Algebra II   Worksheet #8   Unit 7   Selected Solutions

Identify each of the following equations as that of a circle, an ellipse, a hyperbola, or a parabola. Then write the equation in standard form and sketch its graph.

2. $y^2 + 4x - 6y + 13 = 0$

parabola

$y^2 - 6y + 9 = -4x - 13 + 9$
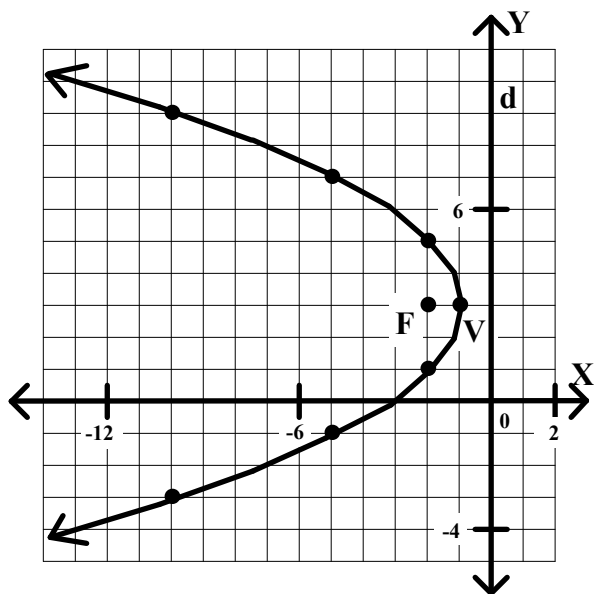$(y - 3)^2 = -4x - 4$
$(y - 3)^2 = -4(x + 1)$

standard form

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

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

$h = -1 \quad k = 3 \qquad a = \frac{1}{4p} = \frac{-1}{4}$

$V(-1, 3) \qquad\qquad p = -1 \quad$ opens 'left'

5. $4x^2 - y^2 - 8x - 2y + 19 = 0$

hyperbola

$4(x^2 - 2x + 1) - 1(y^2 + 2y + 1) = -19 + 4 - 1$
$4(x - 1)^2 - 1(y + 1)^2 = -16$

standard form

$$\frac{(y + 1)^2}{16} - \frac{(x - 1)^2}{4} = 1$$

Type 2

$$\frac{(y - k)^2}{a^2} - \frac{(x - h)^2}{b^2} = 1$$

$h = 1 \quad k = -1 \quad a = 4 \quad b = 2$

center $(1, -1)$ \qquad $c^2 = 20$

$c = \sqrt{20} \approx 4.5$