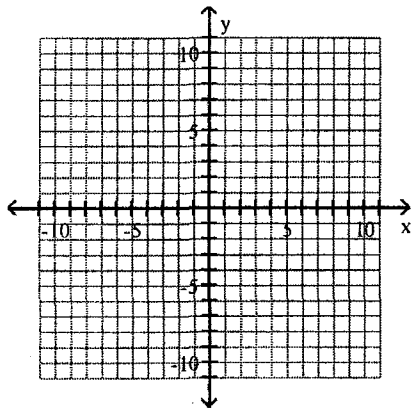


SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Find the direction the parabola opens, the coordinates of the vertex, the equation of the axis of symmetry and draw the graph.

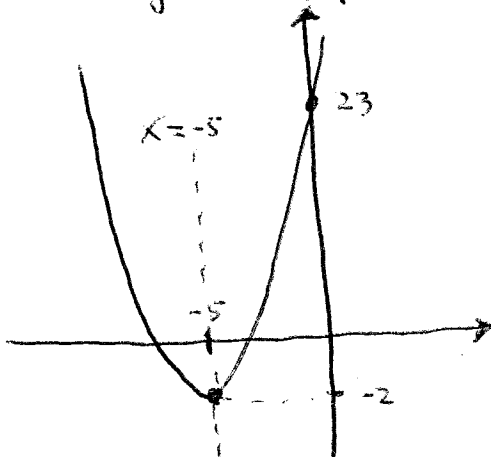
1) $y = (x + 5)^2 - 2$



vertex = $(-5, -2)$

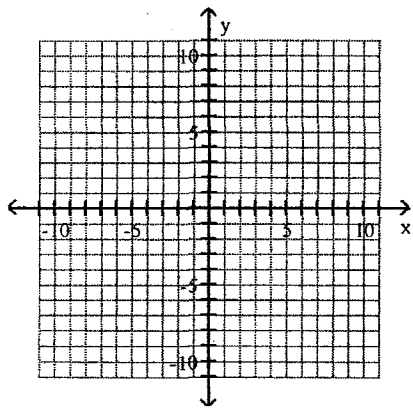
axis: $x = -5$

y-intercept = 23



1) _____

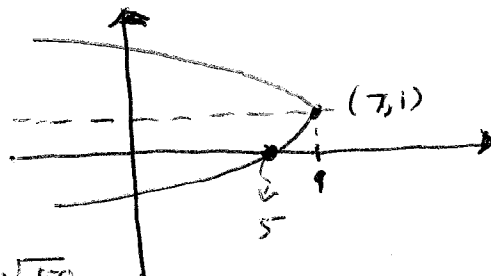
2) $x = -2y^2 + 4y + 5$



$x = -2(y^2 - 2y + 1) + 5 + 2 = -2(y - 1)^2 + 7$

vertex = $(7, 1)$ axis: $y = 1$

x-intercept = 5



2) _____

Find the distance between the two points.

3) $(4, 5)$ and $(5, -2)$

$d = \sqrt{(5-4)^2 + (-2-5)^2} = \sqrt{1 + 49} = \sqrt{50}$

The center and radius of a circle are given. Write the equation of each circle in standard form.

4) Center: $(-9, 0)$, $r = \sqrt{11}$ $(x + 9)^2 + y^2 = 11$

3) _____

The coordinates of the center of a circle and a point on the circle are given. Find the radius of the circle.

5) Center: $(-3, -2)$, point on the circle: $(2, -4)$

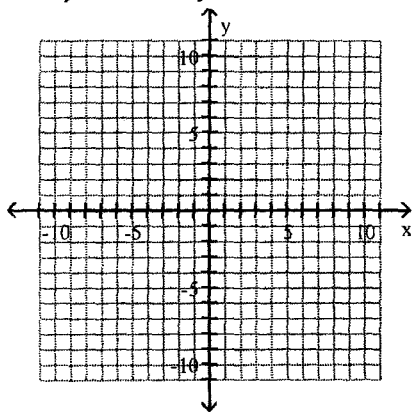
$r^2 = (2 + 3)^2 + (-4 + 2)^2 = 5^2 + (-2)^2 = 25 + 4 = 29$

$(x + 3)^2 + (y + 2)^2 = 29$

5) _____

Find the center and radius and draw the graph.

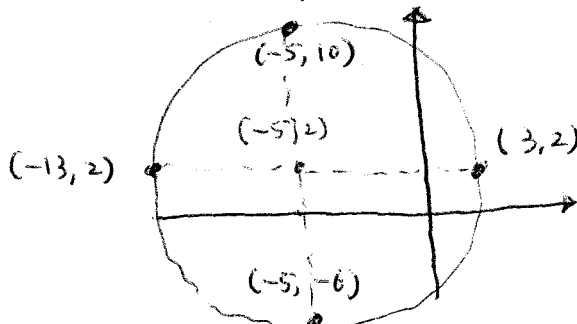
6) $x^2 + y^2 + 10x - 4y - 35 = 0$



$(x^2 + 10x + 25) + (y^2 - 4y + 4) = 35 + 25 + 4$ 6) _____

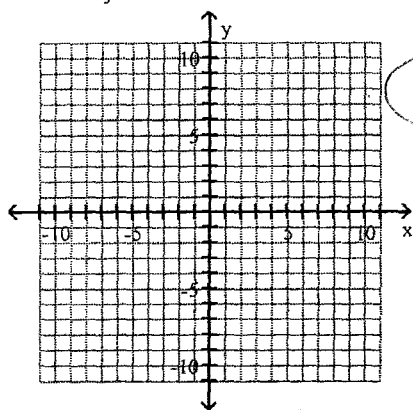
$(x+5)^2 + (y-2)^2 = 64$

center = $(-5, 2)$, radius = 8

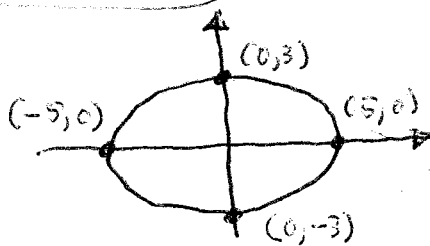


Graph the ellipse. Give the points above, below, to the left, and to the right of the center.

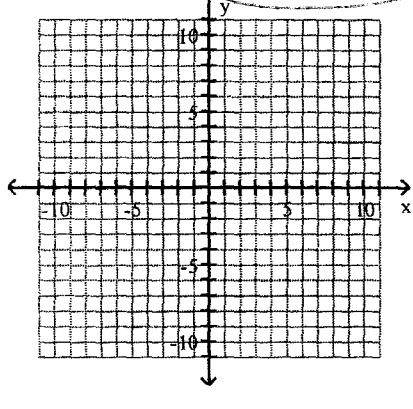
7) $9x^2 + 25y^2 = 225$



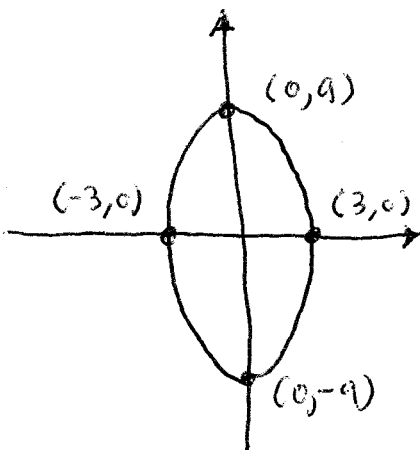
~~_____~~ $\frac{x^2}{225/9} + \frac{y^2}{225/25} = 1$
 $\frac{x^2}{25} + \frac{y^2}{9} = 1 \Rightarrow \frac{x^2}{5^2} + \frac{y^2}{3^2} = 1 \Rightarrow a=5, b=3$



8) $\frac{x^2}{9} + \frac{y^2}{49} = 1 \Rightarrow \frac{x^2}{3^2} + \frac{y^2}{7^2} = 1$



$a=3, b=7$



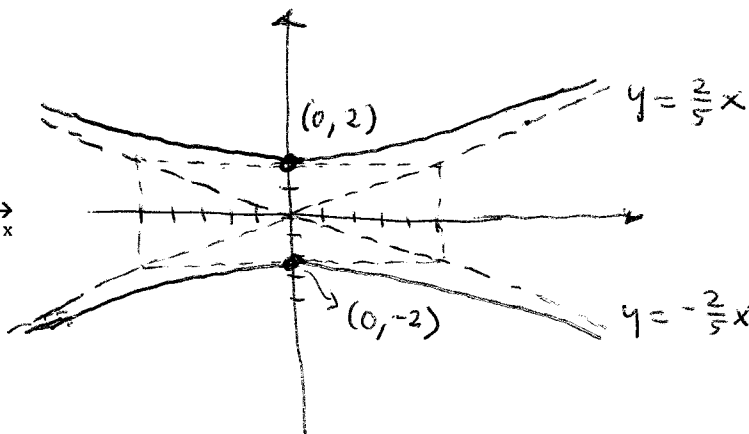
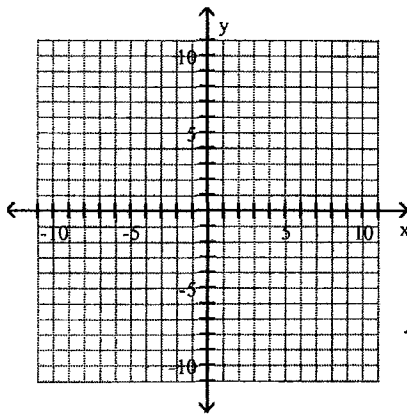
8) _____

Graph the hyperbola and label all intercepts.

9) $\frac{y^2}{4} - \frac{x^2}{25} = 1$

$\frac{y^2}{2^2} - \frac{x^2}{5^2} = 1$

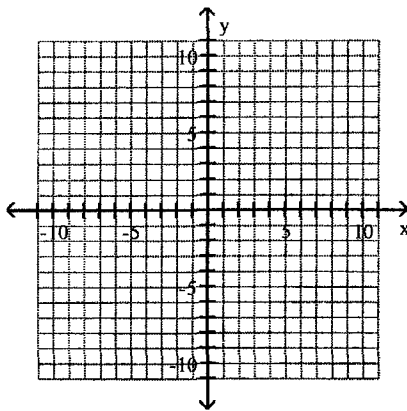
9) _____



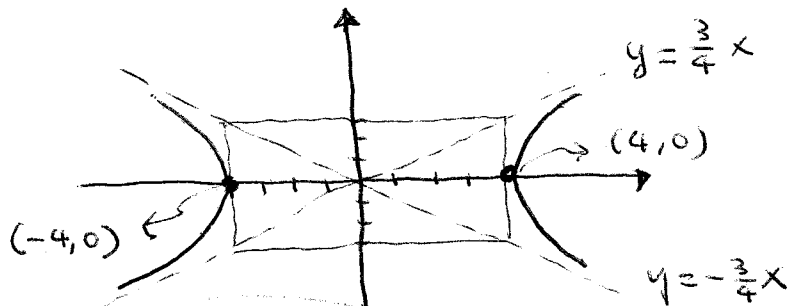
10) $9x^2 - 16y^2 = 144$

$\frac{x^2}{144/9} - \frac{y^2}{144/16} = 1$

10) _____



$\frac{x^2}{16} - \frac{y^2}{9} = 1 \Rightarrow \frac{x^2}{4^2} - \frac{y^2}{3^2} = 1$



Solve the system of equations.

11) $\begin{cases} x^2 + y^2 = 13 \\ x - y = 1 \end{cases} \Rightarrow x = y + 1$

$y^2 + 2y + 1 + y^2 = 13$
 $2y^2 + 2y - 12 = 0$
 $y^2 + y - 6 = 0 \Rightarrow (y + 3)(y - 2) = 0$
 $y = -3 \text{ or } y = 2$
 $x = -2 \text{ or } x = 3$
 $(+3, 2) \text{ or } (-2, -3)$

11) _____

12) $\begin{cases} xy = 1 \\ x^2 + y^2 = 2 \end{cases}$

12) _____

13) $\begin{cases} y = x^2 - 6x + 9 \\ x + y = 5 \end{cases} \Rightarrow y = 5 - x$

13) _____

$5 - x = x^2 - 6x + 9$
 $0 = x^2 - 5x + 4$
 $0 = (x - 4)(x - 1)$
 $x = 1 \text{ or } x = 4$
 $y = 4 \quad y = 1$

$(1, 4) \text{ or } (4, 1)$

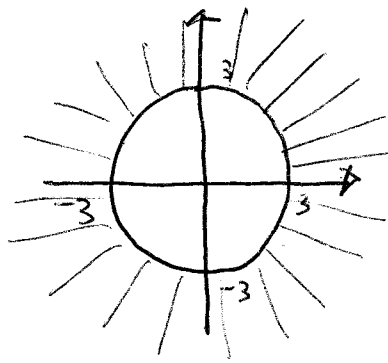
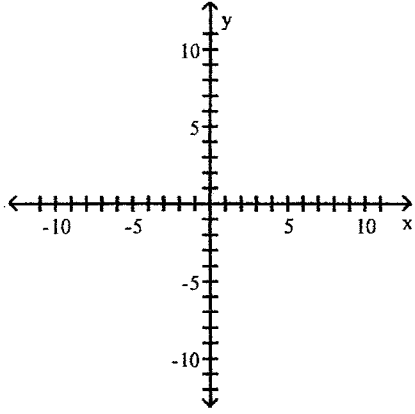
$x = 1/y$
 $\frac{1}{y^2} + y^2 = 2 \Rightarrow 1 + y^4 = 2y^2$
 $y^4 - 2y^2 + 1 = 0$
 $(y^2 - 1)^2 = 0$
 $y^2 = 1 \Rightarrow y = 1 \text{ or } -1$
 $x = 1 \text{ or } -1$

$(1, 1) \text{ or } (-1, -1)$

Graph the inequality.

14) $x^2 + y^2 \geq 9$

14) _____

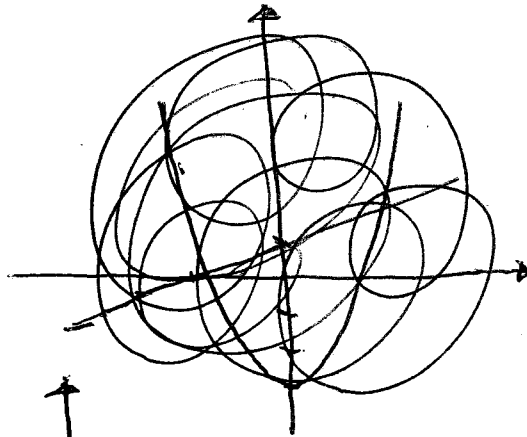
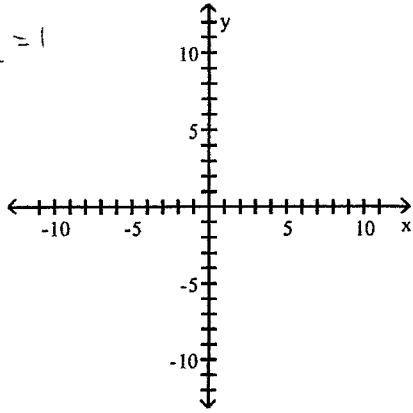


Graph the solution set of the system of inequalities.

15) $\begin{cases} y > x^2 - 3 \\ 2y - x < 2 \end{cases}$

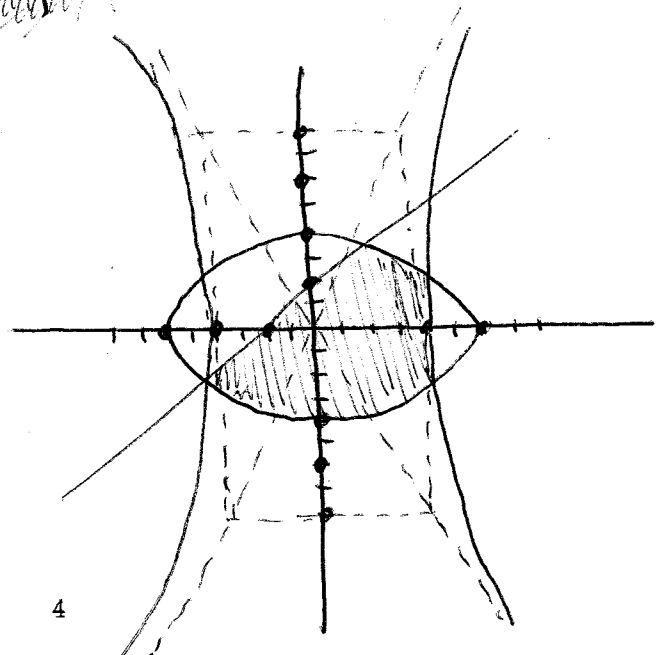
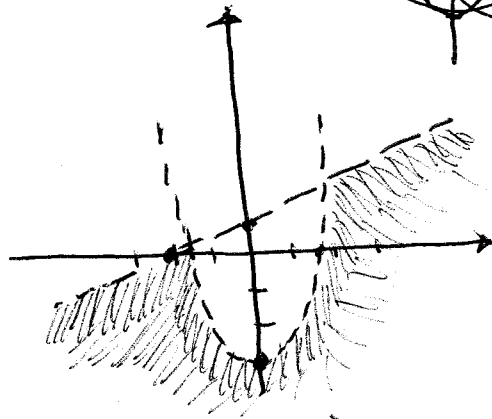
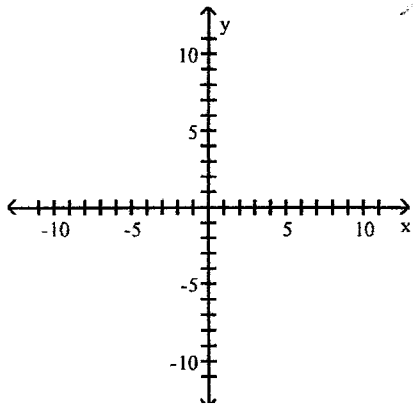
15) _____

$\frac{5}{1} - \frac{x}{2} = 1$



16) $\begin{cases} \frac{x^2}{16} - \frac{y^2}{64} \leq 1 \\ \frac{x^2}{36} + \frac{y^2}{16} \leq 1 \\ y - x \leq 2 \end{cases}$

16) _____



Solve the problem.

17) If a rock is thrown vertically upward from the top of a building 80 feet high with an initial velocity of 64 feet per second, the height, h , above ground level after t seconds is given by $h = -16t^2 + 64t + 80$, where h is in feet and t is in seconds.

17) _____

a. What is the maximum height the rock will reach?

$$\begin{aligned}y &= -16t^2 + 64t + 80 \\ &= -16(t^2 - 4t + 4) + 80 + 64 \\ &= -16(t-2)^2 + 144\end{aligned}$$

Maximum height = 144 feet

b. How many seconds will it take the rock to hit the ground?

$$\begin{aligned}0 &= -16t^2 + 64t + 80 \\ 0 &= 16t^2 - 64t - 80 \\ &= 16(t^2 - 4t - 5) \\ &= 16(t-5)(t+1)\end{aligned}$$

$$t = 5 \text{ or } t = -1$$

after 5 seconds hit the ground.