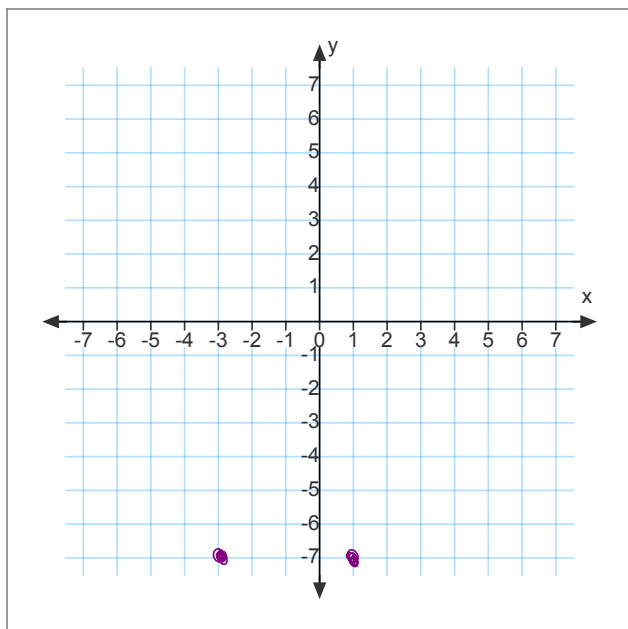


## Warm up

1. Find the equation of a parabola with focal chord length of 8 ending at (2, -1) and (2, 7) and opening to the left.

2. Find the equation of the parabola with a directrix  $y = 2$  and focus (2, 4).

3. Find the focus point of  $x = \frac{1}{16}(y + 7)^2 - 3$



$\uparrow$  y  $\uparrow$  x

$$P = \frac{1}{4\left(\frac{1}{16}\right)}$$

$$\frac{1}{1/4}$$

GO COUGARS!



## Homework Questions

$$y^2 = -12x$$

$$x = -\frac{1}{12}y^2$$

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

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

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

$$x^2 - 2x + y^2 - 6y - 27 = 0$$

$$x^2 - 2x - 27 = 0$$

x & y

$$y^2 - 6y - 27 = 0$$

$$(y-9)(y+3) = 0$$

$$y = 9, -3$$

$$x^2 - 2x + 1 + y^2 - 6y + 9 = 27 + 10$$

$$(x-1)^2 + (y-3)^2 = 37$$

## 9.2 The Ellipse

Find the equation given points

Find the points given an equation

Ellipse- all points  $P$ , where the sum of the distances from 2 fixed points called foci, is a constant.

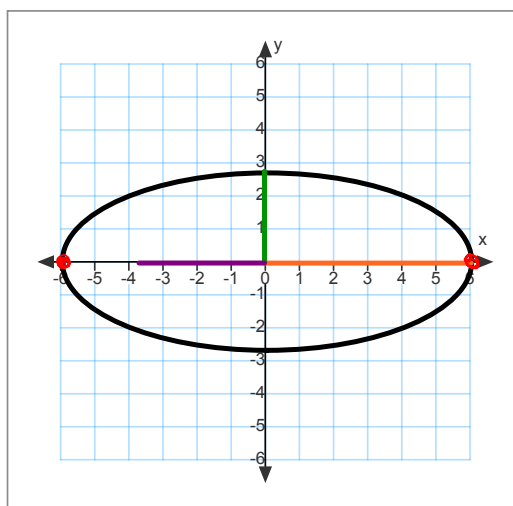
middle to vertex =  $a$

major axis =  $2a$     vertices are on major axis

middle to side =  $b$

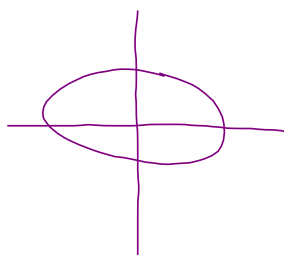
minor axis =  $2b$

middle to focus =  $c$     foci on major axis

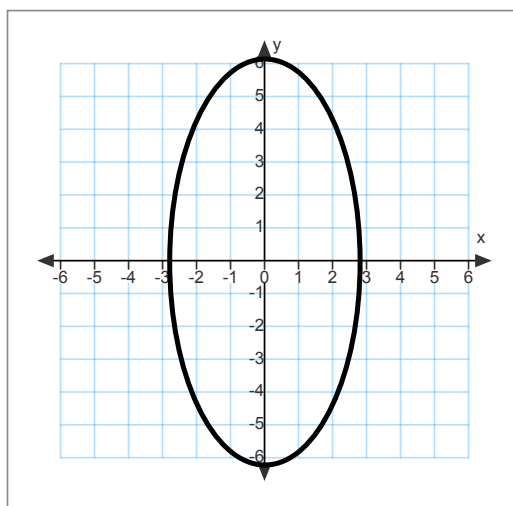


$$\frac{(x-h)^2}{a^2} + \frac{(y-k)^2}{b^2} = 1$$

$a > b > 0$   
*a is bigger*  
 $a^2 - b^2 = c^2$   
*to find foci*



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



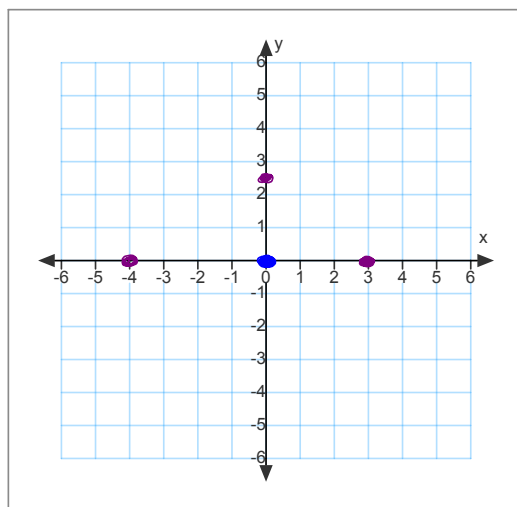
Find equation of an ellipse with

$$M(0,0) \quad F_1(3,0) \quad V(-4,0)$$

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

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$$

$$\frac{x^2}{16} + \frac{y^2}{7} = 1$$



$$a^2 - b^2 = c^2$$

$$16 - b^2 = 9$$

$$-b^2 = -7$$

$$b^2 = 7$$

Discuss  $\frac{x^2}{25} + \frac{y^2}{4} = 1$

Discuss changes in equation for vertical ellipse

Find the vertices and foci for  $4x^2 + y^2 = 16$

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

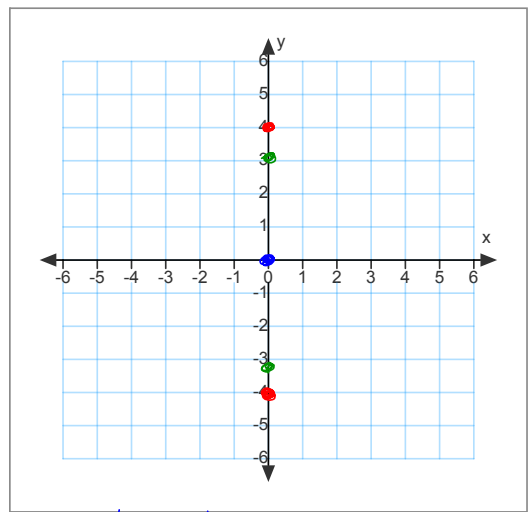
$$\frac{x^2}{\underset{b^2}{4}} + \frac{y^2}{16} = 1$$

$$a^2 - b^2 = c^2$$

$$16 - 4 = c^2$$

$$12 = c^2$$

$$2\sqrt{3} = c$$



vertical

vertices:  $(0, 4)$

$(0, -4)$

foci:  $(0, \pm 2\sqrt{3})$

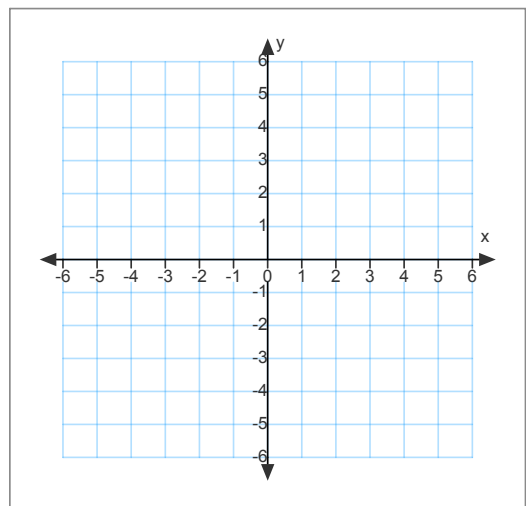


A circle is a special type of ellipse where  $a = b$ !

$$\frac{x^2}{a^2} + \frac{y^2}{a^2} = 1 \quad \text{or} \quad x^2 + y^2 = a^2$$

Find the equation for an ellipse if

$$M (2, -3) \quad F (3, -3) \quad V (5, -3)$$



Find the middle, foci and vertices for

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

$$M (3, -1)$$

$$\text{vertices: } (3, 2)$$

$$a=3 \quad (3, -4)$$

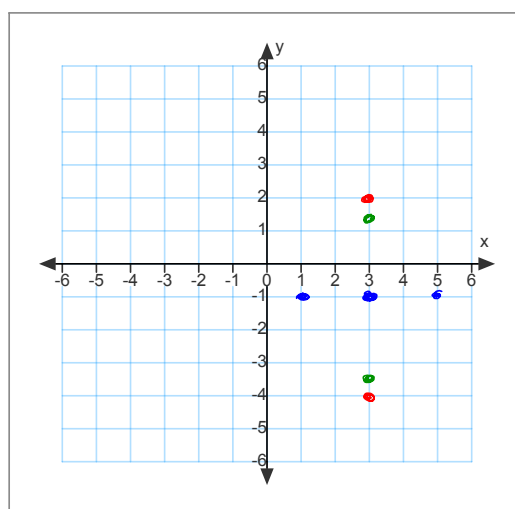
foci:

$$a^2 - b^2 = c^2 \quad (3, -1 \pm \sqrt{5})$$

$$9 - 4 = c^2$$

$$5 = c^2$$

$$c = \sqrt{5}$$



Not in center form?????

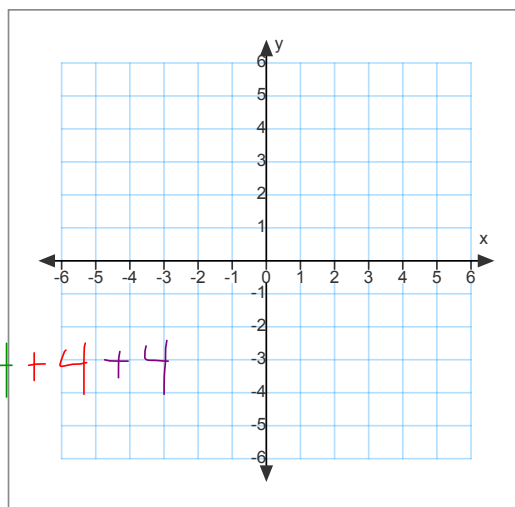
$$4x^2 + y^2 - 8x + 4y + 4 = 0$$

$$\underbrace{4x^2 - 8x} + y^2 + 4y = -4$$

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

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

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



# HOMework



p 677 1-6 all, 7-40 by 3's