

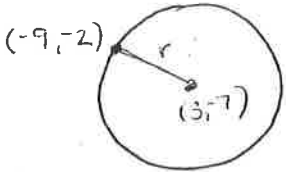
CW

Precalculus  
Conic Sections Review

Name Key

Write the equation of the conic section that meets each set of criteria:

1. A circle whose center is at the point  $(3, -7)$  and contains the point  $(-9, -2)$ .



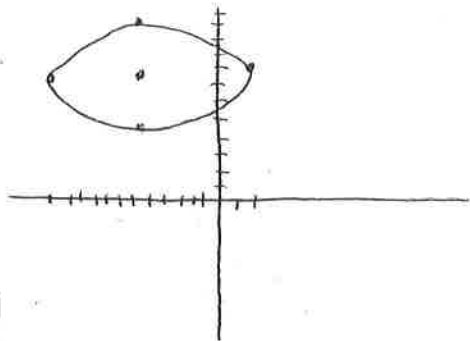
$$r = \sqrt{(-9-3)^2 + (-2+7)^2} \quad (x-3)^2 + (y+7)^2 = 169$$

$$r = \sqrt{144 + 25}$$

$$r = \sqrt{169}$$

$$r = 13$$

2. An ellipse whose center is at the point  $(-5, 8)$ , the length of its minor axis is 8 and the length of its horizontal axis is 14.

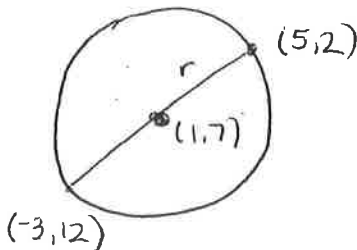


$$a = 7$$

$$b = 4$$

$$\frac{(x+5)^2}{49} + \frac{(y-8)^2}{16} = 1$$

3. Circle with a diameter whose endpoints are  $(-3, 12)$  and  $(5, 2)$ .



$$\text{center: } \left( \frac{5+(-3)}{2}, \frac{12+2}{2} \right)$$

$$(1, 7)$$

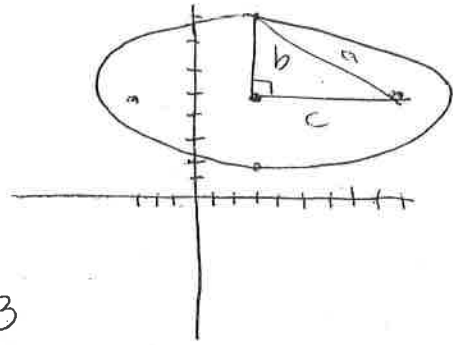
$$(x-1)^2 + (y-7)^2 = 41$$

$$r = \sqrt{(5-1)^2 + (2-7)^2}$$

$$r = \sqrt{16 + 25}$$

$$r = \sqrt{41}$$

4. An ellipse whose center is at (3, 5), the length of the vertical minor axis is 6 and the foci are at the points (9, 5) and (-3, 5).



$$\frac{(x-3)^2}{45} + \frac{(y-5)^2}{9} = 1$$

$$b = 3$$

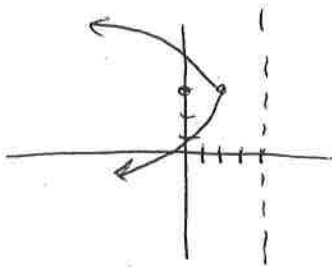
$$c = 6$$

$$3^2 + 6^2 = a^2$$

$$9 + 36 = a^2$$

$$45 = a^2$$

5. A parabola whose vertex is (2, 3) and whose directrix is the line  $x = 4$ .

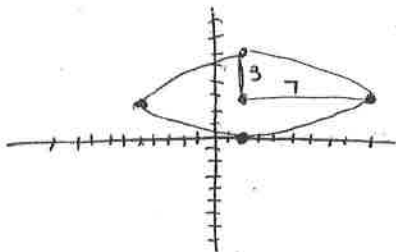


$$(y-3)^2 = 4p(x-2)$$

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

$$(y-3)^2 = -8(x-2)$$

6. An ellipse whose vertices are at (9, 3), (-5, 3), (2, 6), (2, 0).



$$\frac{(x-2)^2}{49} + \frac{(y-3)^2}{9} = 1$$

Center:

$$(2, 3)$$

$$a = 7$$

$$b = 3$$

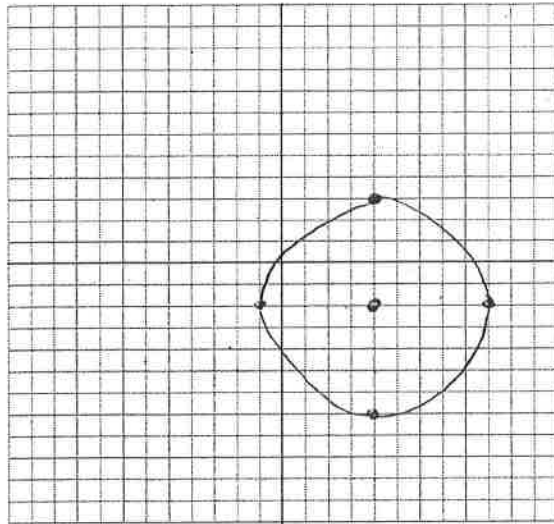
Graph the following equations. State all key information related to the conic section.

7.  $(x-4)^2 + (y+2)^2 = 25$   
circle

center:

$$(4, -2)$$

$$\text{radius} = 5$$



8.  $\frac{(x+1)^2}{25} - \frac{(y-3)^2}{4} = 1$   
hyperbola

center:

$$(-1, 3)$$

$$a = 5$$

$$b = 2$$

$$5^2 + 2^2 = c^2$$

$$29 = c^2$$

$$c = \sqrt{29}$$

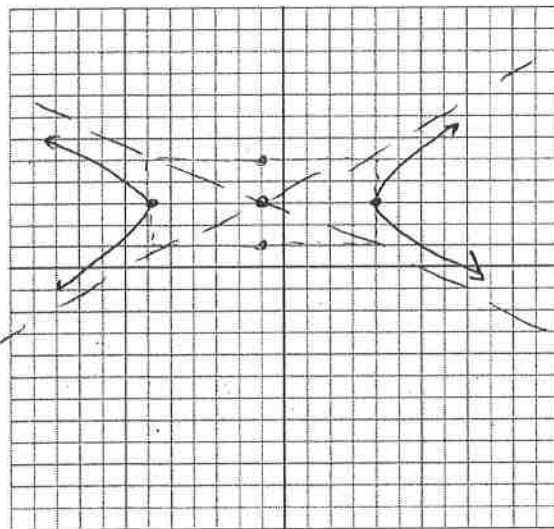
foci:

$$(-1 + \sqrt{29}, 3)$$

$$(-1 - \sqrt{29}, 3)$$

asymptotes

$$y = 3 \pm \frac{2}{5}(x+1)$$



9.  $x^2 + y^2 + 6x - 10y = -30$

circle

$$x^2 + 6x + y^2 - 10y = -30$$

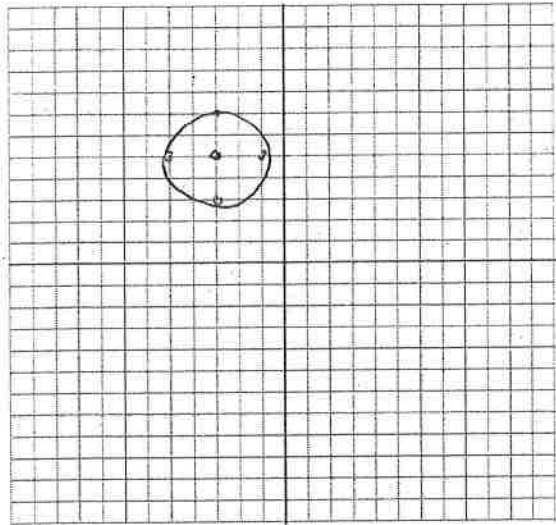
$$x^2 + 6x + 9 + y^2 - 10y + 25 = -30 + 9 + 25$$

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

center:

$$(-3, 5)$$

$$\text{radius} = 2$$



10.  $\frac{(x-2)^2}{36} + \frac{(y-5)^2}{9} = 1$

ellipse

center:

$$(2, 5)$$

$$a = 6$$

$$b = 3$$

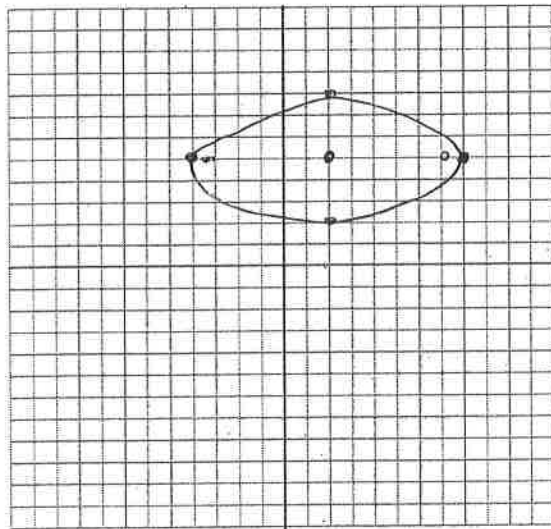
$$3^2 + c^2 = 6^2$$

$$c = \sqrt{27}$$

foci:

$$(2 + \sqrt{27}, 5)$$

$$(2 - \sqrt{27}, 5)$$



$$11. \frac{(x+4)^2}{49} + \frac{(y-3)^2}{25} = 1$$

ellipse

$$a=7$$

$$b=5$$

center:

$$(-4, 3)$$

$$5^2 + c^2 = 7^2$$

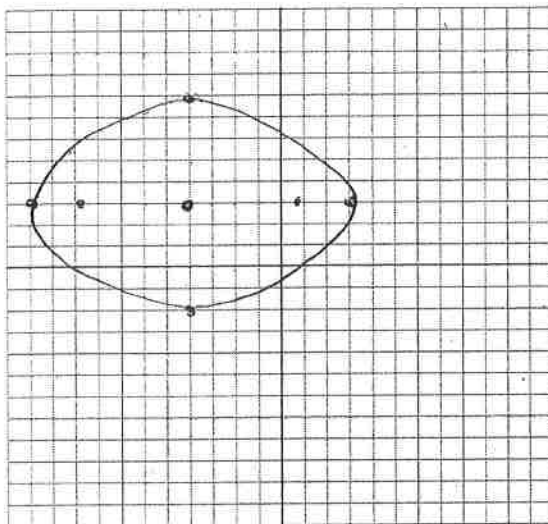
$$c^2 = 24$$

$$c = \sqrt{24}$$

foci:

$$(-4 + \sqrt{24}, 3)$$

$$(-4 - \sqrt{24}, 3)$$



$$12. \frac{(y-2)^2}{25} - \frac{(x-5)^2}{4} = 1$$

hyperbola

center:

$$(5, 2)$$

$$a=5$$

$$b=2$$

$$5^2 + 2^2 = c^2$$

$$29 = c^2$$

$$c = \sqrt{29}$$

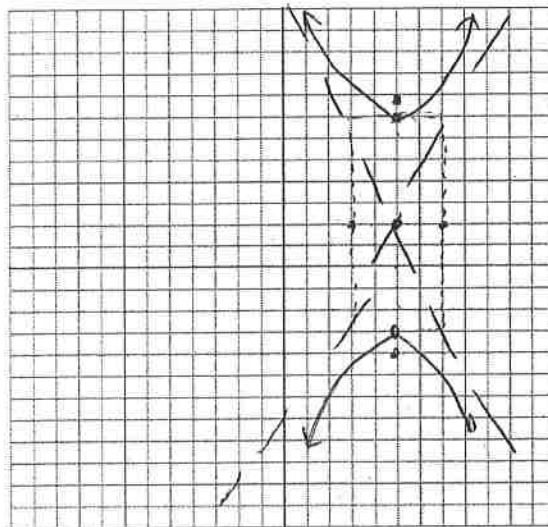
foci:

$$(5, 2 + \sqrt{29})$$

$$(5, 2 - \sqrt{29})$$

asymptotes:

$$y = 2 \pm \frac{5}{2}(x-5)$$



$$13. (x-3)^2 = 4(y+5)$$

parabola

vertex:

$$(3, -5)$$

$$p = 1$$

directrix:

$$y = -6$$

focus

$$(3, -4)$$

