

Review WS KEY

Tuesday, April 21, 2015 2:57 PM

Precalculus Conic Section – Circles & Ellipses (Review)

Name:
Period:

1. Determine which equation below is a circle and which is an ellipse.

a. $5x^2 - 9x + 5y^2 - 100y + 13 = 0$

circle $\Rightarrow x^2$ & y^2 have
the same L.C.

b. $9x^2 - 18x + 4y^2 + 16y - 11 = 0$

ellipse $\Rightarrow x^2$ & y^2 have
different leading
coefficients

2. For each equation below, put it into standard form for that particular shape.

a. $\frac{9x^2}{36} + \frac{4y^2}{36} = \frac{36}{36}$

$\frac{x^2}{4} + \frac{y^2}{9} = 1$

ellipse

b. $4x^2 + 4y^2 - 16x + 24y + 20 = 0$

$4(x^2 + y^2 - 4x + 6y + 5) = 0$

$(x^2 - 4x + 4) + (y^2 + 6y + 9) = -5 + 4 + 9$
 $(x-2)^2 + (y+3)^2 = 8$

circle

c. $4x^2 - 24x + 10y^2 - 100y = -246$

$4(x^2 - 6x + 9) + 10(y^2 - 10y + 25) = -246 + 36 + 250$

$\frac{4(x-3)^2}{40} + \frac{10(y-5)^2}{40} = \frac{40}{40}$
 $\frac{(x-3)^2}{10} + \frac{(y-5)^2}{4} = 1$

ellipse

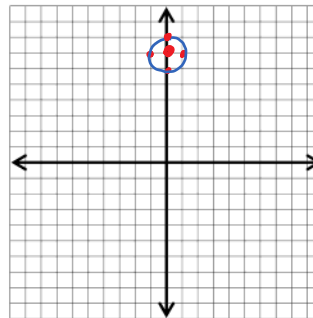
3. Graph the circle: $2x^2 + 2y^2 - 28y + 96 = 0$

$\frac{2(x^2 + y^2 - 14y + 48)}{2} = \frac{0}{2}$

$x^2 + (y^2 - 14y + 49) = -48 + 49$

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

Center: (0,7)
r=1



4. Graph the ellipse: $4x^2 + 16x + 49y^2 - 294y + 261 = 0$

$4(x^2 + 4x + 4) + 49(y^2 - 6y + 9) = -261 + 16 + 441$

$\frac{4(x+2)^2}{196} + \frac{49(y-3)^2}{196} = \frac{196}{196}$

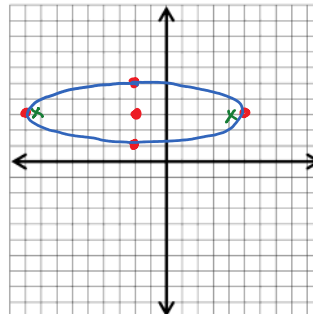
$\frac{(x+2)^2}{49} + \frac{(y-3)^2}{4} = 1$

Center: (-2,3)

a=7 (major)
b=2 (minor)

foci: $\sqrt{7^2 - 2^2} = \sqrt{45}$
 $= 3\sqrt{5}$

$(-2 + 3\sqrt{5}, 3)$
 $(-2 - 3\sqrt{5}, 3)$ foci



5. For each ellipse, determine the coordinates of the foci.

a. $\frac{(x+1)^2}{16} + \frac{(y-2)^2}{36} = 1$ center: $(-1, 2)$

\uparrow major!
 $f = \sqrt{6^2 - 4^2} = \sqrt{20} = 2\sqrt{5}$

$(-1, 2 - 2\sqrt{5})$

$(-1, 2 + 2\sqrt{5})$

b. $\frac{(x-2)^2}{4} + \frac{(y-5)^2}{1} = 1$

\uparrow major!

center: $(2, 5)$

$f = \sqrt{2^2 - 1^2} = \sqrt{3}$

$(2 - \sqrt{3}, 5)$

$(2 + \sqrt{3}, 5)$

6. Write the equation of the ellipse with a major axis from $(-3, 5)$ to $(9, 5)$ and a minor axis that is 4 units long.

$\frac{(x-3)^2}{36} + \frac{(y-5)^2}{4} = 1$

major: $-3 \rightarrow 9 = 12$

$a = 6, b = 2$

center: $-3 + 6 \Rightarrow (3, 5)$

7. Write the equation of an ellipse whose focal points are $(-3, 2)$ and $(5, 2)$ and has a minor axis of length 8.

$\frac{(x-1)^2}{32} + \frac{(y-2)^2}{16} = 1$

major (parallel to) x-axis

\downarrow
 $b = 4$

center: $-3 \rightarrow 5 = \frac{8}{2} = 4 \rightarrow f = 4$

$-3 + 4 = 1$
 $(1, 2)$

$4 = \sqrt{a^2 - 4^2}$

$16 = a^2 - 16 \Rightarrow a = \sqrt{32}$
 $a = 4\sqrt{2}$

8. Write the parametric equations of an ellipse whose center is at $(-2, 3)$ and whose major axis (vertical) has length 10 and minor axis of length 2.

$a = 1$

$x = \cos t - 2$

$y = 5 \sin t + 3$

9. Write the parametric equations of a circle whose center is at $(-1, 4)$ and has radius of length 4.

$x = 4 \cos t - 1$

$y = 4 \sin t + 4$