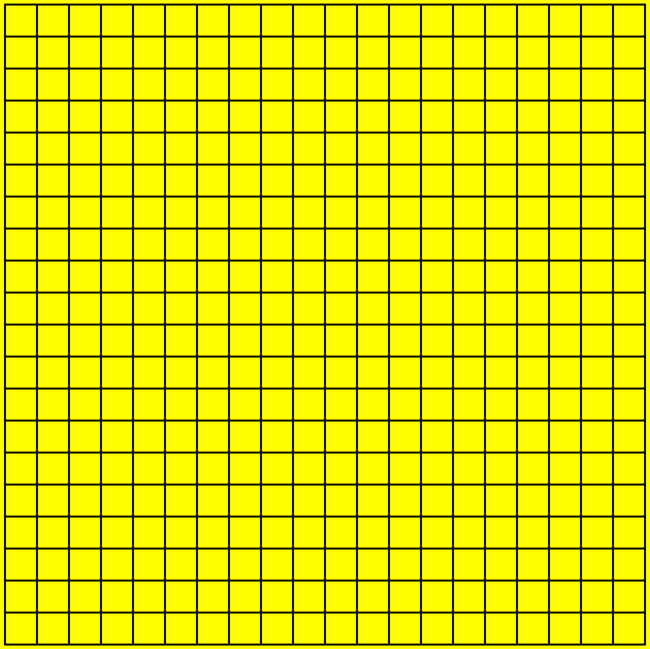

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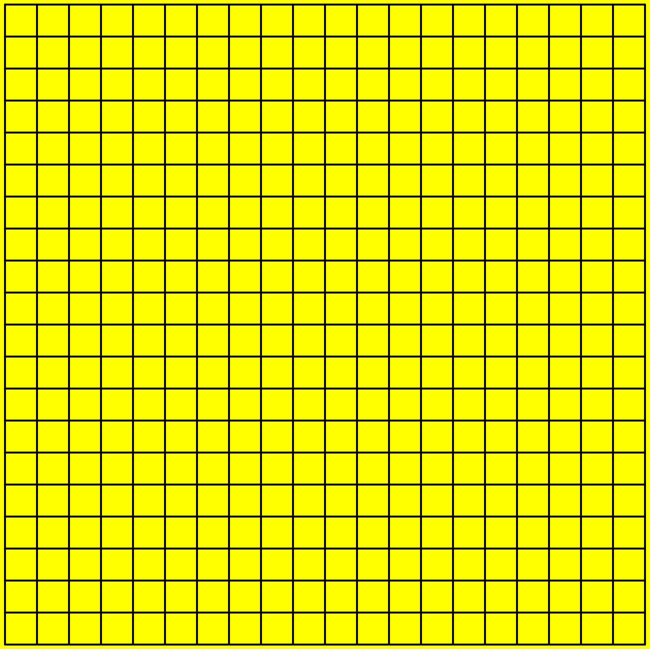

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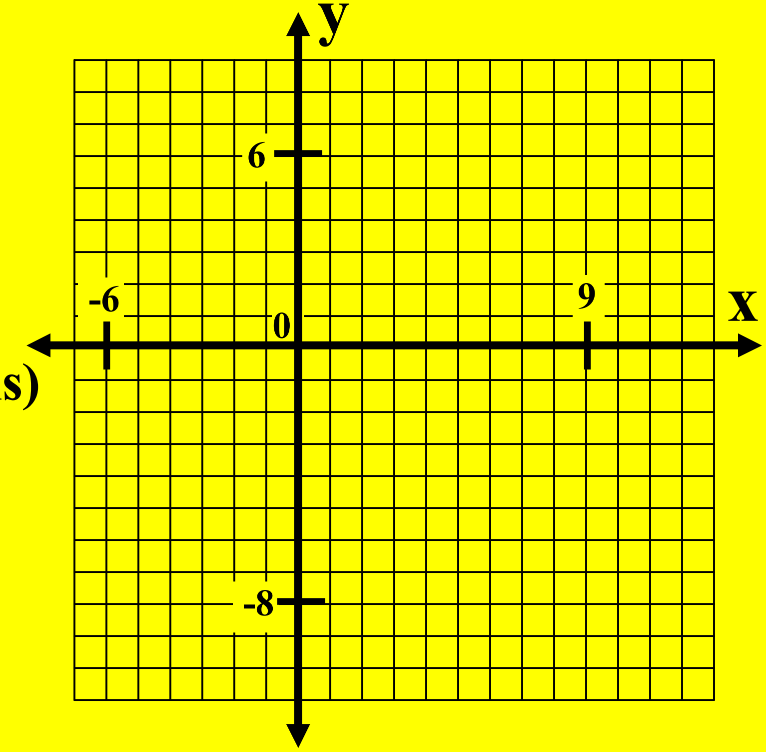

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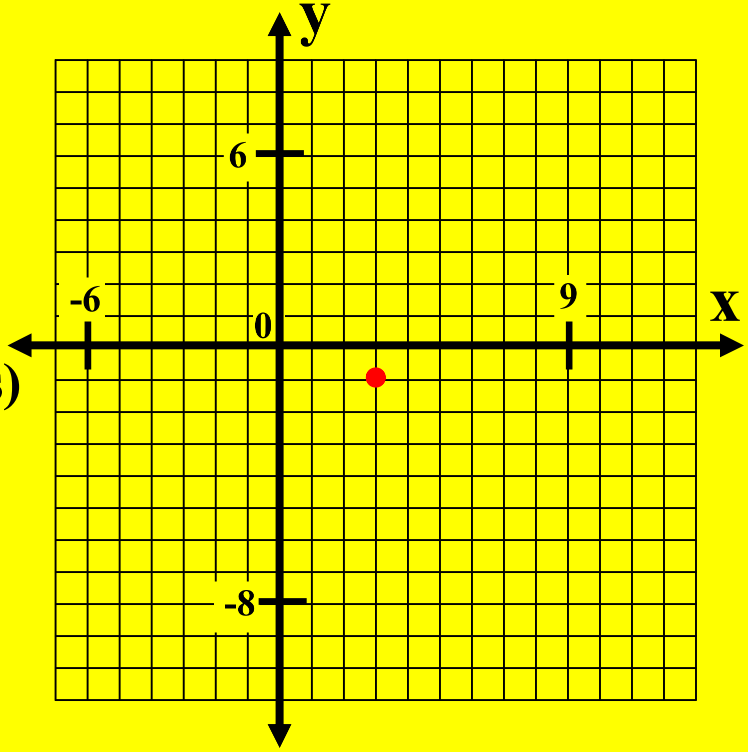

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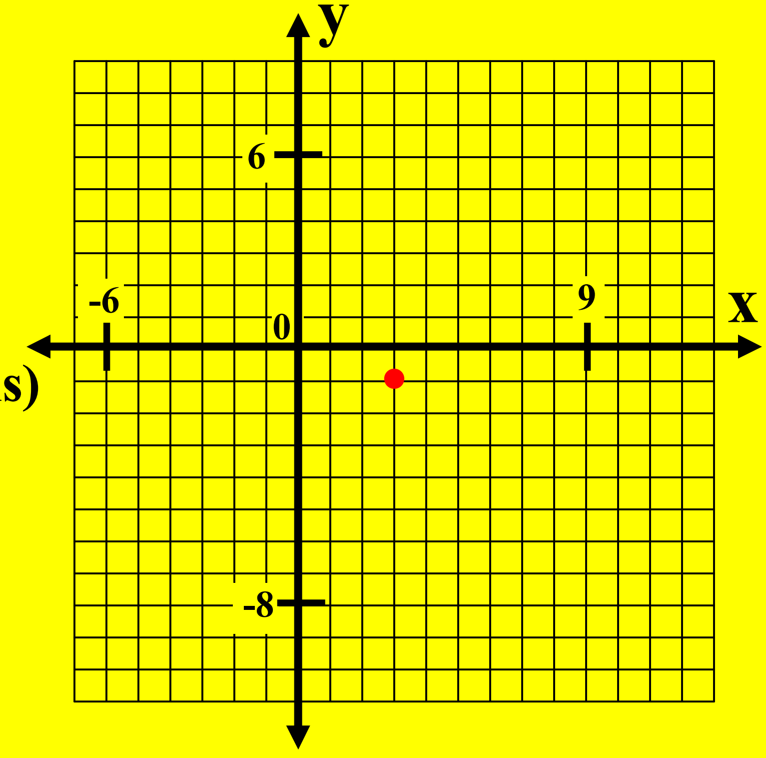

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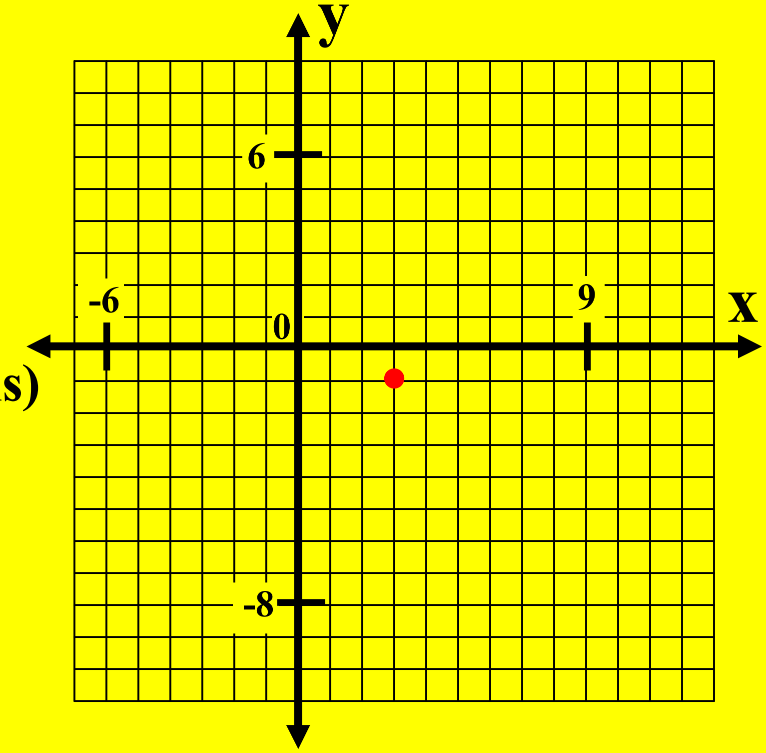

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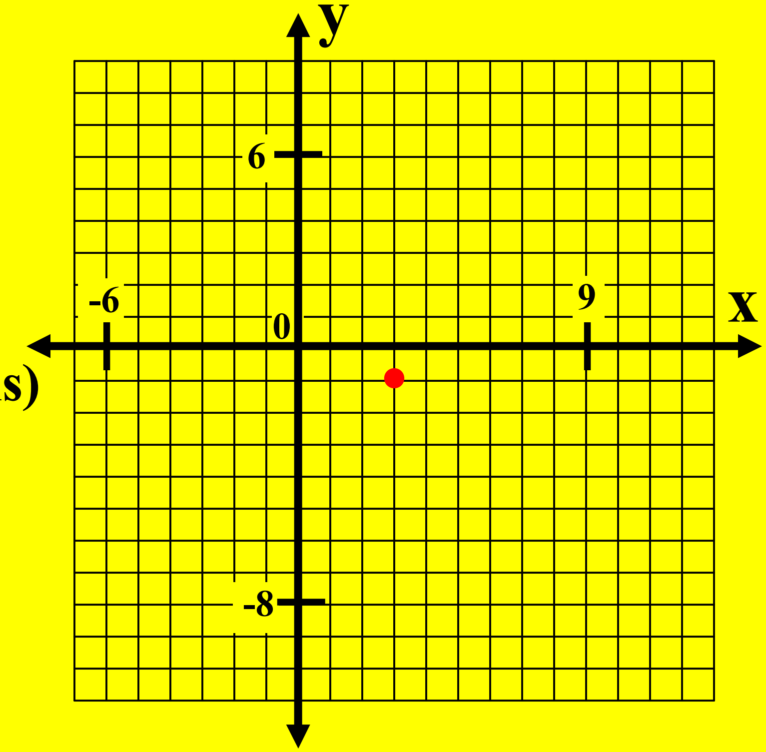

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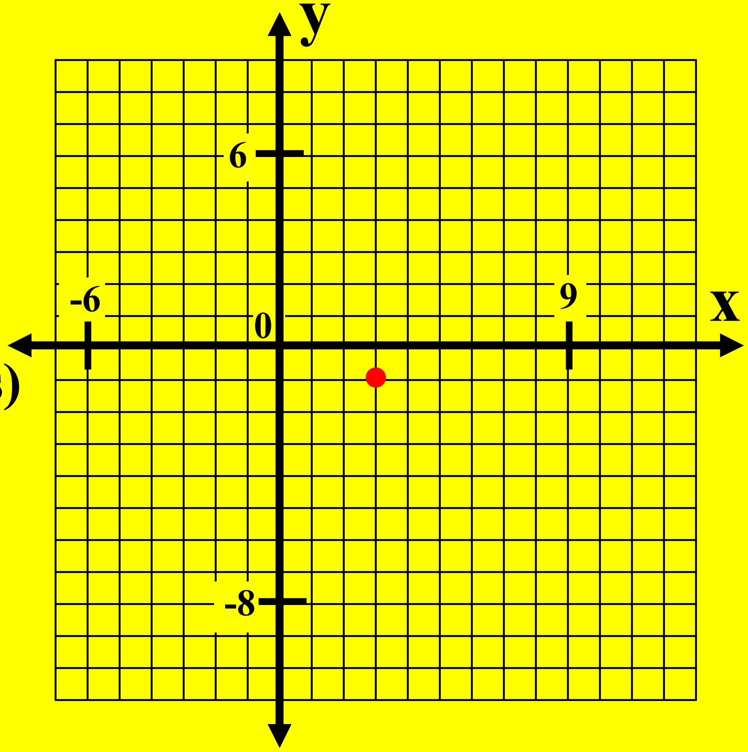

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Type 1 Hyperbola (horizontal transverse axis)

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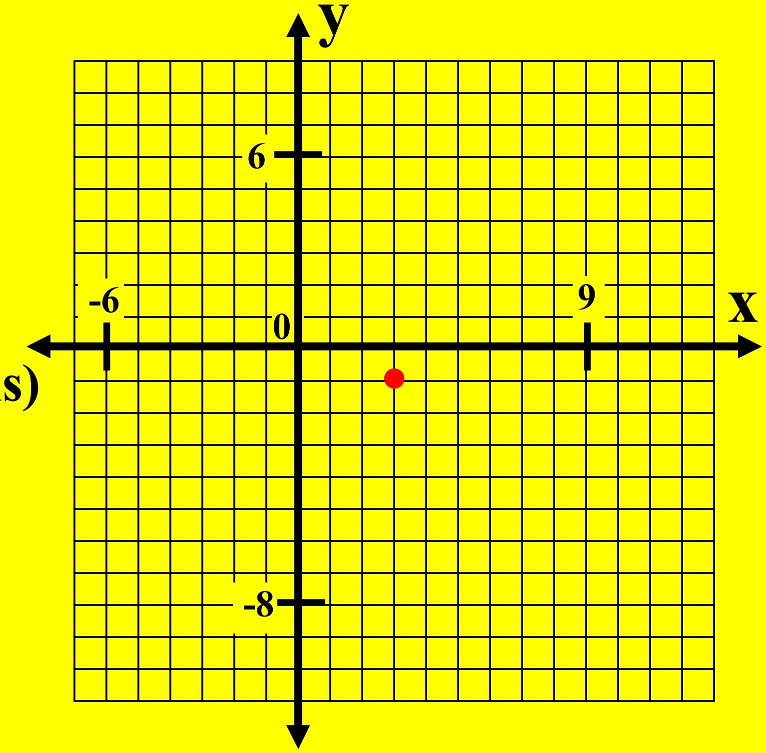

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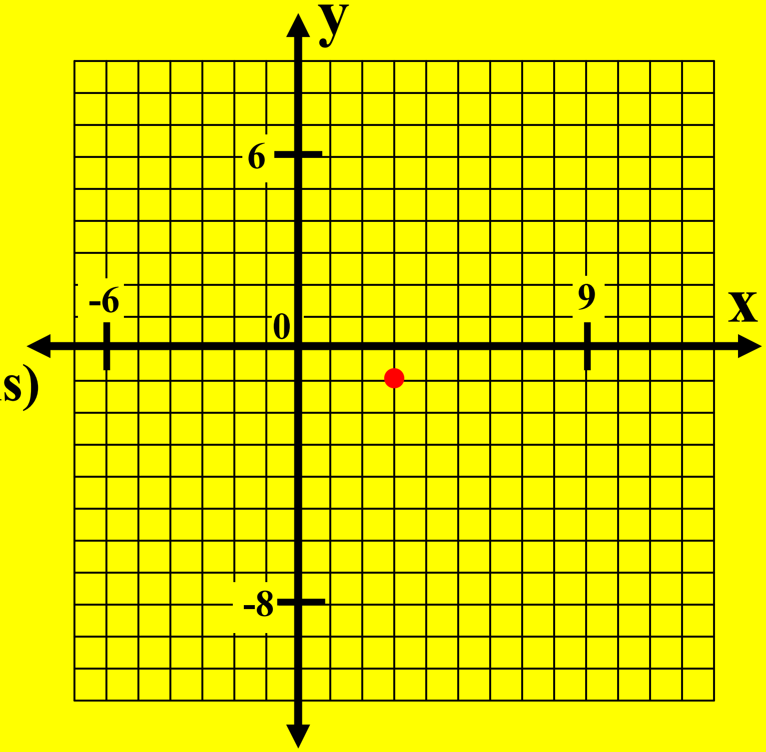

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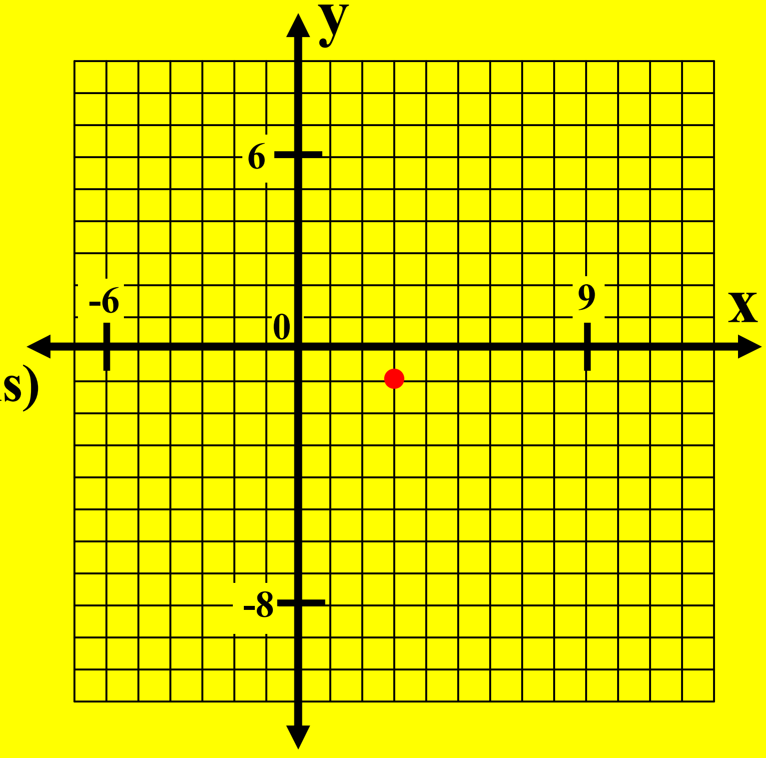

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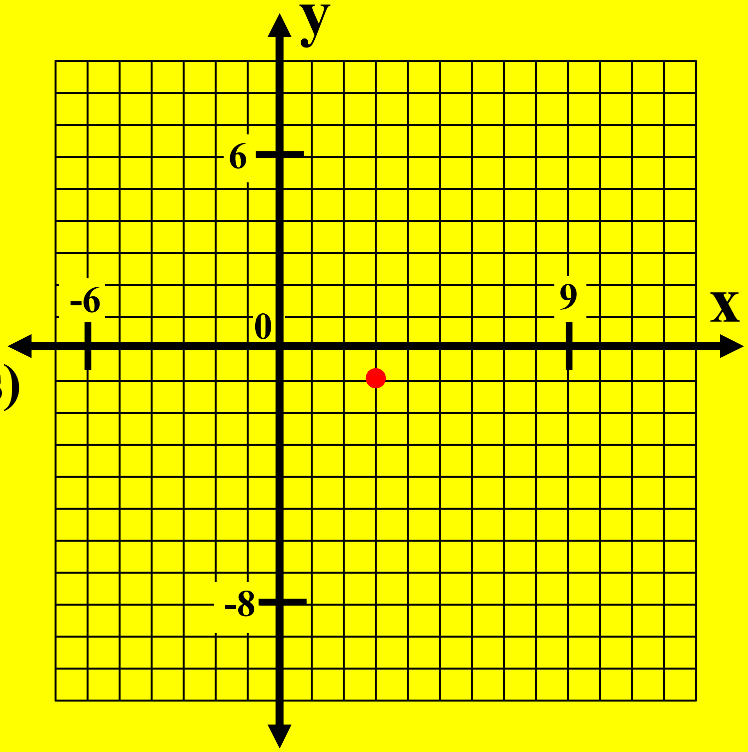

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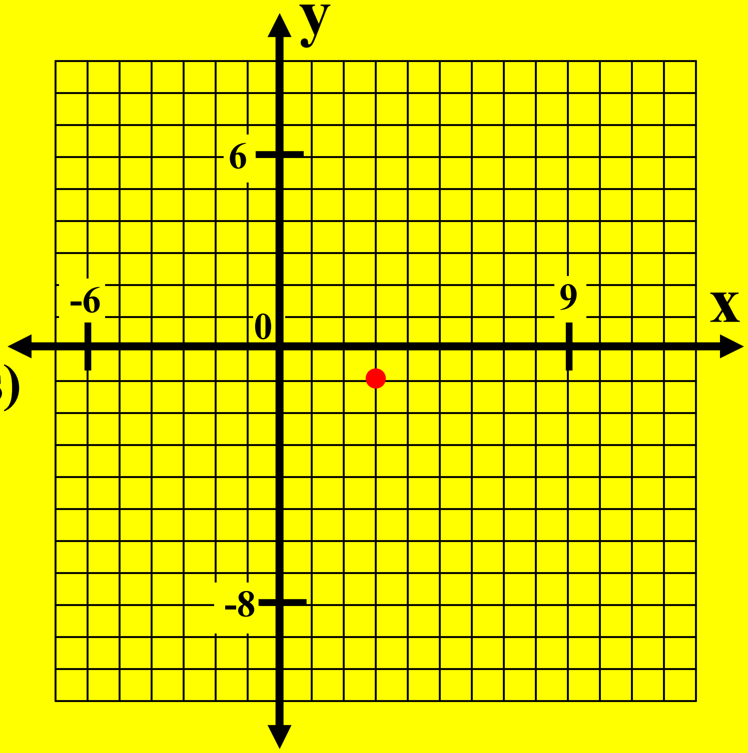

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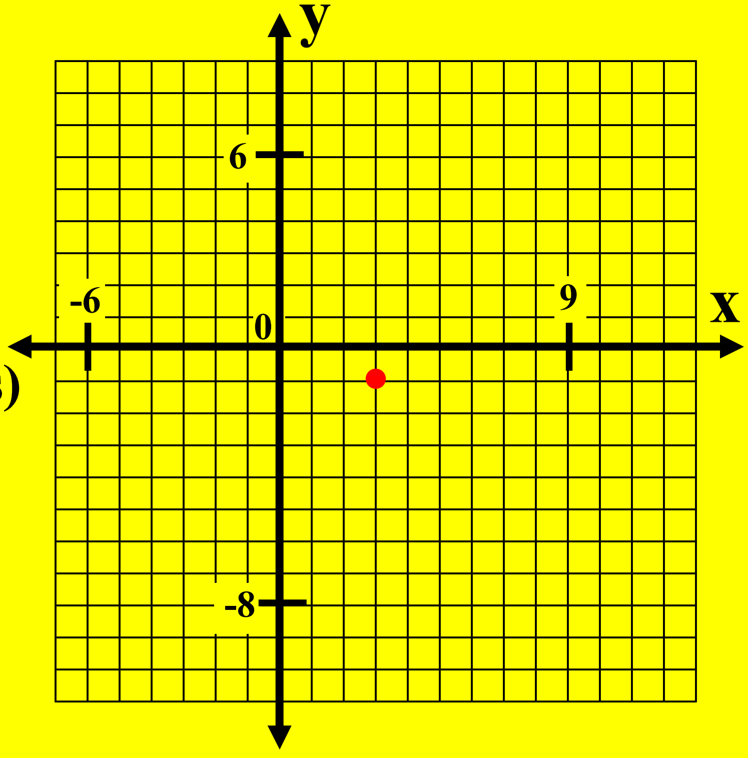

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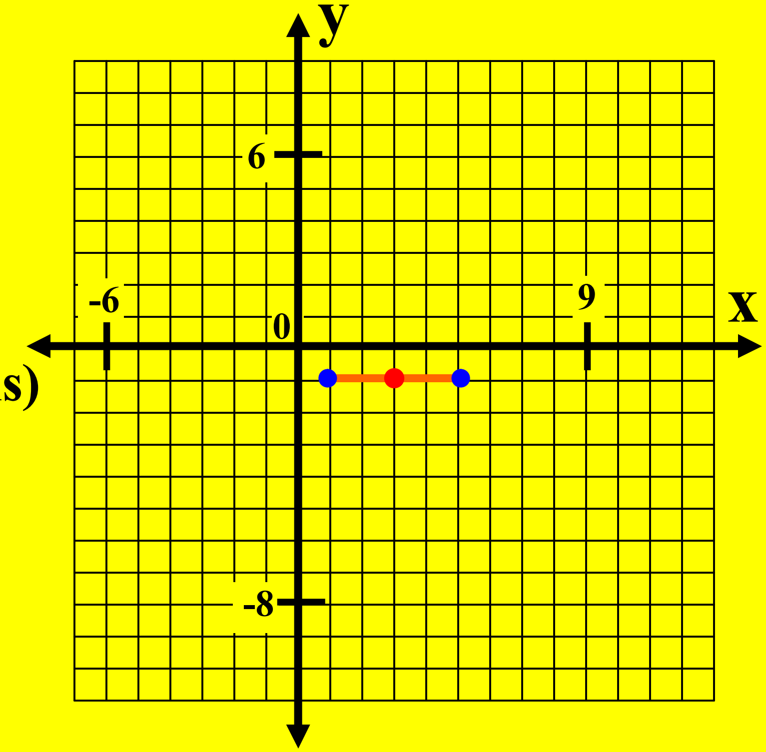

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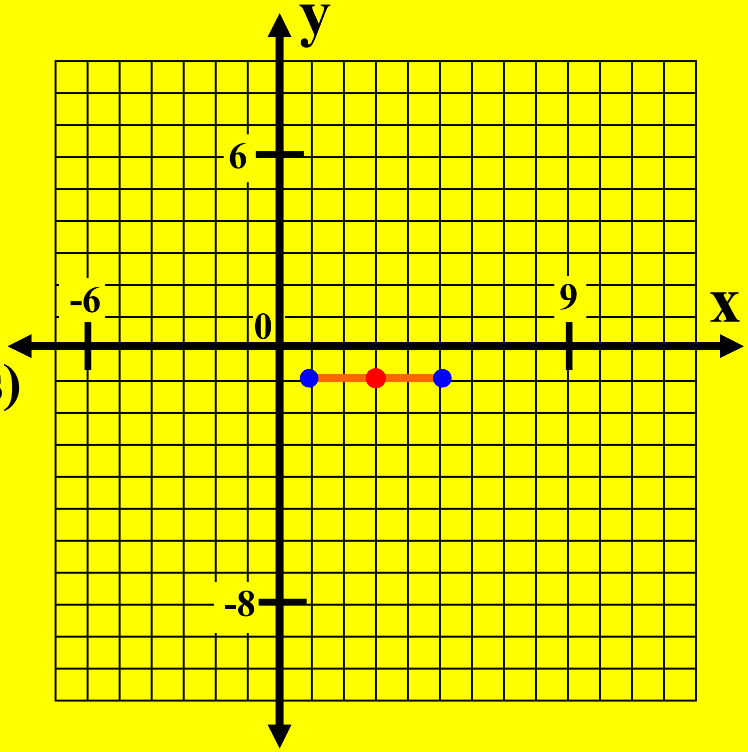

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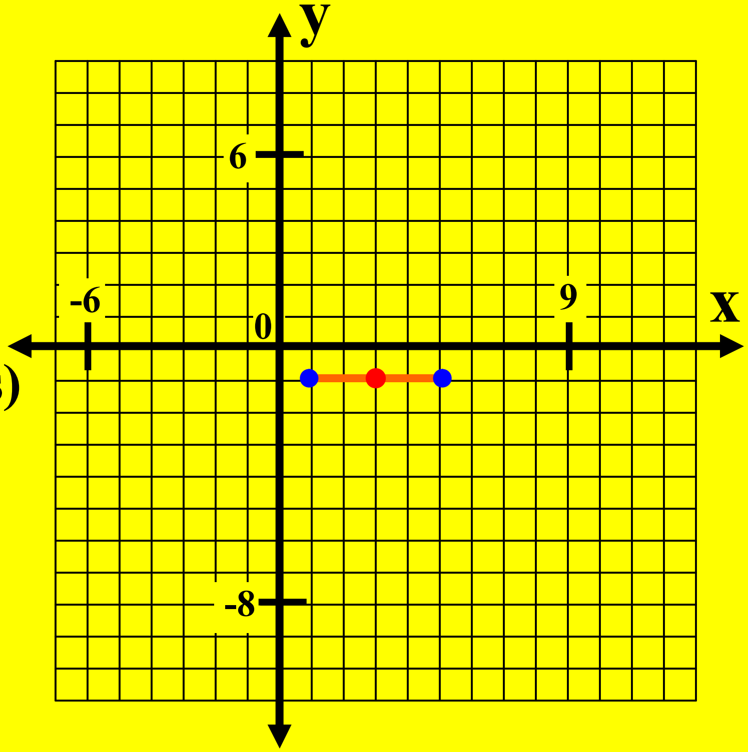

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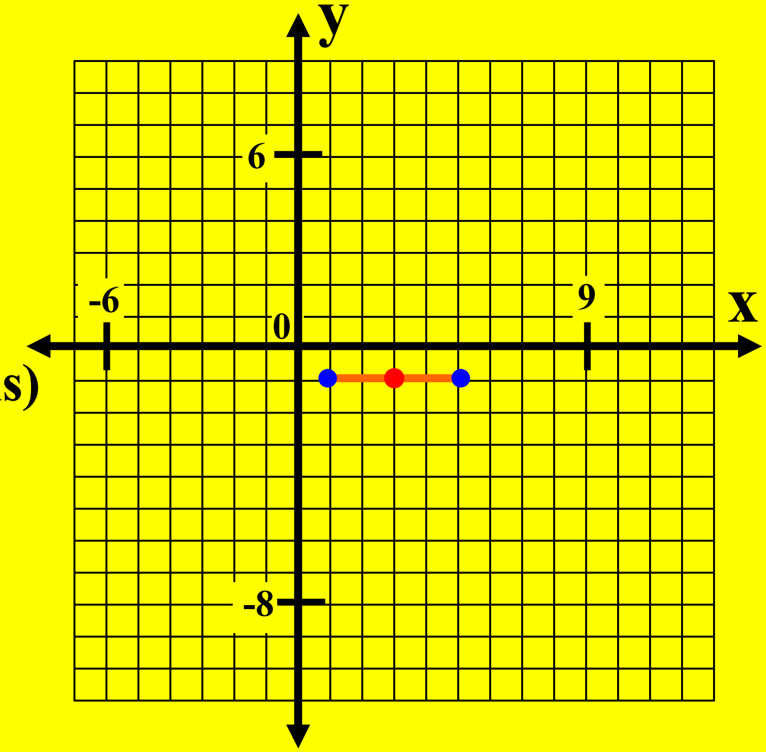

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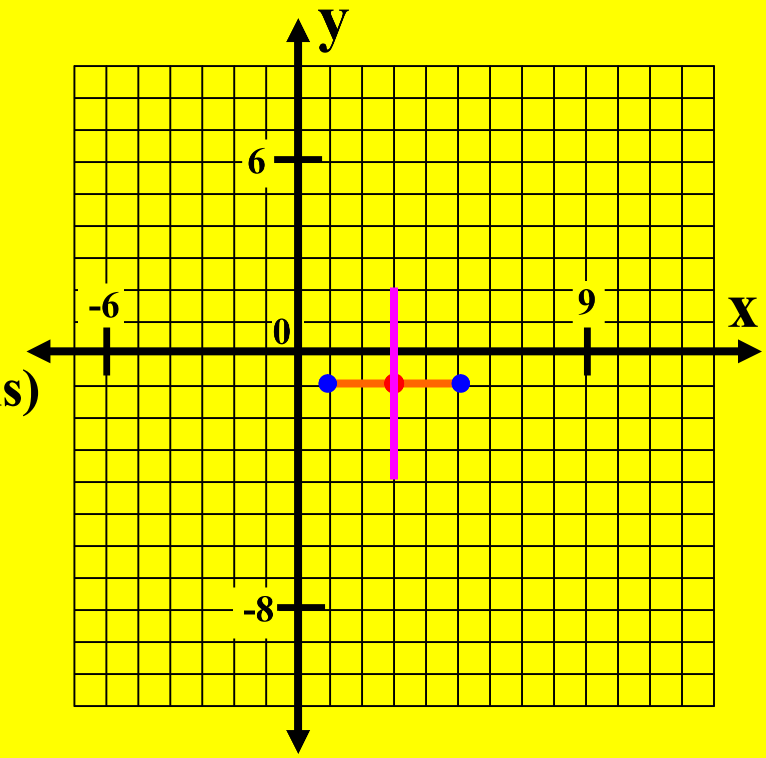

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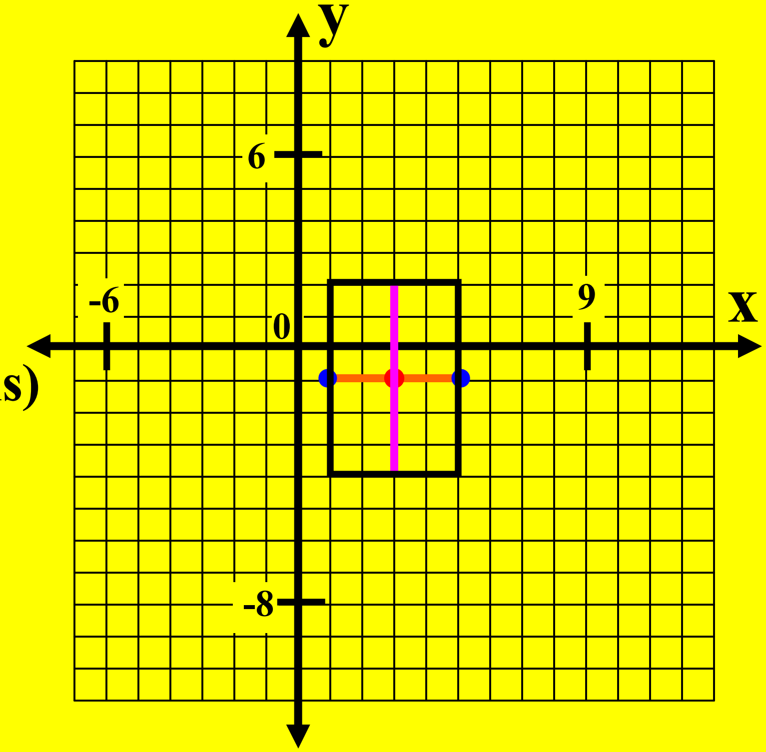

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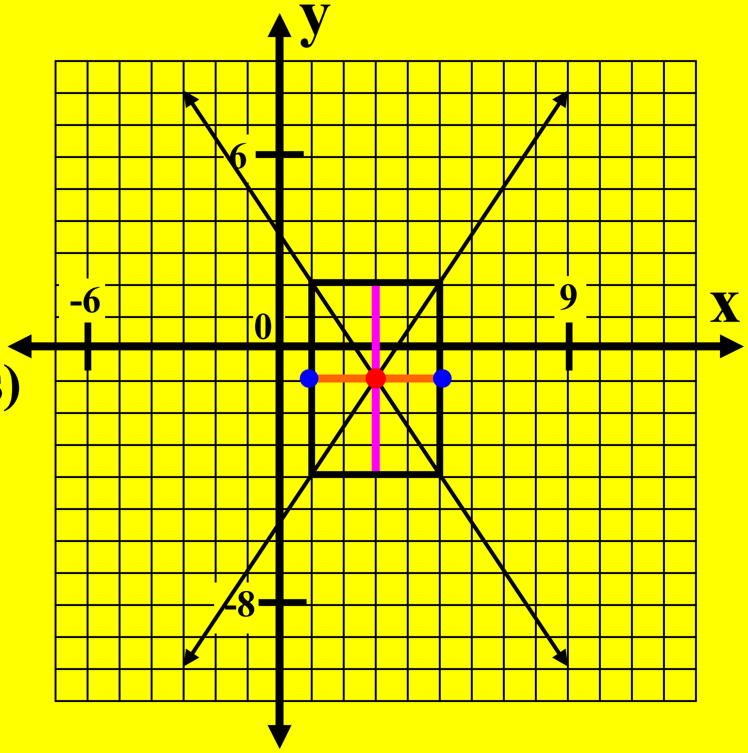

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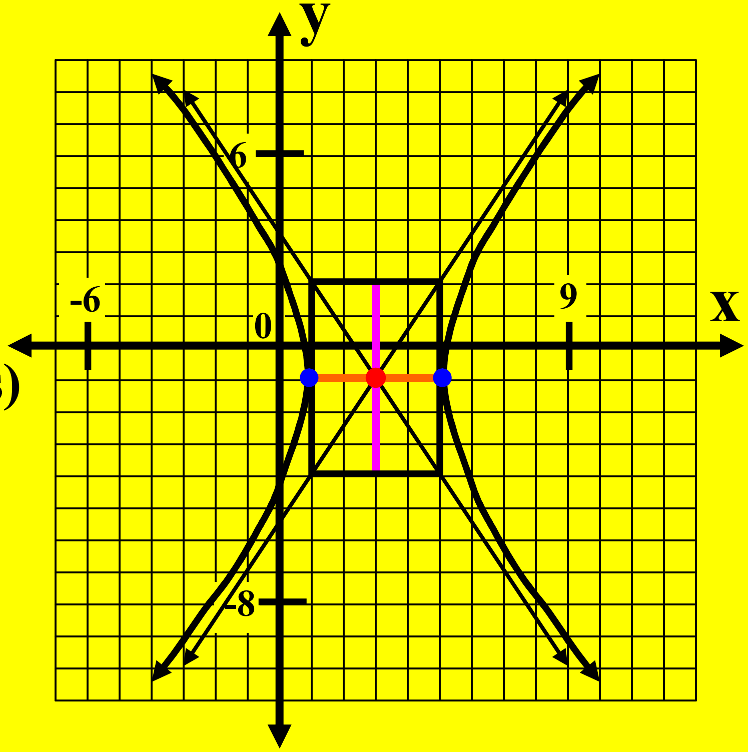

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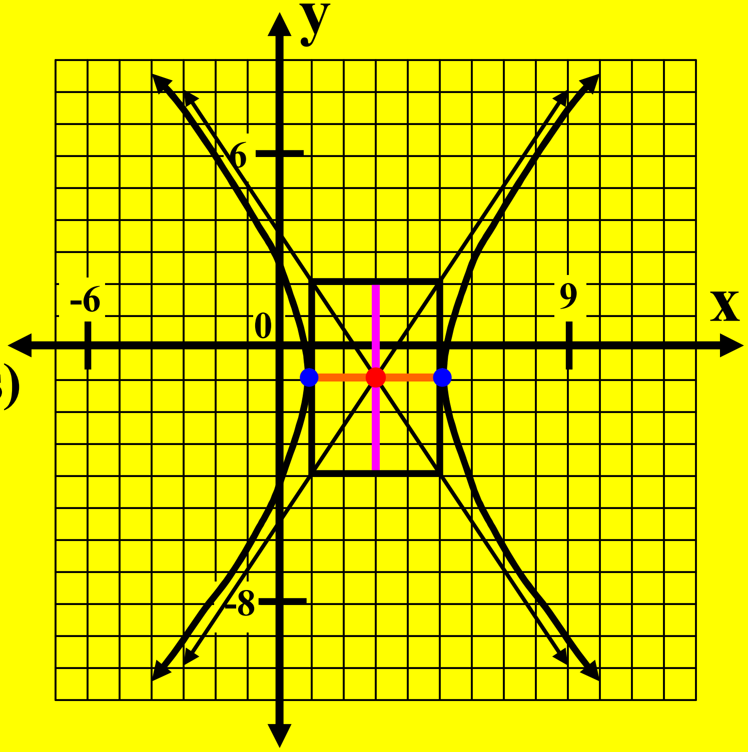

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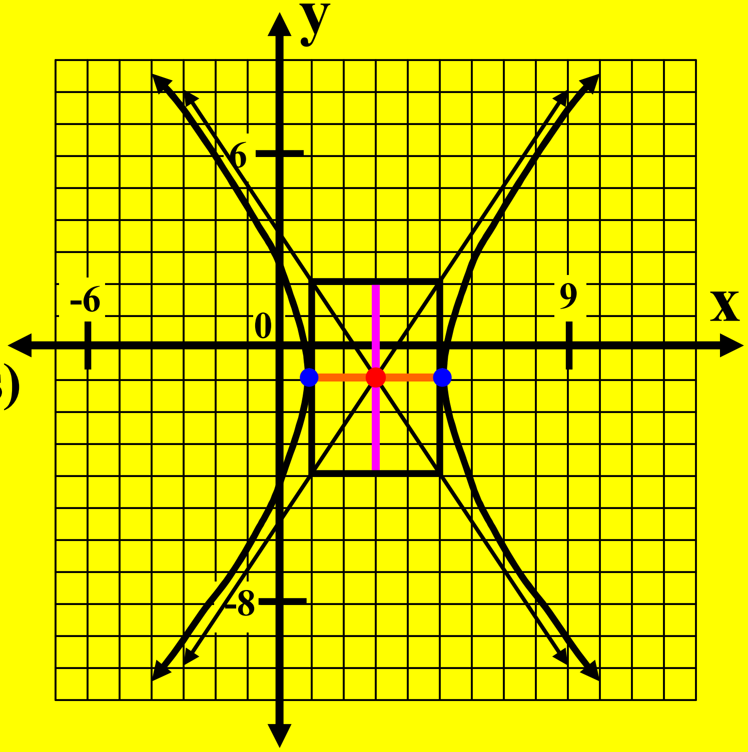

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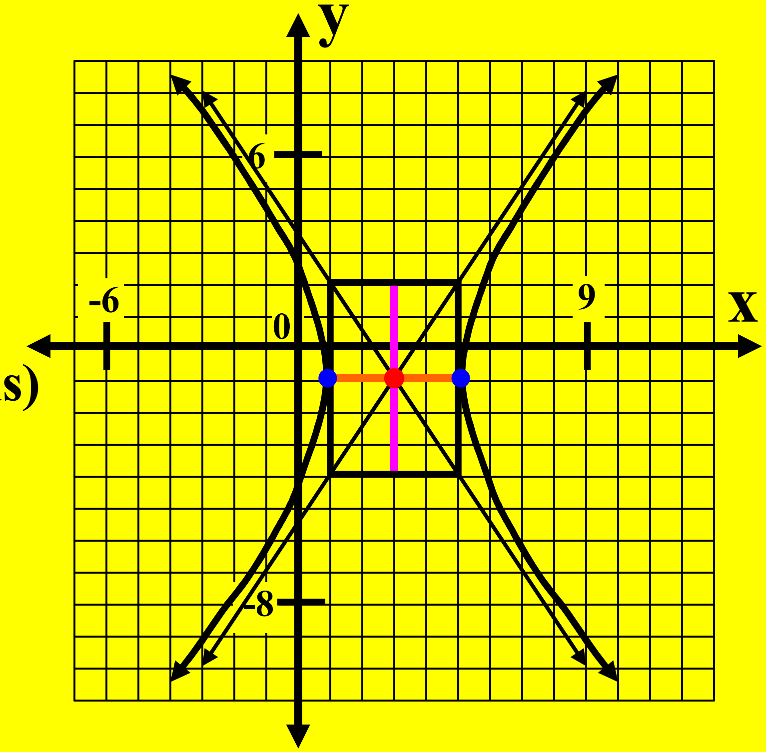

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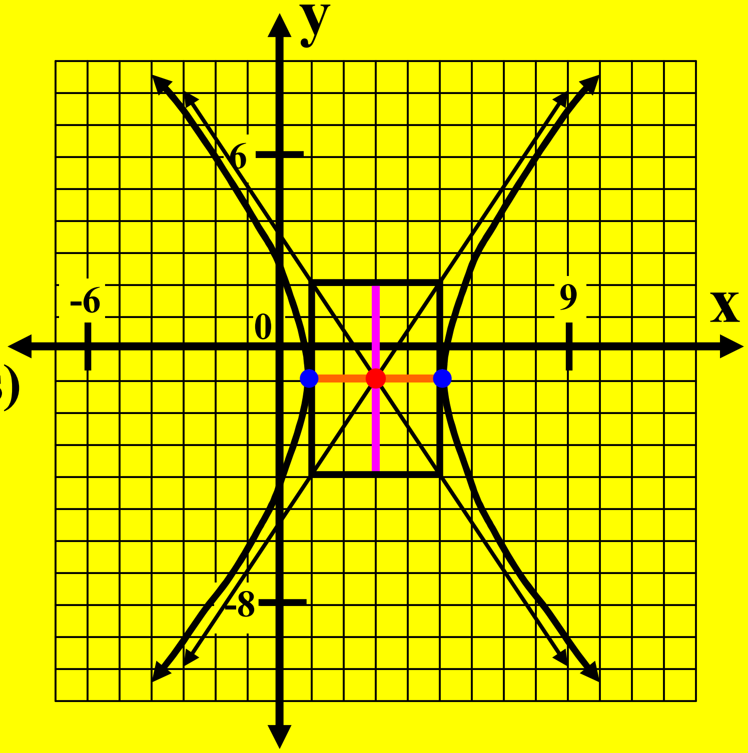

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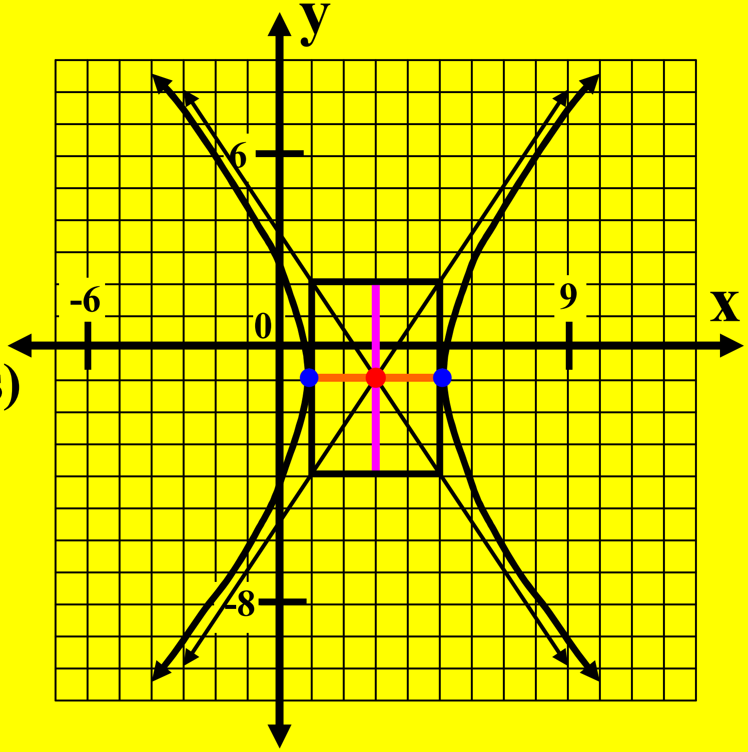

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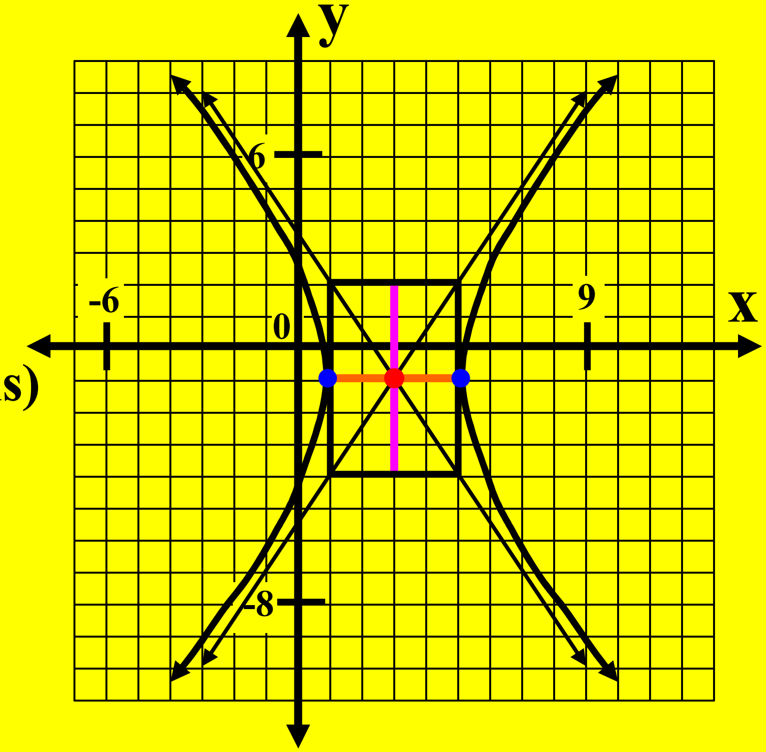

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$$\frac{9(x-3)^2}{36} - \frac{4(y+1)^2}{36} = \frac{36}{36}$$

$$\boxed{\frac{(x-3)^2}{4} - \frac{(y+1)^2}{9} = 1}$$

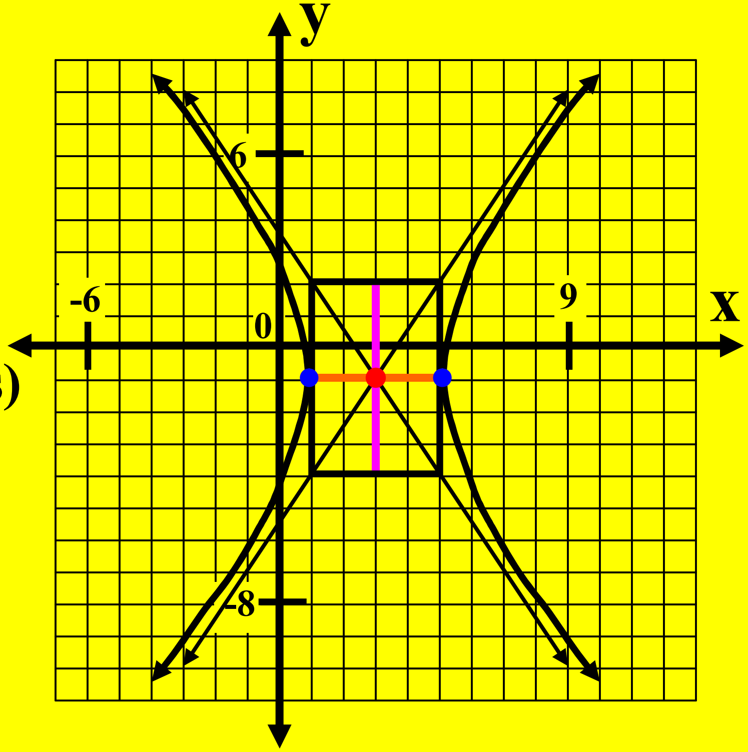
This is the general form equation of an hyperbola.

Type 1 Hyperbola (horizontal transverse axis)

$h = 3$ and $k = -1$ center $(3, -1)$

$a^2 = 4$ and $b^2 = 9$ $a = 2$ and $b = 3$

$c = \sqrt{a^2 + b^2} = \sqrt{4 + 9}$



Algebra 2 Class Worksheet #5 Unit 7

Identify each equation as that of a circle, ellipse, hyperbola, or parabola. Express the equation in standard form and sketch its graph.

3. $9x^2 - 4y^2 - 54x - 8y + 41 = 0$

This is the general form equation of an hyperbola.

$$9x^2 - 54x - 4y^2 - 8y = -41$$

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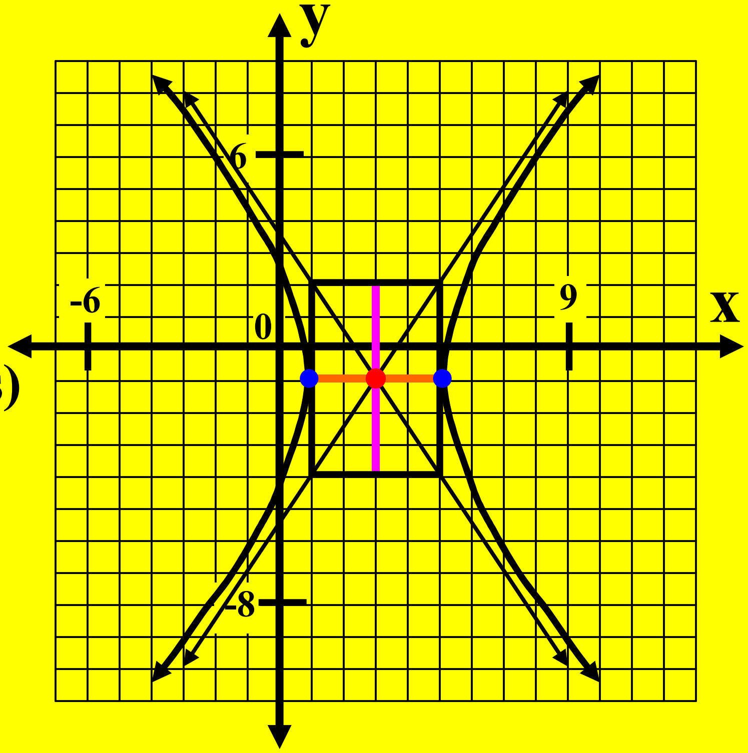

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$h = 3$ and $k = -1$ center $(3, -1)$

$a^2 = 4$ and $b^2 = 9$ $a = 2$ and $b = 3$

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Algebra 2 Class Worksheet #5 Unit 7

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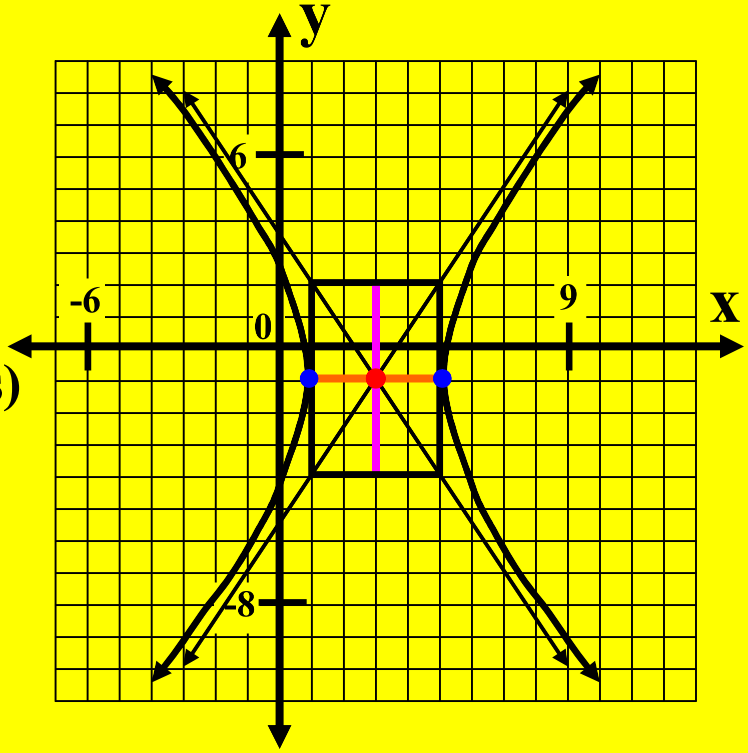

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$h = 3$ and $k = -1$ center $(3, -1)$

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Algebra 2 Class Worksheet #5 Unit 7

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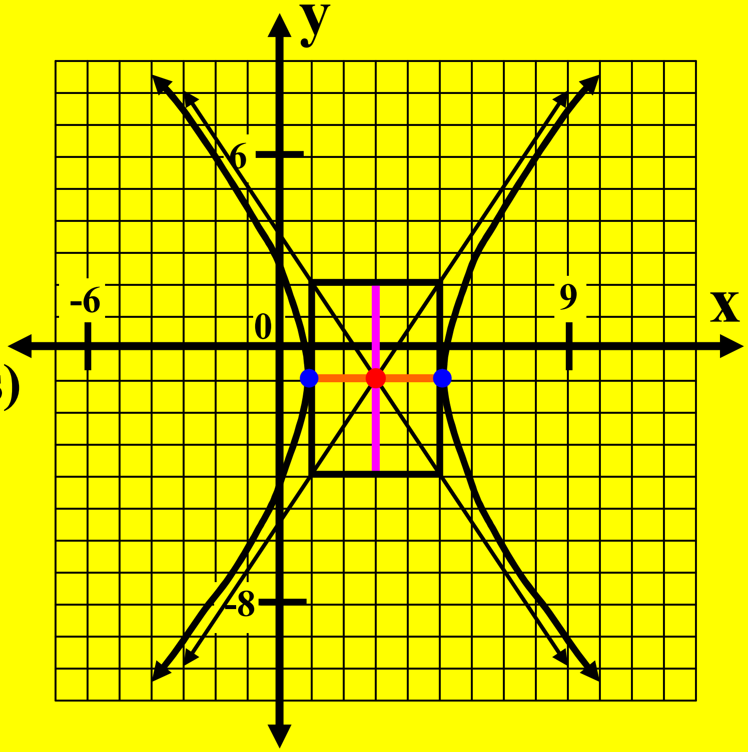

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$$c = \sqrt{a^2 + b^2} = \sqrt{4 + 9} = \sqrt{13} \approx 3.6$$

Algebra 2 Class Worksheet #5 Unit 7

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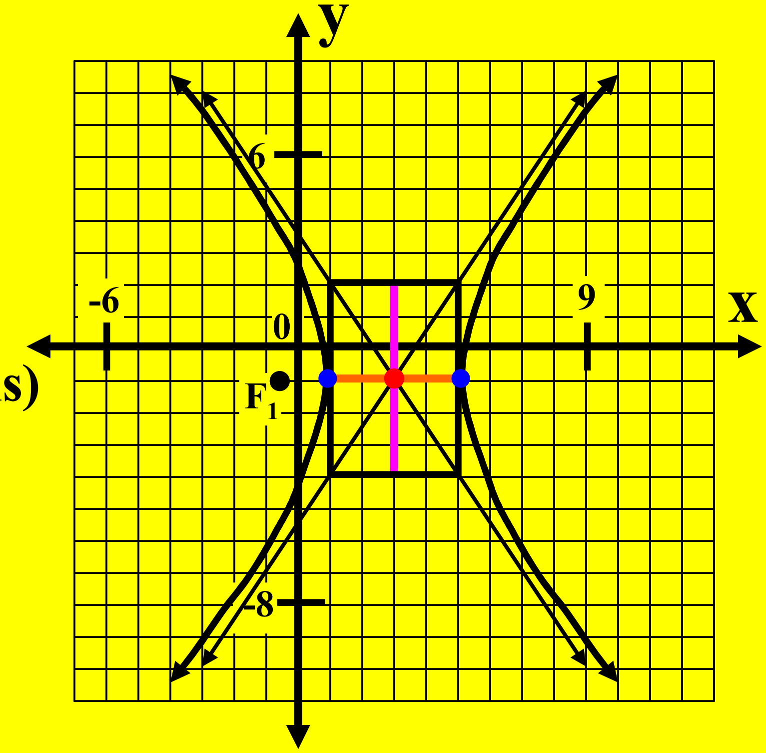

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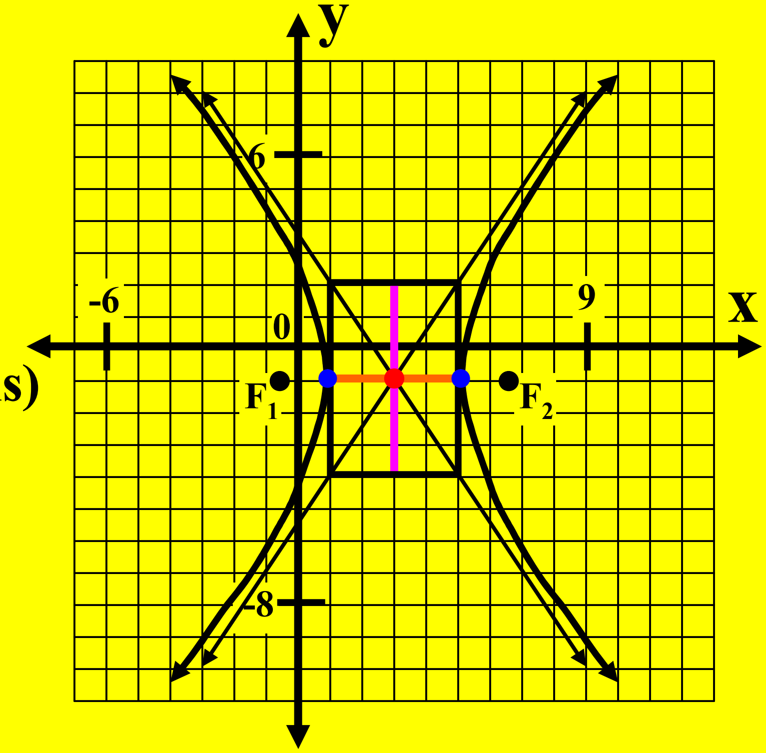

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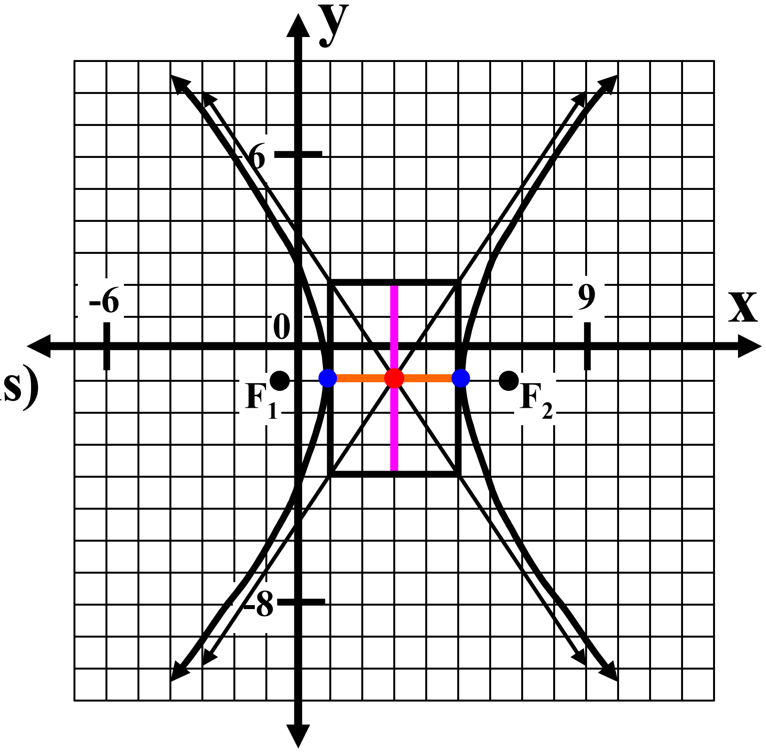

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Algebra 2 Class Worksheet #5 Unit 7

Identify each equation as that of a circle, ellipse, hyperbola, or parabola. Express the equation in standard form and sketch its graph.

4. $y^2 + 4x - 4y - 8 = 0$

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This is the general form equation of a <u>parabola</u>.

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4. $y^2 + 4x - 4y - 8 = 0$

This is the general form equation of a parabola.

Add -4x + 8 to each side.

Algebra 2 Class Worksheet #5 Unit 7

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Express the equation in standard form and sketch its graph.

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Add -4x + 8 to each side.

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4. $y^2 + 4x - 4y - 8 = 0$

$y^2 - 4y = -4x + 8$

This is the general form equation of a parabola.

Complete the square.

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$$y^2 - 4y \qquad = -4x + 8$$

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$(y$

This is the general form equation of a parabola.

Complete the square.

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Identify each equation as that of a circle, ellipse, hyperbola, or parabola. Express the equation in standard form and sketch its graph.

4. $y^2 + 4x - 4y - 8 = 0$

$y^2 - 4y = -4x + 8$

$y^2 - 4y + 4 = -4x + 8 + 4$

$(y - 2)$

This is the general form equation of a parabola.

Complete the square.

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$(y - 2)^2$

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4. $y^2 + 4x - 4y - 8 = 0$

$y^2 - 4y = -4x + 8$

$y^2 - 4y + 4 = -4x + 8 + 4$

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

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This is the general form equation of a parabola.

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

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

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

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

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

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$$x - 3 = \frac{-1}{4}(y - 2)^2$$

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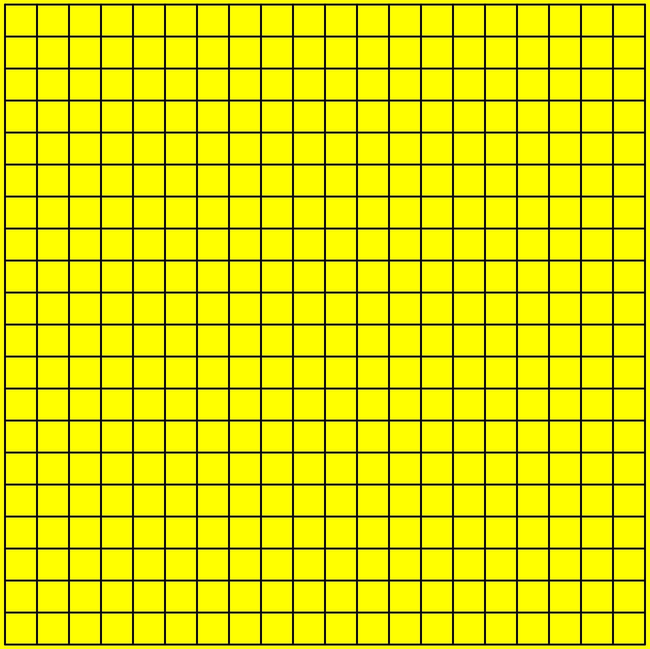

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Type 2 Parabola

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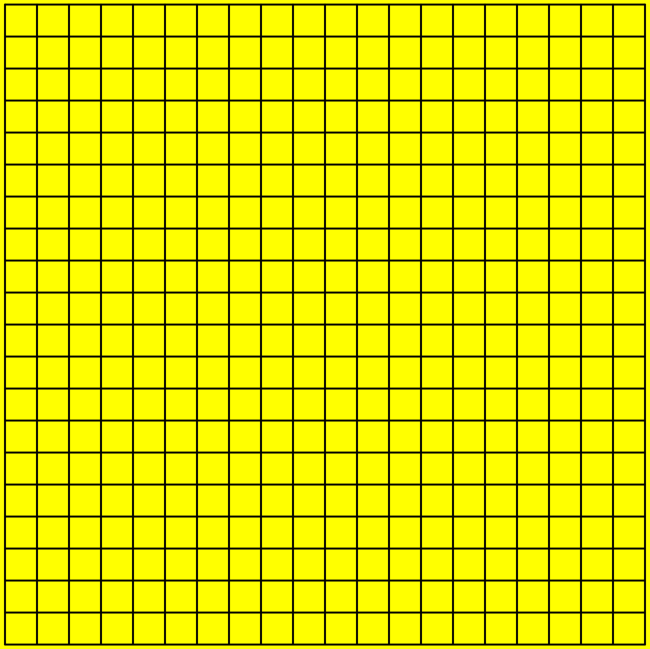

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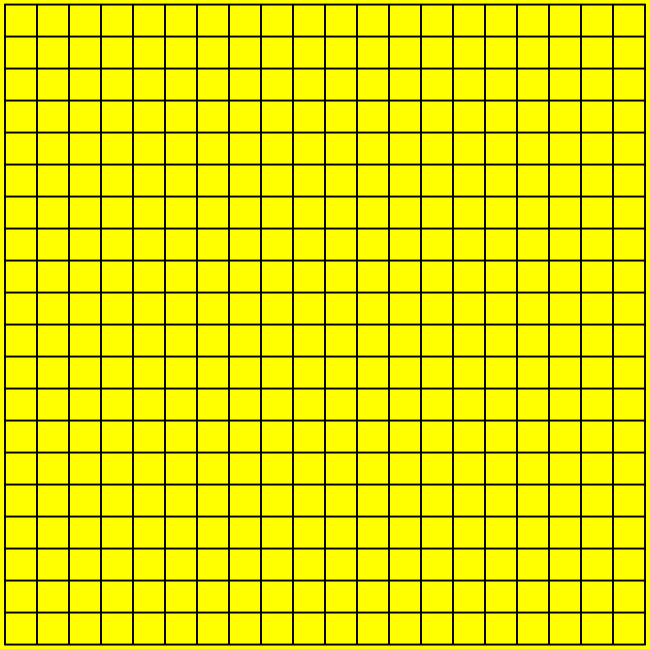

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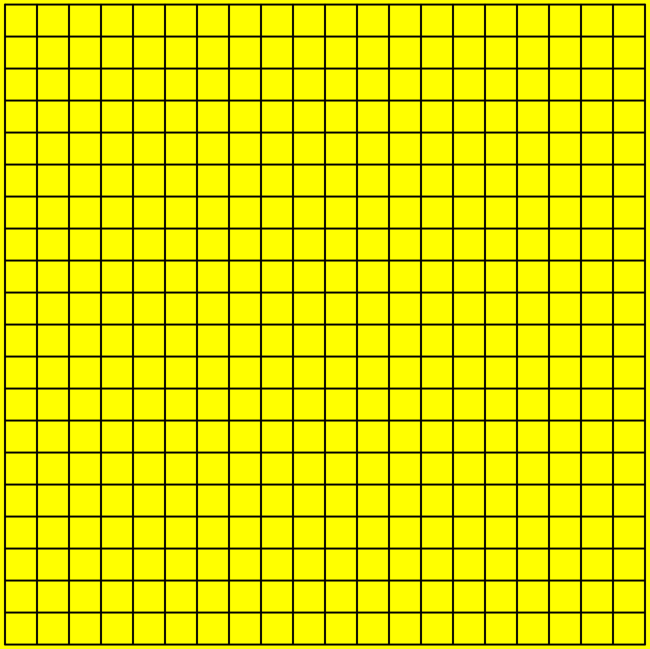

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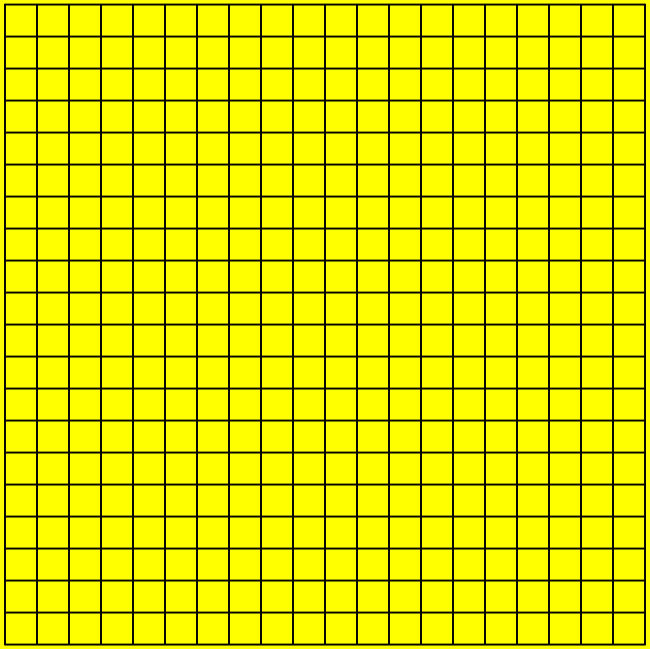

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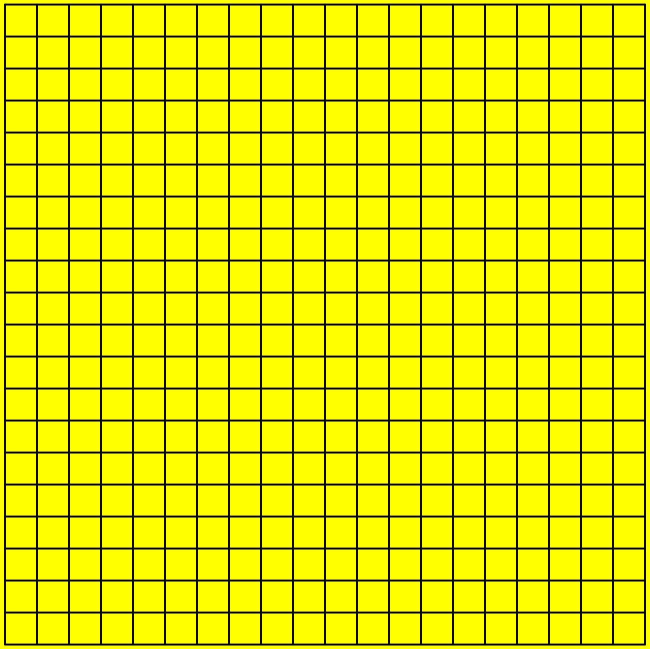

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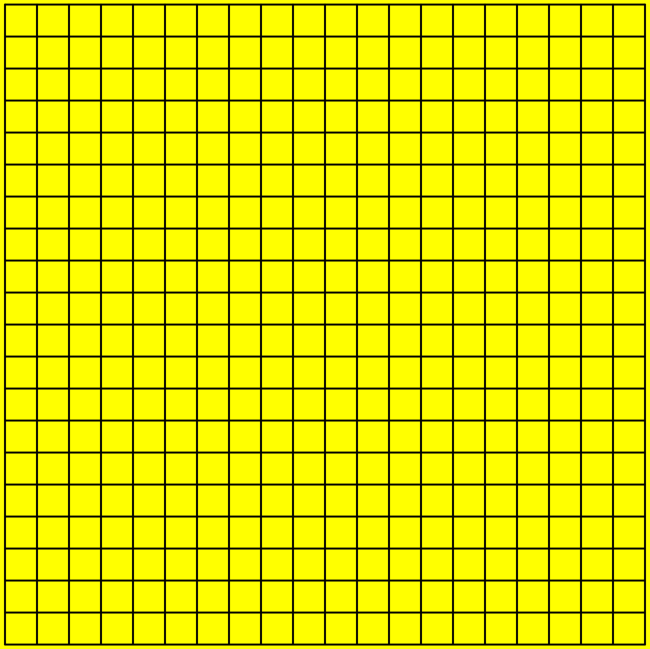

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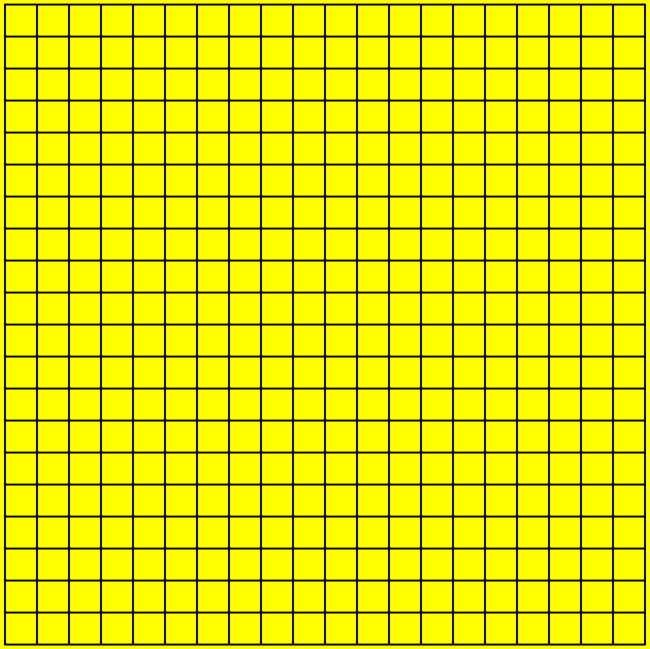

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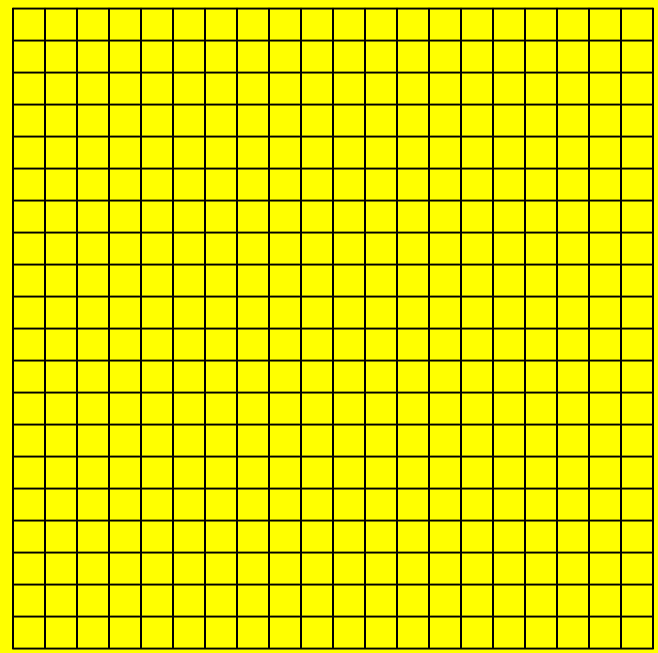

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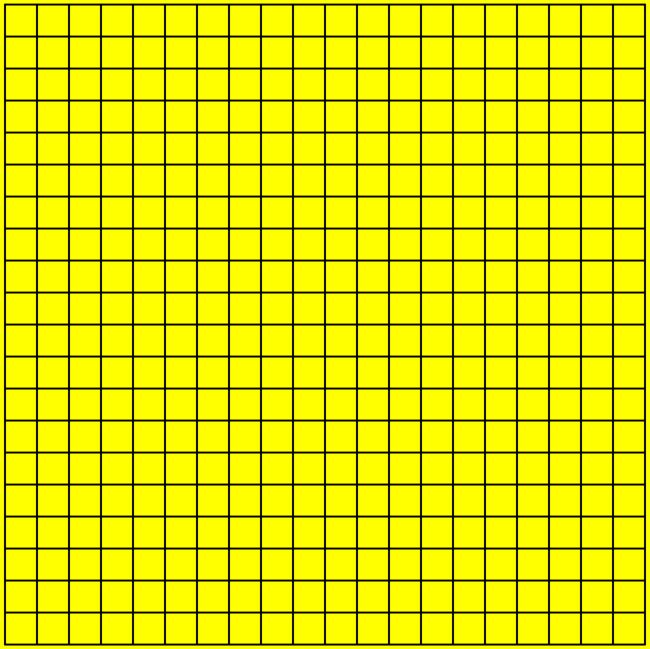
$h = 3$ and $k = 2$



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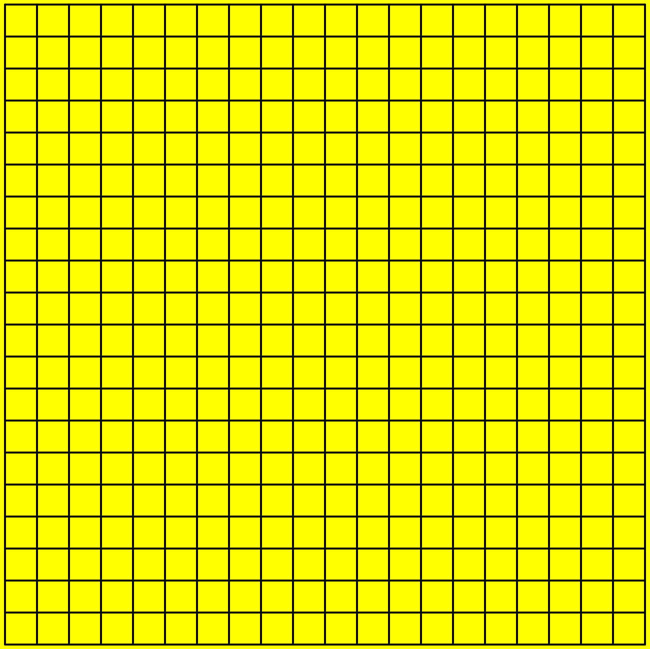

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Type 2 Parabola (vertical directrix)

$h = 3$ and $k = 2$ vertex

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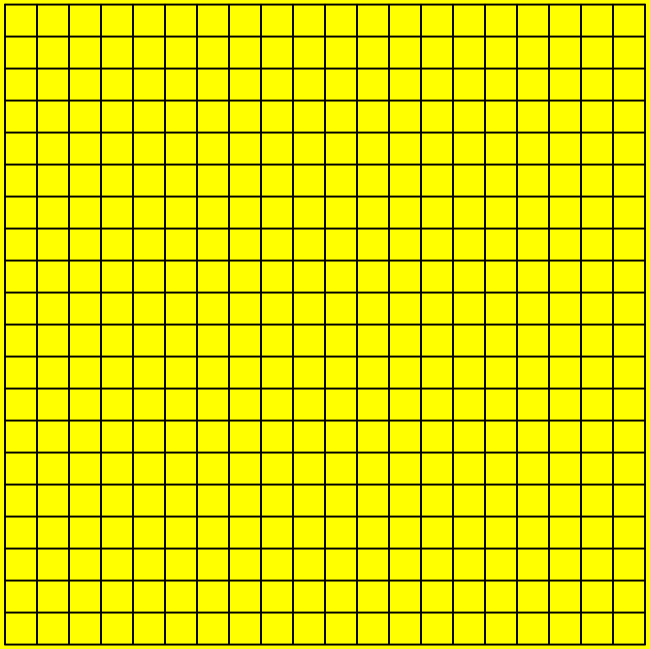

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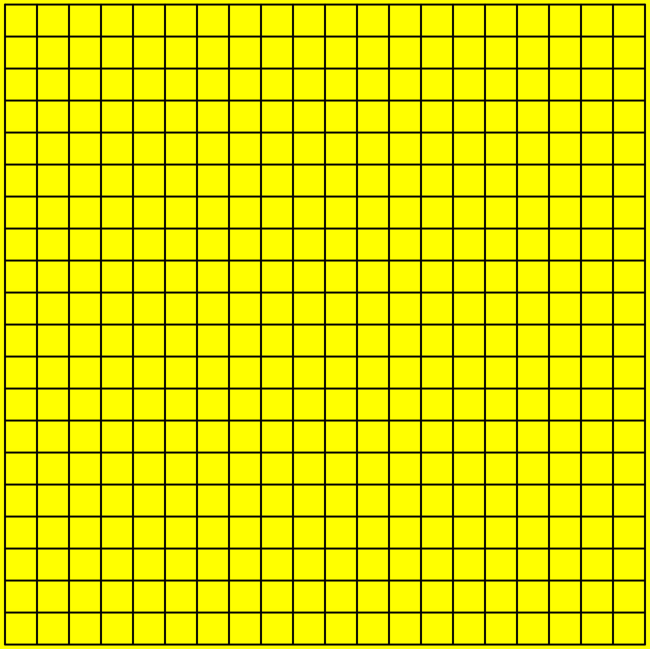

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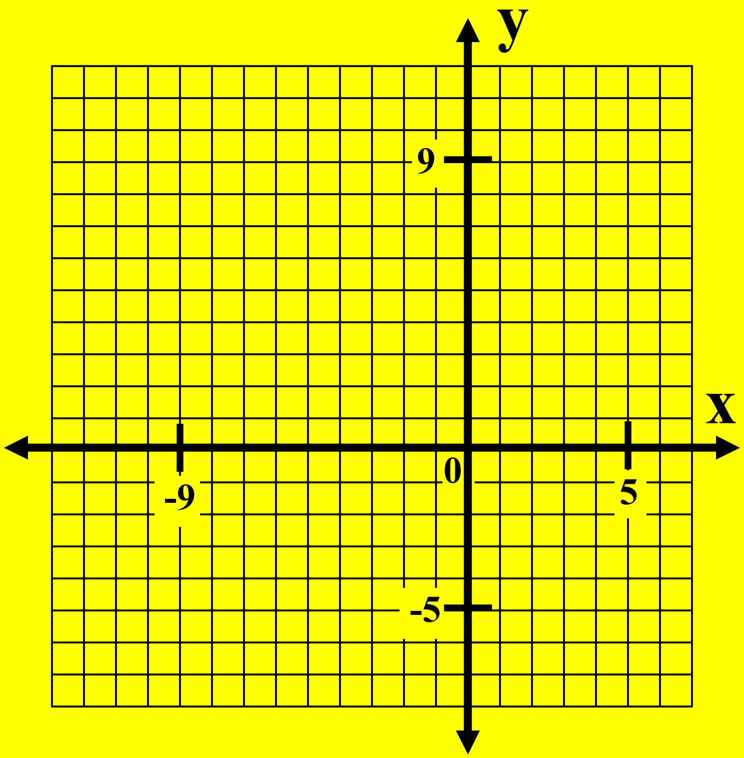

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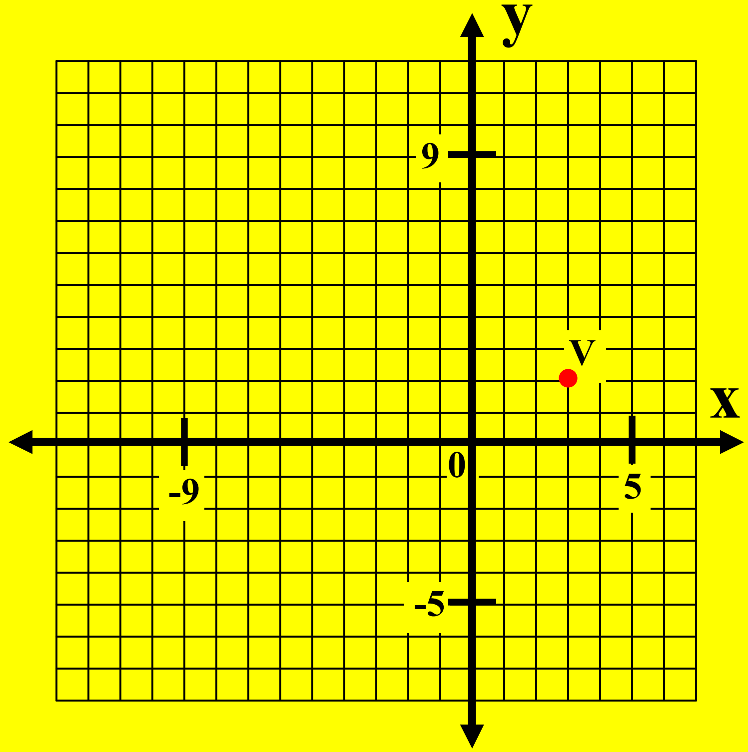

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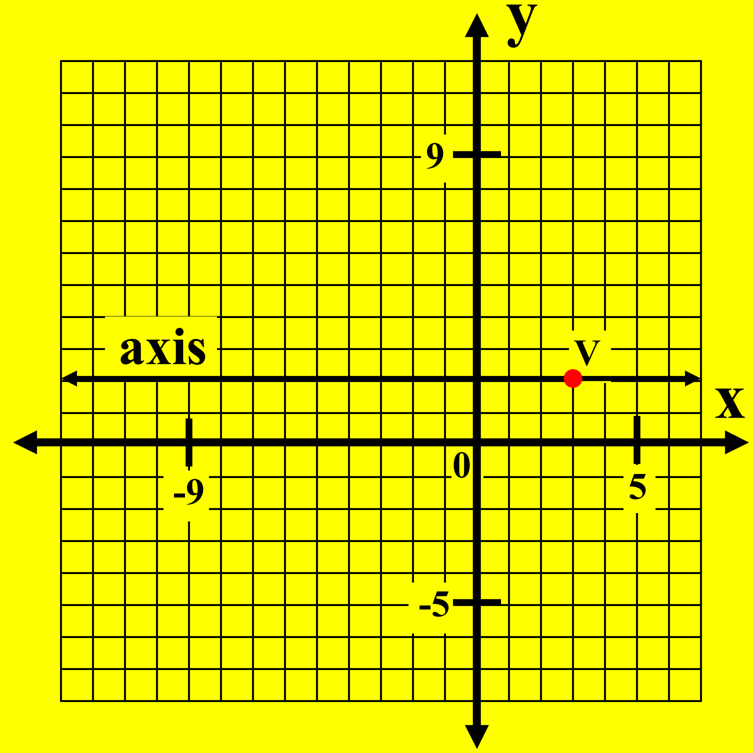

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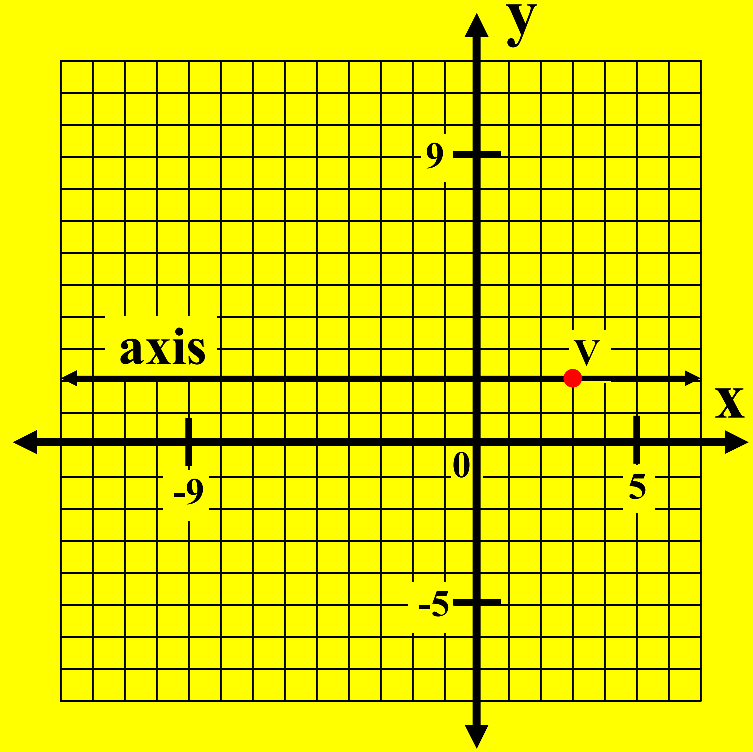

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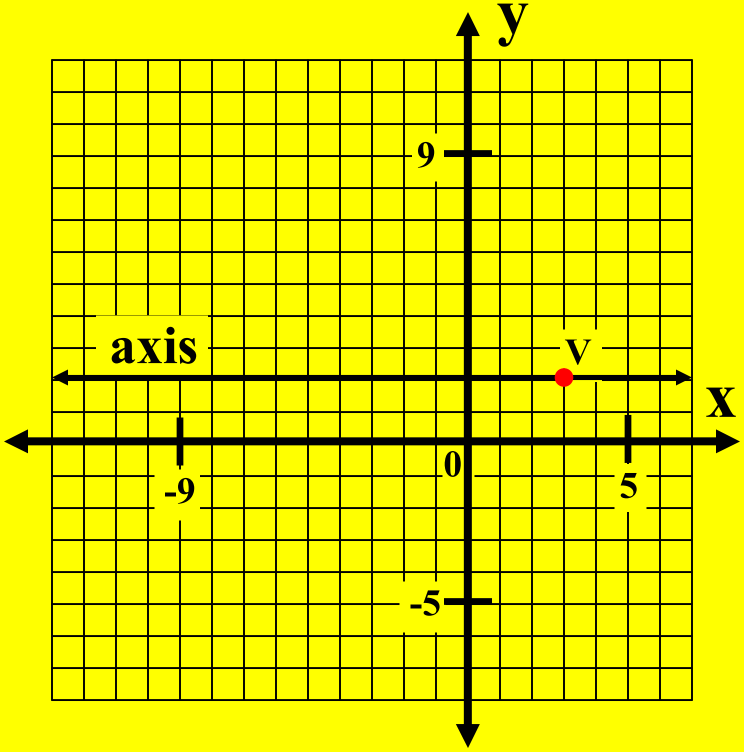
Type 2 Parabola (vertical directrix)

$h = 3$ and $k = 2$ vertex $(3, 2)$

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



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

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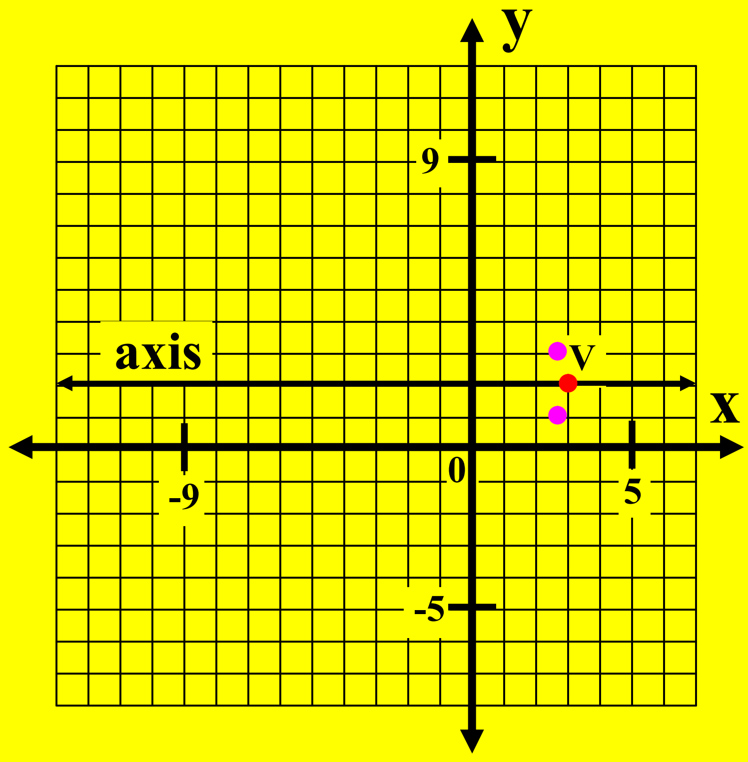

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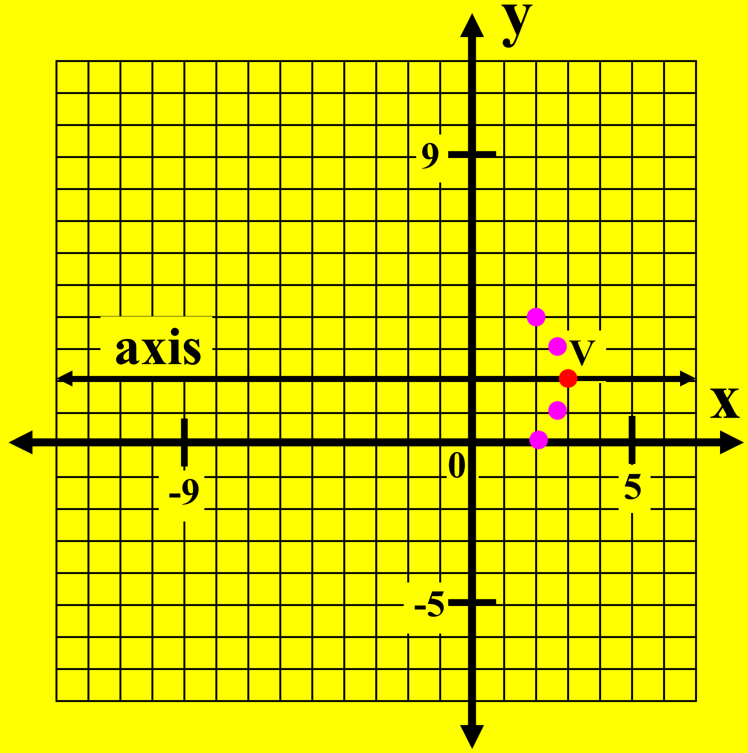

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Type 2 Parabola (vertical directrix)

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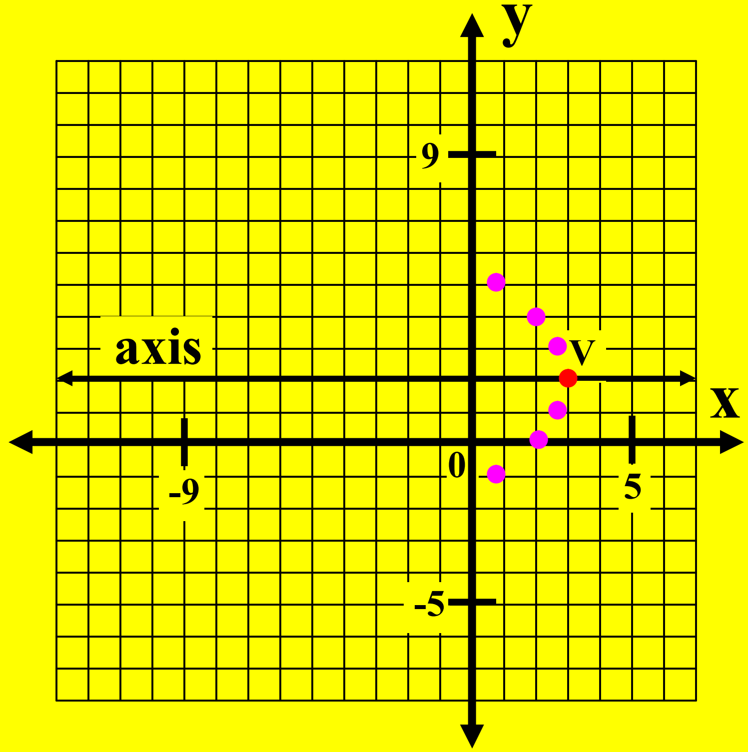

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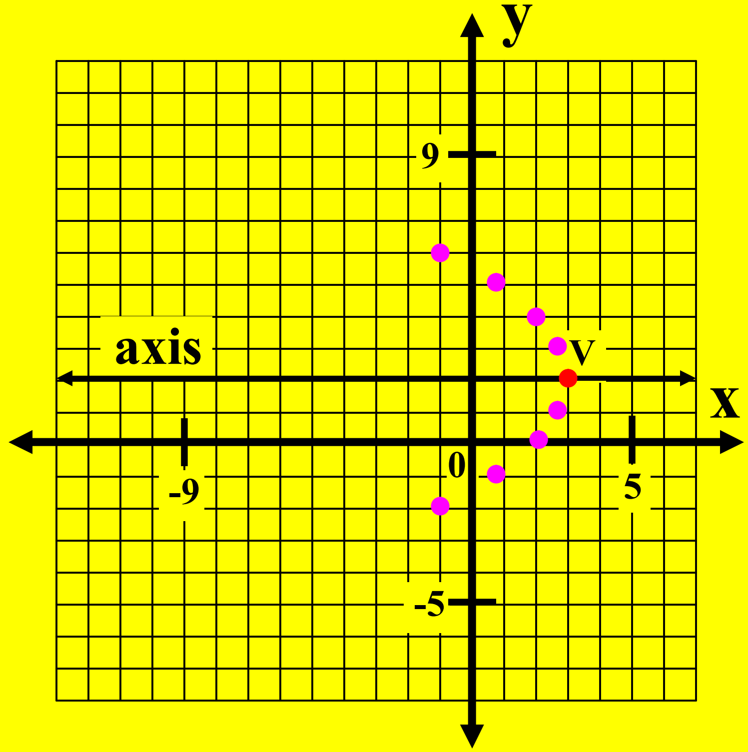
$$7a = \frac{-7}{4}$$



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$$9a = \frac{-9}{4}$$

Type 2 Parabola (vertical directrix)

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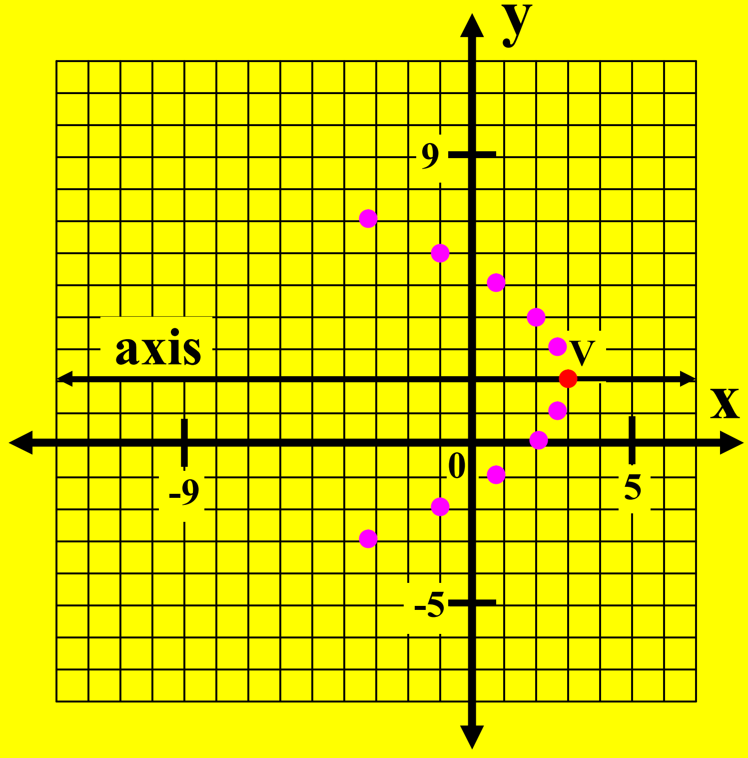

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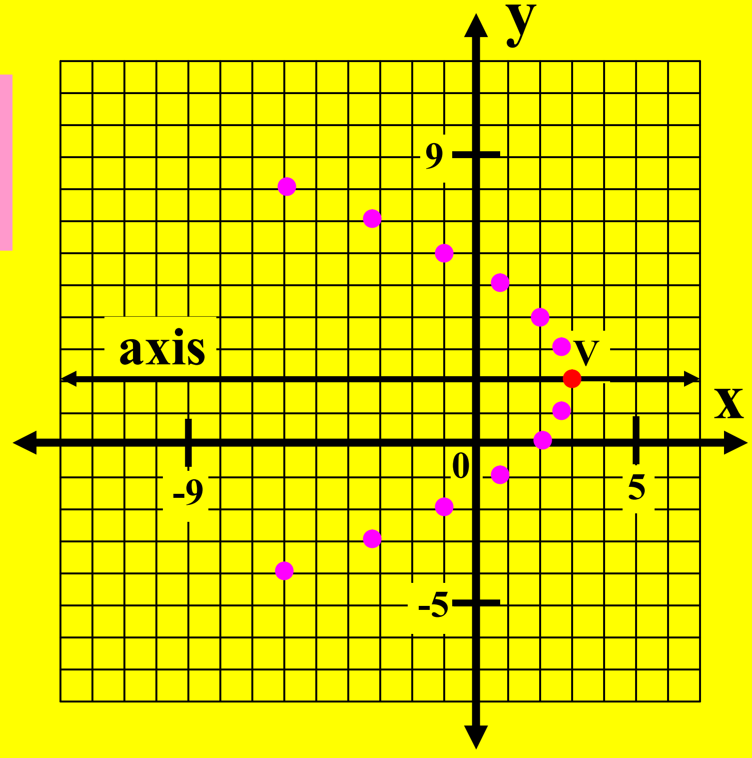

Type 2 Parabola (vertical directrix)

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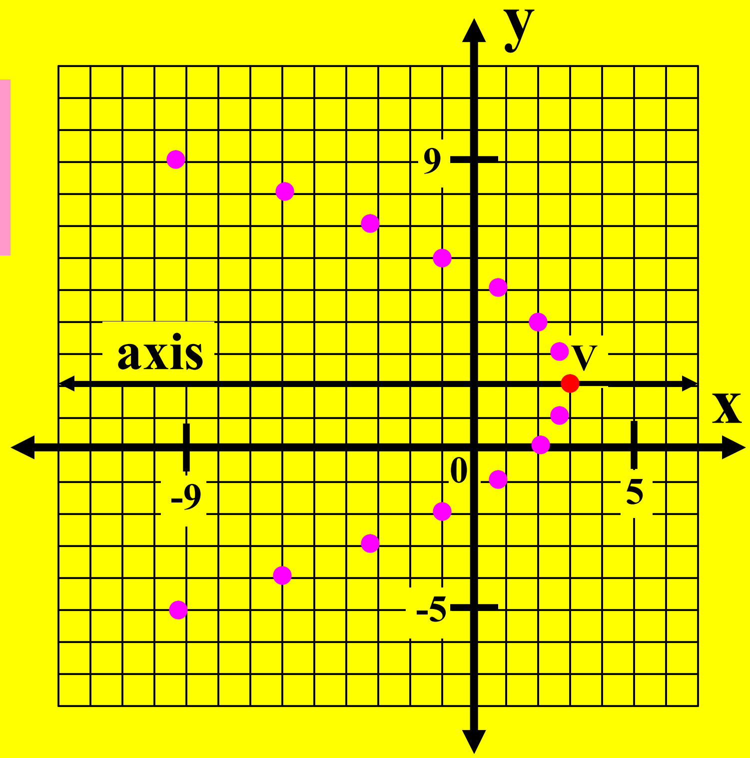

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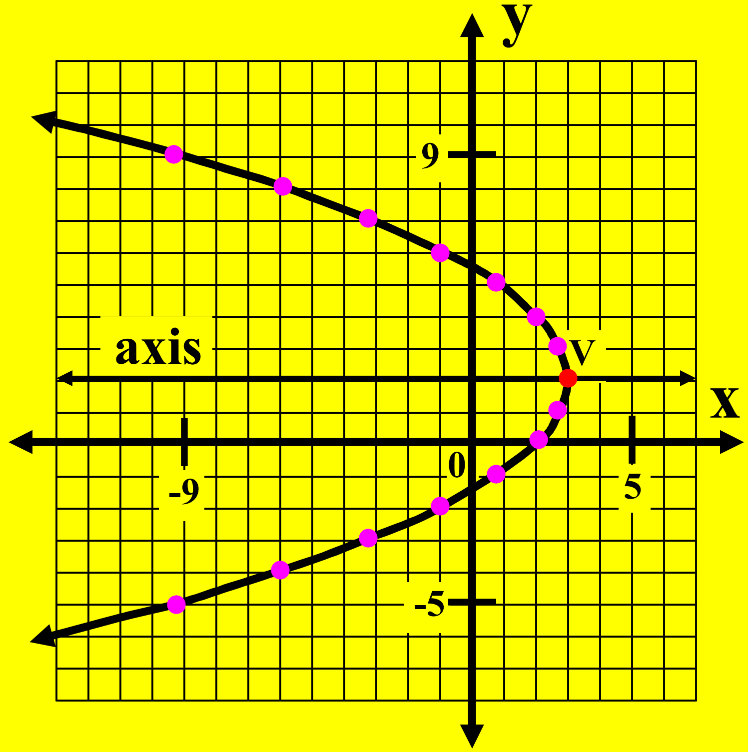

Algebra 2 Class Worksheet #5 Unit 7

Identify each equation as that of a circle, ellipse, hyperbola, or parabola. Express the equation in standard form and sketch its graph.

4. $y^2 + 4x - 4y - 8 = 0$

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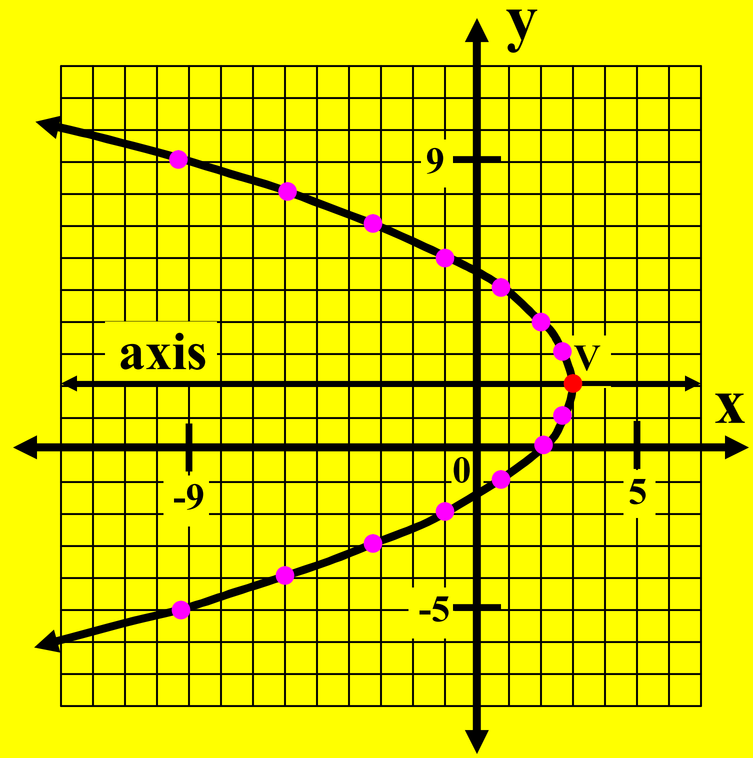
$(y - 2)^2 = -4x + 12$

$\frac{-1}{4}(y - 2)^2 = x - 3$

This is the general form equation of a <u>parabola</u>.

$$x - 3 = \frac{-1}{4}(y - 2)^2$$



Type 2 Parabola (vertical directrix)

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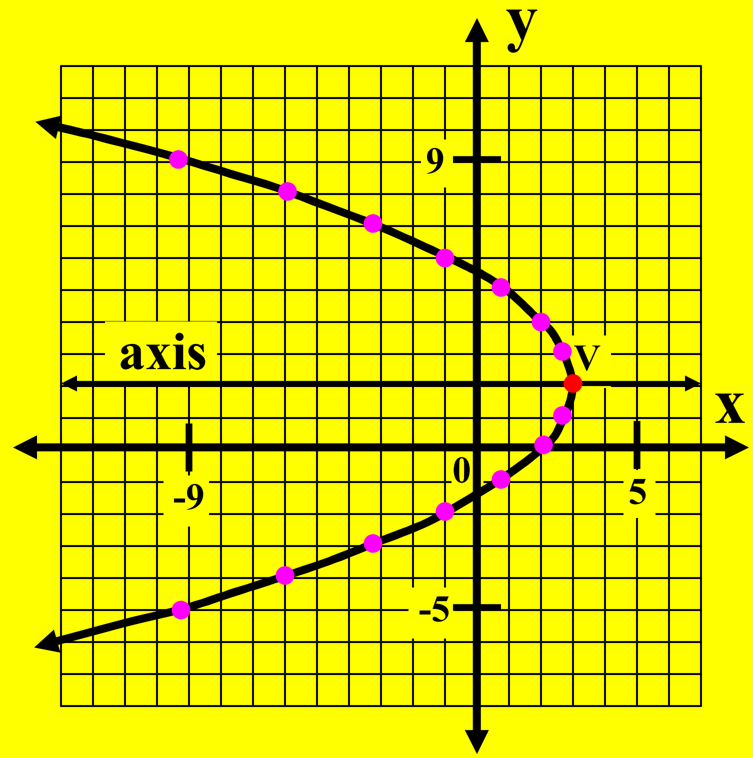

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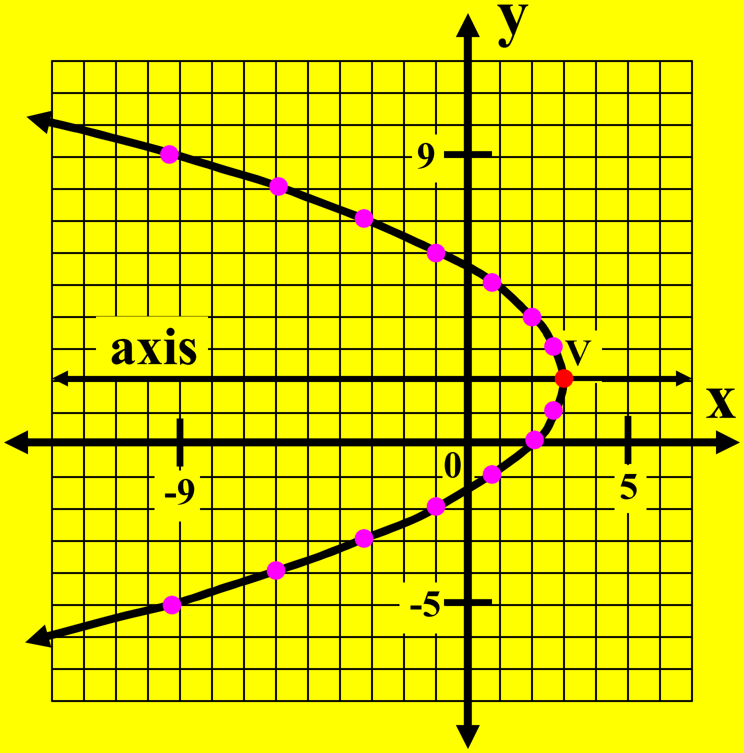

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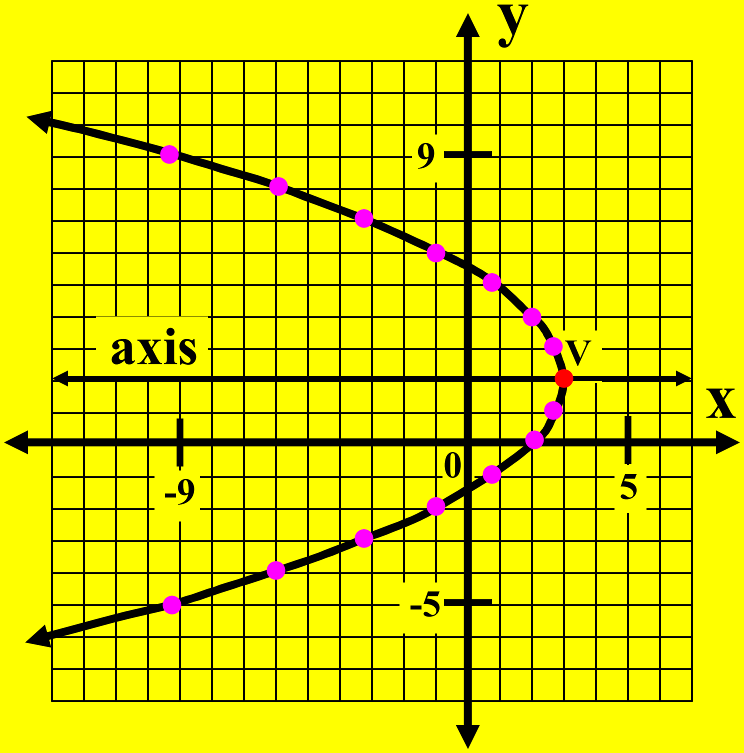

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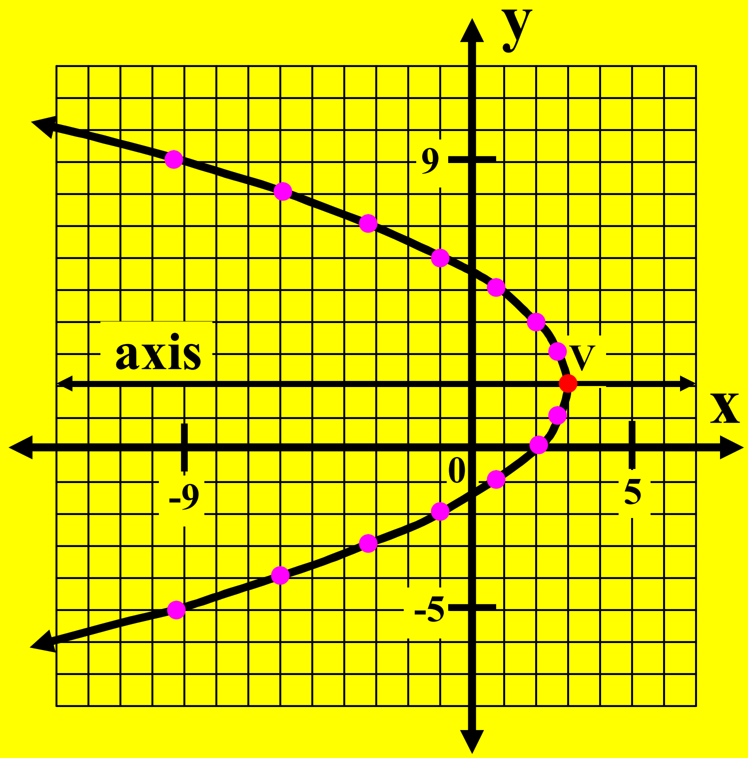

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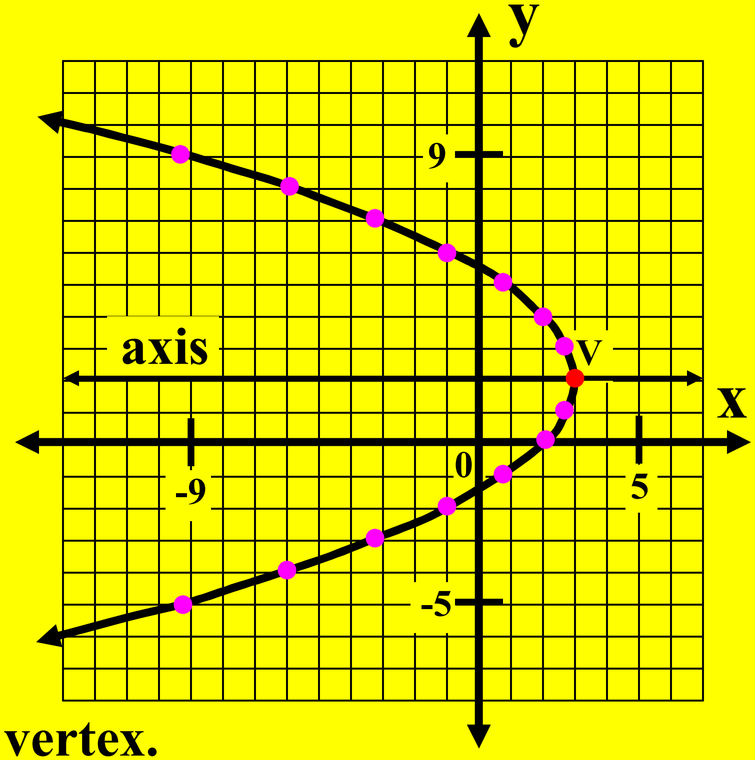

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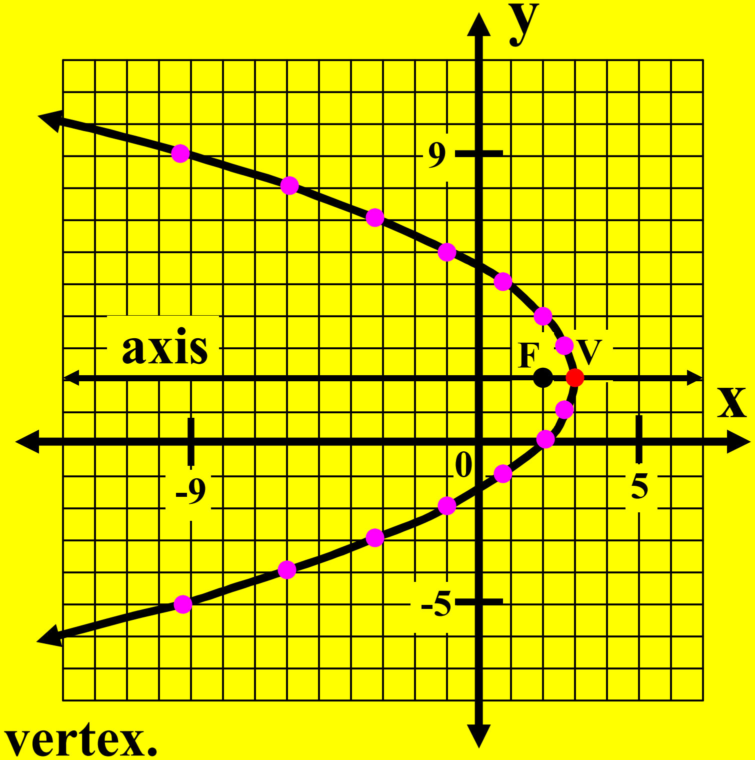

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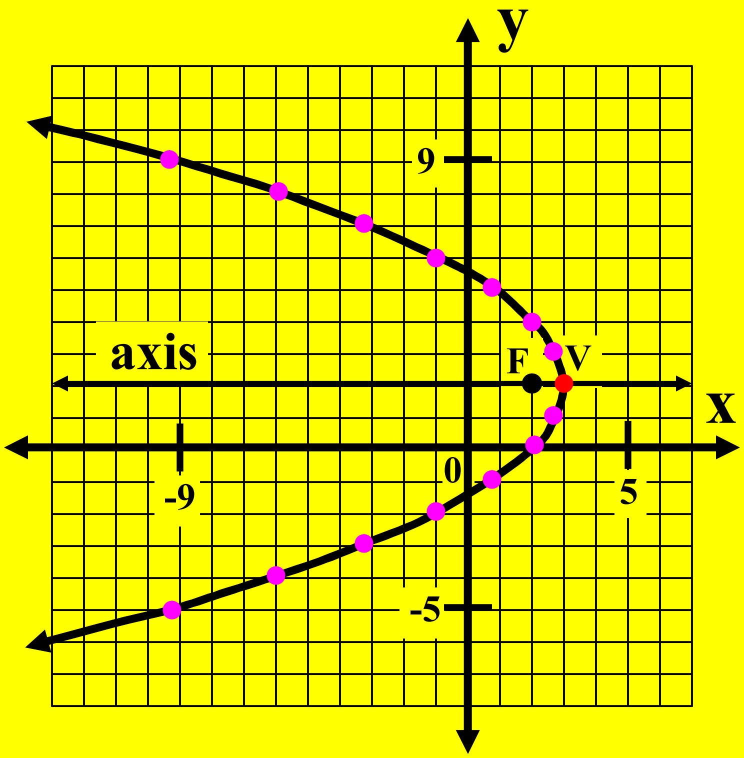

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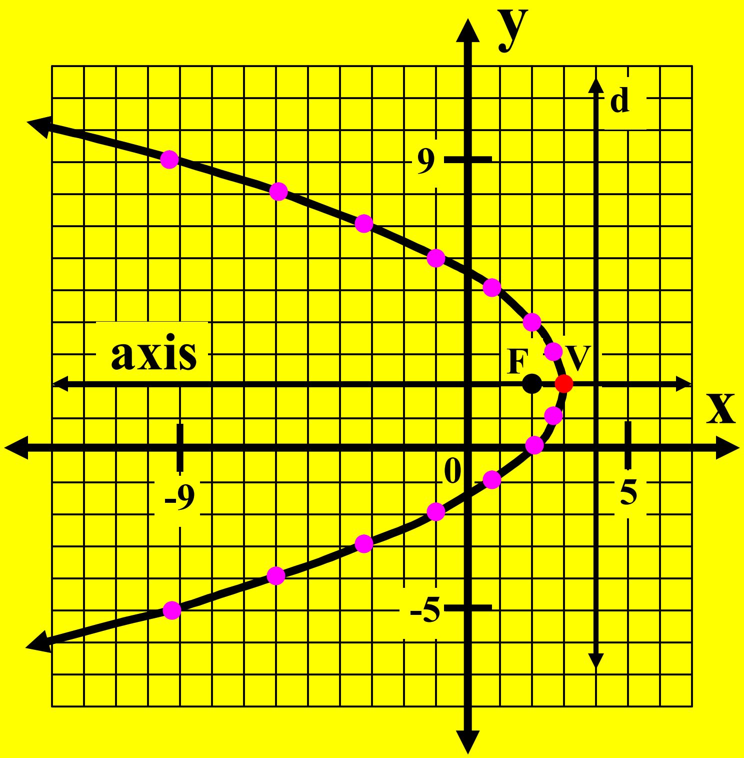

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