

Circles

Write an equation for the circle with the given center and radius.

1) center: $(-1, -5)$; $r = 2$ units

2) center: $(0, 7)$; $r = 1$ unit

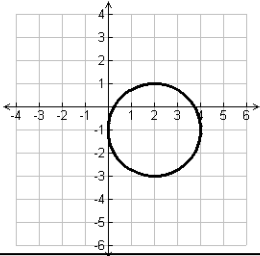
Find the coordinates of the center and the radius of each circle whose equation is given and then draw a graph.

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

4) $x^2 + y^2 + 6y = -50 - 14x$

Write the equation each graph or description of the circle.

5)



6) The circle has its center at $(8, -9)$ and passes through the point $(21, 22)$.

Ellipses

Find the coordinates of the center, vertices, and the lengths of the semi-major and semi-minor axes for each ellipse, then sketch a graph.

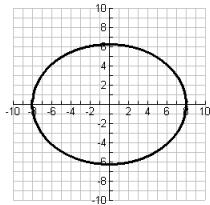
1) $\frac{x^2}{9} + \frac{y^2}{18} = 1$

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

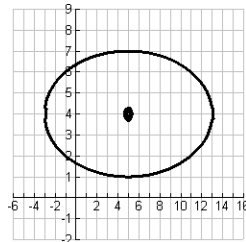
3) $\frac{(x+8)^2}{144} + \frac{(y-2)^2}{81} = 1$

Write an equation for each graph.

4)



5)



6) Write in standard form. Find the center and the semi-major and semi-minor axes. $4x^2 + 16y^2 - 8x + 96y + 84 = 0$

Parabolas

Find (a) vertex (b) focus and (c) the directrix

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

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

3) $x - 5 = 4(y - 1)^2$

Write in standard form. Then find the vertex, focus, the directrix, and graph the equation

4) $2y^2 + 8x - 8y + 16 = 0$

Write the equation of a parabola in standard form for the following:

5) Focus $(7, -2)$; directrix $x = 1$

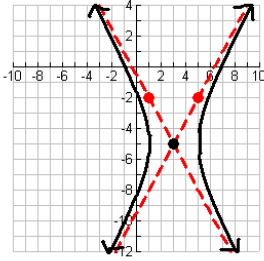
6) Parabola passes through point $(2, 16)$; axis of symmetry is $x = 0$; vertex $(0, 0)$

Hyperbolas

B

Write an equation for the hyperbola pictured.

1)



Find the coordinates of the center, the endpoints of the semi-conjugate axis and semi-transverse axis, and sketch a graph.

2) $\frac{x^2}{81} - \frac{y^2}{49} = 1$

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

4) $\frac{(x+6)^2}{36} - \frac{(y+3)^2}{9} = 1$

Write in standard form of a hyperbola

5) $9x^2 - 25y^2 - 36x + 50y - 214 = 0$

Write an equation for the following hyperbolas in standard form:

6) center (3, 3); vertex (1, 3)

All Conics

A

For each of the following: (a) Identify the type of conic section, and (b) Write the equation in standard form.

1) $x^2 + y^2 - 2x + 4y + 4 = 0$

2) $x^2 + 9y^2 - 36y + 27 = 0$

3) $y^2 - 4x - 6y + 9 = 0$

4) $x^2 - 8x + 2y + 16 = 0$

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

Conic Applications

A+

1) The main cables of a suspension bridge are 20 meters above the road at the towers and 4 meters above the road at the center. The road is 80 meters long. Vertical cables are spaced every 10 meters. The main cables hang in the shape of a parabola. Find the equation of the parabola.

2) The outer door of an airplane hangar is in the shape of a parabola. The door is 120 feet across and 90 feet high. Find an equation describing the door's shape.

3) An engineer designs a satellite dish with a parabolic cross-section. The dish is 15 ft. wide at the opening and the depth is 4 feet. Find the position of the light source (the focus).

CHALLENGE!!!! Sarai is riding a Ferris wheel that has a diameter of 80 feet and is the lowest point is 10 feet above the ground. The wheel turns at a rate of one revolution every 15 seconds.

a) Write the parametric equations describing Sarah's position if she starts at the 3 o'clock position.

b) What is Sarah's position after 40 seconds?