

Name key  
Date \_\_\_\_\_ Period \_\_\_\_\_

1. Give the center and radius of the circle  $(x+2)^2 + (y-3)^2 = 12$

$C(-2, 3)$   $r = \sqrt{12} = 2\sqrt{3}$

2. Give the lengths of the major and minor axes of  $\frac{(x+1)^2}{16} + \frac{(y-4)^2}{9} = 1$   $a=4$   
 $b=3$

major: 8 minor: 6

3. Give the vertex and axis of symmetry of the parabola  $x = -2(y+1)^2 - 3$

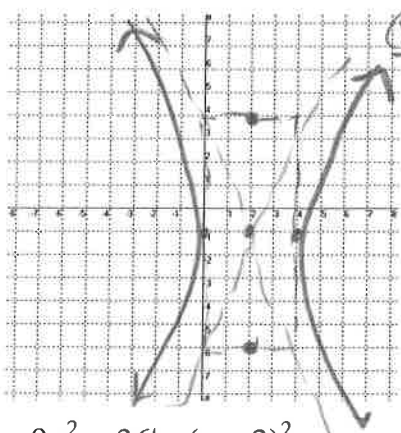
$V(-3, -1)$   $Y = -1$

4. Write the equations of the asymptotes of the hyperbola  $\frac{9y^2}{36} - \frac{4x^2}{36} = \frac{36}{36}$   $a=2$   
 $b=3$

$\frac{y^2}{4} - \frac{x^2}{9} = 1$   $Y = \pm \frac{2}{3}X$

Graph each of the following. For each circle, give the center and radius. For each ellipse, give the center and lengths of the major and minor axes. For each parabola, give the vertex, x- and y- intercepts. For each hyperbola, sketch the asymptotes.

5.  $25(x-2)^2 = 100 + 4(y+1)^2$   
 $\frac{25(x-2)^2}{100} - \frac{4(y+1)^2}{100} = \frac{100}{100}$

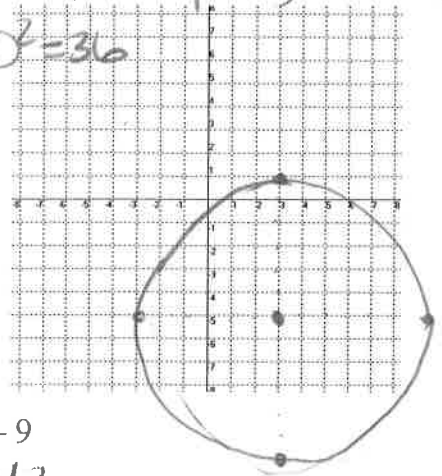


$\frac{(x-2)^2}{4} - \frac{(y+1)^2}{25} = 1$

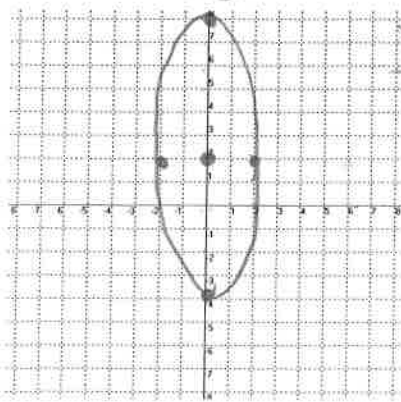
6.  $x^2 + y^2 - 6x + 10y = 2$   
 $x^2 - 6x + y^2 + 10y = 2$   
 $(x^2 - 6x + 9) + (y^2 + 10y + 25) = 2 + 9 + 25$

$(x-3)^2 + (y+5)^2 = 36$

$C(3, -5)$   
 $r = 6$



7.  $9x^2 = 36 - (y-2)^2$   
 $\frac{9x^2}{36} + \frac{(y-2)^2}{36} = \frac{36}{36}$



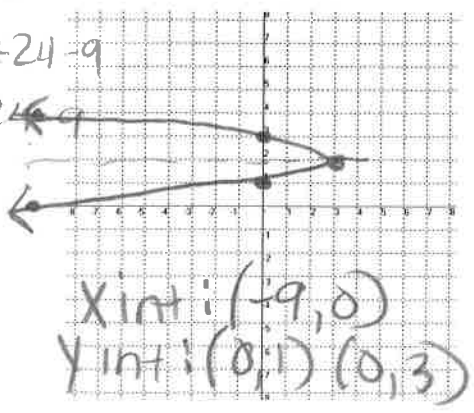
$\frac{x^2}{4} + \frac{(y-2)^2}{36} = 1$   
 $C(0, 2)$   
maj: 12  
min: 4

8.  $x = -3y^2 + 12y - 9$   
 $Y = \frac{-12}{2(-3)} = \frac{-12}{-6} = 2$

$X = -3(4) + 24 - 9$   
 $= -12 + 24 - 9$   
 $= 3$

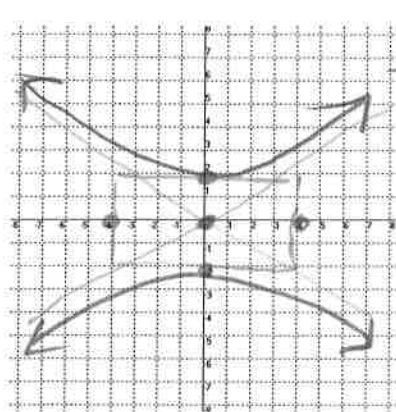
$V(3, 2)$

$\begin{array}{r|l} x & y \\ -3 & 12 \\ 0 & 9 \\ \hline & -9 \end{array} \quad \begin{array}{l} 1 \\ 0 \end{array}$



X int: (-9, 0)  
Y int: (0, 1) (0, 3)

9.  $8y^2 - 32 = 2x^2$   
 $\frac{8y^2}{32} - \frac{2x^2}{32} = \frac{32}{32}$

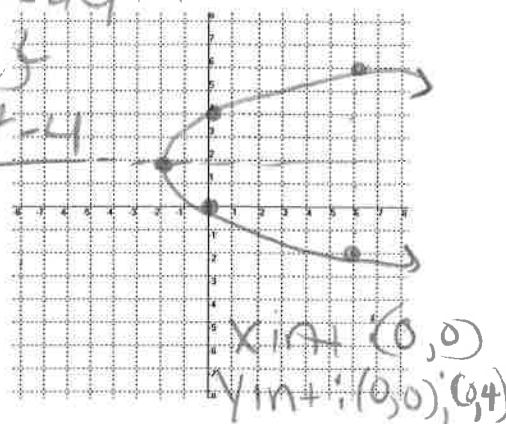


$\frac{y^2}{4} - \frac{x^2}{16} = 1$

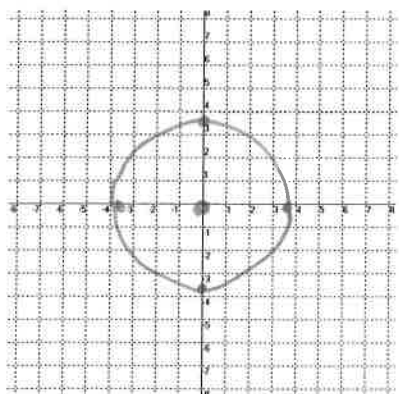
10.  $x = \frac{1}{2}y^2 - 2y$       $\frac{4}{2} + 4 = 6 - 2$

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

$x = \frac{1}{2}(y - 2)^2 - 2$   
 V(-2, 2)



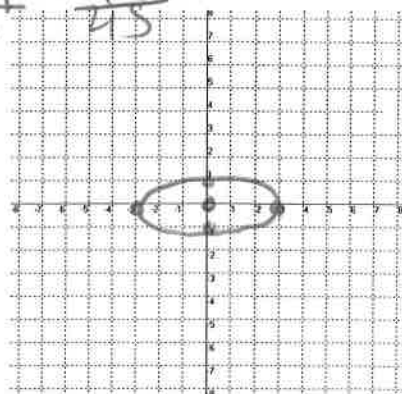
11.  $x^2 = 15 - y^2$   
 $x^2 + y^2 = 15$



C(0,0)  
 $r = \sqrt{15}$

12.  $45 - 45y^2 = 5x^2$   
 $-5x^2 - 45y^2 = -45$   
 $\frac{5x^2}{45} + \frac{45y^2}{45} = \frac{45}{45}$

$\frac{x^2}{9} + \frac{y^2}{1} = 1$   
 C(0,0)  
 Maj: 6  
 Min: 2

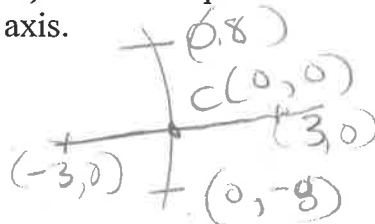


13. Write the equation of the ellipse for which (0, 8) and (0, -8) are the endpoints of the major axis and (3, 0) and (-3, 0) are the endpoints of the minor axis.

$\frac{x^2}{9} + \frac{y^2}{64} = 1$

$b = 3$

$a = 8$



14. Write the equation of the circle with a diameter having endpoints of (3, 4) and (-1, 6).

Center:  $X_m = \frac{3 + (-1)}{2} = \frac{2}{2} = 1$   
 $Y_m = \frac{4 + 6}{2} = \frac{10}{2} = 5$   
 Center: (1, 5)  
 $r: d = \sqrt{(1+1)^2 + (5-6)^2}$   
 $= \sqrt{4 + 1} = \sqrt{5}$   
 $\frac{r}{2} = \frac{\sqrt{5}}{2}$   
 $\left(\frac{r}{2}\right)^2 = \frac{5}{4}$   
 $4 \left(\frac{r}{2}\right)^2 = 5$   
 $(x-1)^2 + (y-5)^2 = 5$

15. Write the equation of the circle with a center of  $(-2, -5)$  and passing through  $(1, -6)$ .

$$d = \sqrt{(-2-1)^2 + (-5+6)^2} = \sqrt{9+1} = \sqrt{10}$$

$$(x+2)^2 + (y+5)^2 = 10$$

16. Find the midpoint of the segment connecting  $(-4, 7)$  and  $(-10, -1)$ .

$$x_m = \frac{-4-10}{2} = -7 \quad y_m = \frac{7-1}{2} = 3$$

$$(-7, 3)$$

17. Find the length of the segment connecting  $(\sqrt{7}, 5\sqrt{3})$  and  $(3\sqrt{7}, 7\sqrt{3})$ .

$$d = \sqrt{(3\sqrt{7}-\sqrt{7})^2 + (7\sqrt{3}-5\sqrt{3})^2} = \sqrt{(2\sqrt{7})^2 + (2\sqrt{3})^2}$$

$$= \sqrt{4 \cdot 7 + 4 \cdot 3} = \sqrt{28+12} = \sqrt{40} = 2\sqrt{10}$$

18. A segment has a midpoint of  $(-7, -2)$  and an endpoint of  $(3, -8)$ . Find the other endpoint.

$$-7 = \frac{3+x_2}{2} \quad -2 = \frac{-8+y_2}{2}$$

$$-14 = 3+x_2 \quad -4 = -8+y_2$$

$$-17 = x_2 \quad 4 = y_2$$

$$(-17, 4)$$

19. The length of the segment connecting  $(2, 7)$  and  $(6, a)$  is  $\sqrt{41}$ . Find  $a$ .

$$\sqrt{41} = \sqrt{(2-6)^2 + (7-a)^2}$$

$$41 = (4)^2 + (7-a)^2$$

$$41 - 16 = (7-a)^2$$

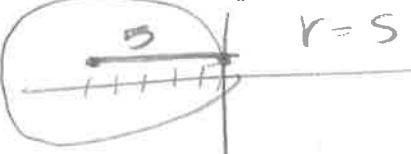
$$25 = (7-a)^2$$

$$\pm 5 = 7-a$$

$$-7+5 = -a \quad -2 = -a$$

$$-7-5 = -a \quad -12 = -a$$

20. Write the equation of the circle with a center of  $(-5, 2)$  and tangent to the y-axis.



$$r = 5$$

$$(x+5)^2 + (y-2)^2 = 25$$

$$a \text{ is } 2 \text{ or } 12$$

Write an equation for each graph.

