

Identify the conic section

1.  $16x^2 - 16y^2 = 32$

Hyperbola

2.  $4x^2 - 8x - y = 3$

Parabola

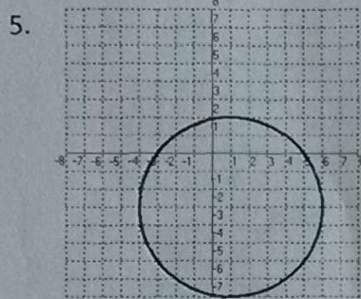
3.  $(x-4)^2 + (y-2)^2 = 25$

Circle

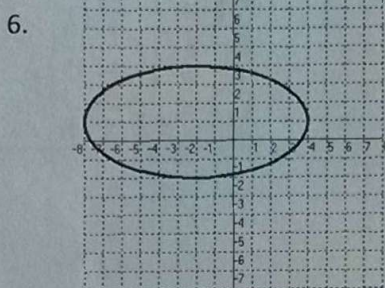
4.  $\frac{x^2}{25} + \frac{y^2}{36} = 1$

Ellipse

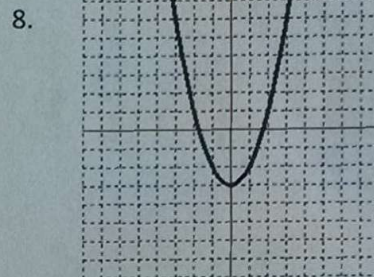
State the Domain and Range.



D:  $[4, 6]$   
R:  $[-8, 2]$



D:  $[-8, 4]$   
R:  $[-2, 4]$



D:  $\mathbb{R}$   
R:  $[-3, \infty)$

Answer all information about the parabolas and graph: Direction it opens, vertex, focus, Directrix, axis of symmetry, and graph

9.  $(y-2)^2 = 8(x+3)$

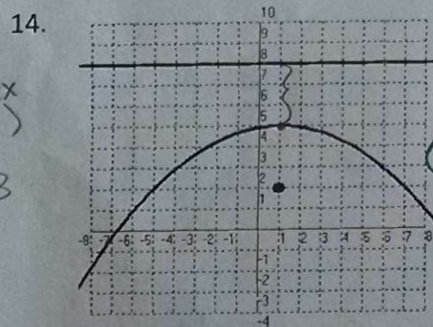
10.  $(x+1)^2 = -12(y-2)$

11.  $x^2 + 10x + 3y + 22 = 0$

Write the equation of the parabolas given the following parts:

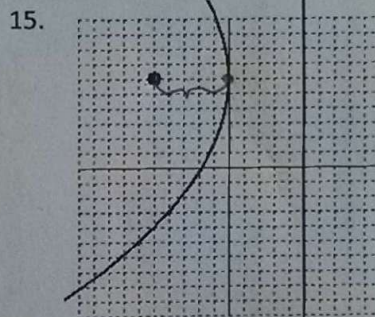
12. With vertex  $(2, -4)$  and directrix  $x = 0$

13. With focus  $(0, 5)$  and directrix  $y = -3$ .



graph paper  
Vertex  $(1, 5)$   
 $p = -3$

$(x-1)^2 = 4(-3)(y-5)$   
 $(x-1)^2 = -12(y-5)$



Vertex:  $(0, 6)$   
 $p = -5$

$(y-6)^2 = 4(-5)(x-0)$   
 $(y-6)^2 = -20(x-0)$   
 $(y-6)^2 = -20x$

Use  $f(x)$ ,  $g(x)$ ,  $h(x)$  and  $k(x)$  to evaluate:

x	-2	-1	0	1	2	3
f(x)	-3	0	1	0	-3	-8

x	-3	-2	-1	0	1	2
g(x)	-5	-2	1	4	7	10

$h(x) = 2x - 4$

$k(x) = 5 + 2x$

16.  $(f-g)(2)$

17.  $(fg)(-1)$

18.  $h(k(1))$

19.  $k(h(x))$

20.  $(f+k)(0)$

graph paper



Answer the following questions about Circles:

26. Find the center of the circle and the radius:  $(x+2)^2 + (y-7)^2 = 25$   **$(-2, 7)$   $r=5$**
27. Find the equation of the circle with center  $(-3, 4)$  and tangent to the  $x$ -axis. *graph paper*
28. Find the equation of the circle with center  $(0, 2)$  and point on the circle  $(2, 5)$ .
29. Rewrite  $x^2 + y^2 + 8x - 6y = 11$  in standard and find the center and the radius.

Answer the following questions about ellipses:

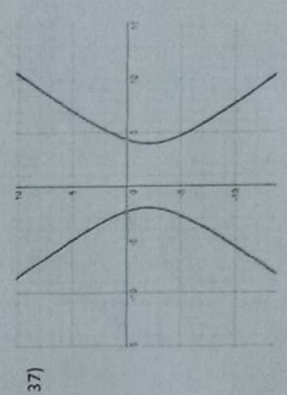
30. Find the center of the ellipse:  $\frac{(x-3)^2}{16} + \frac{(y+4)^2}{9} = 1$   **$(3, -4)$**
31. Find the vertices, co-vertices and Foci of the ellipse:  $\frac{x^2}{25} + \frac{y^2}{9} = 1$  *graph paper*
32. Find the equation of the ellipse given co-vertices at  $(\pm 4, 0)$  with foci at  $(0, \pm 3)$
33. Graph the ellipse  $\frac{(x-1)^2}{16} + \frac{(y+3)^2}{36} = 1$ . Include the foci.

Answer the following questions about hyperbolas:

34. Find the vertices, co-vertices and Foci of the hyperbola:  $\frac{x^2}{16} - \frac{y^2}{9} = 1$  *graph paper*
35. Find the asymptotes of the hyperbola:  $\frac{x^2}{9} - \frac{y^2}{4} = 1$
36. Write an equation of a hyperbola given center at  $(0, 0)$ , vertex at  $(0, 4)$  and foci at  $(0, 5)$
37. Graph the hyperbola  $\frac{(x-1)^2}{9} - \frac{(y+2)^2}{16} = 1$ . Include the foci and asymptotes.

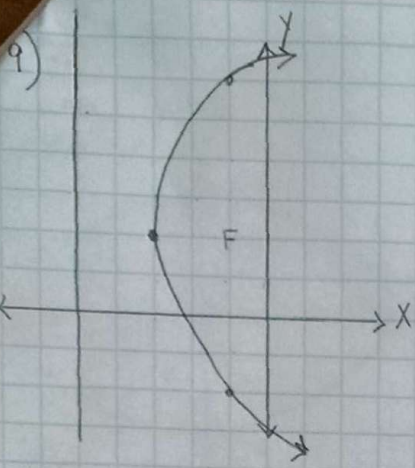
REMEMBER TO BRING GRAPH PAPER TO THE TEST IF YOU THINK YOU MIGHT NEED IT!

1. hyperbola	2. parabola	3. circle	4. ellipse
5. D: $[-1, 6]$ R: $[-8, 2]$	6. D: $[-8, 4]$ R: $[-2, 5]$	7. D: $\mathbb{R}$ R: $y \leq -5$ or $y \geq 5$	8. D: $\mathbb{R}$ R: $y \geq -3$
9. right V: $(3, 2)$ F: $(1, 2)$ Directrix: $x = -5$ Axis Symm: $y = 2$		10. down V: $(-1, 2)$ F: $(-1, 1)$ Directrix: $y = 5$ Axis Symm: $x = -1$	
11. $(x+5)^2 = -3(y-1)$ $(-5, 1)$	12. $(y+4)^2 = 8(x-2)$	13. $(x-0)^2 = 16(y-1)$	14. $(x-1)^2 = -12(y-5)$
15. $(y-6)^2 = -20(x-0)$	16. -13	17. 0	18. 10
19. $4x-3$	20. 6	21. no	22. yes
23. no	24. $y^{-1} = 2x-3$	25. $y^{-1} = \pm\sqrt{x+4}$	26. $(-2, 7)$ ; $r = 5$
27. $(x+3)^2 + (y-4)^2 = 16$	28. $x^2 + (y-2)^2 = 13$	29. $(x+4)^2 + (y-3)^2 = 36$ $(-4, 3)$ ; $r = 6$	30. $(3, -4)$
31. CoV: $(0, \pm 3)$ F: $(\pm 4, 0)$	32. $\frac{x^2}{16} + \frac{y^2}{25} = 1$	33. F: $(1, -9)$ and $(1, 3)$ CoV: $(-3, -3)$ and $(5, -3)$ F: $(1, 1.5)$ and $(1, -7.5)$	
34. Vertices: $(4, 0)$ and $(-4, 0)$ Co-Vertices: $(0, 3)$ and $(0, -3)$ Focus: $(5, 0)$ and $(-5, 0)$	35. $y = \pm \frac{2}{3}x$	36. $\frac{y^2}{16} - \frac{x^2}{9} = 1$	

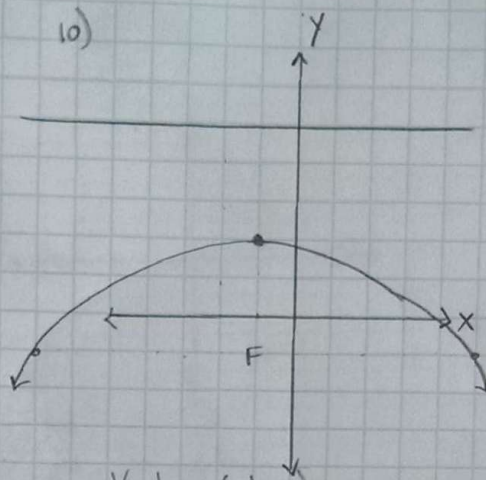


Asymptotes:  $y = \pm \frac{4}{3}(x-1) - 2$   
Foci:  $(5, -2)$  and  $(-3, -2)$





Vertex:  $(-3, 2)$   
 opens: Right  
 $p = +2$



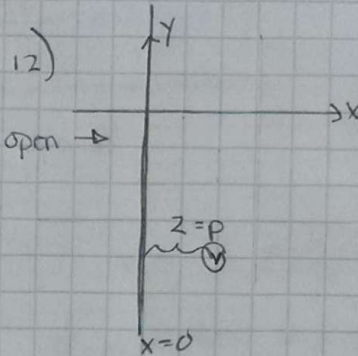
Vertex:  $(-1, 2)$   
 opens: down  
 $p = -3$

11)  $x^2 + 10x + 25 = -3y - 22 + 25$

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

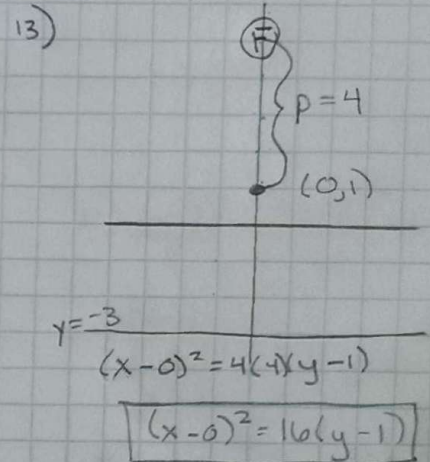
$$(x+5)^2 = -3(y-1)$$

Vertex:  $(-5, 1)$   
 opens down  
 $p = -3/4$



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

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



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

$$(x-0)^2 = 16(y-1)$$

16)  $(f-g)(2)$

$$f(2) - g(2)$$

$$-3 - 10$$

$$\boxed{-13}$$

17)  $(fg)(-1)$

$$f(-1) \cdot g(-1)$$

$$0 \cdot 1$$

$$\boxed{0}$$

18)  $h(k(1))$

$$k(1) = 5 + 2(1)$$

$$= 7$$

$$h(7) = 2(7) - 4$$

$$\boxed{10}$$

19)  $k(h(x))$

$$5 + 2(2x - 4)$$

$$5 + 4x - 8$$

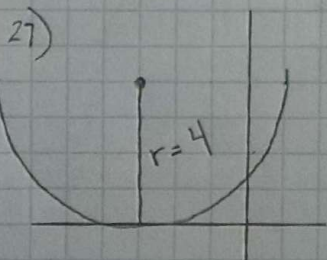
$$\boxed{4x - 3}$$

20)  $(f+k)(0)$

$$f(0) + k(0)$$

$$1 + 5$$

$$\boxed{6}$$



$$(x+3)^2 + (y-4)^2 = 16$$

28) Center  $(0, 2)$  pt  $(2, 5)$   
 $h, k$   $x, y$

$$(x-h)^2 + (y-k)^2 = r^2$$

$$(2-0)^2 + (5-2)^2 = r^2$$

$$(2)^2 + (3)^2 = r^2$$

$$4 + 9 = r^2$$

$$13 = r^2$$

$$(x-0)^2 + (y-2)^2 = 13$$

$$x^2 + (y-2)^2 = 13$$

29)  $x^2 + y^2 + 8x - 6y = 11$

$$x^2 + 8x + 16 + y^2 - 6y + 9 = 11 + 16 + 9$$

$$(x+4)^2 + (y-3)^2 = 36$$

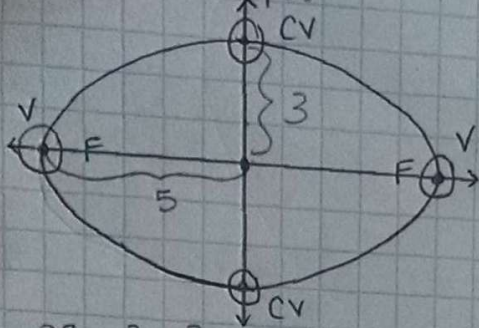
$$\text{Center } (-4, 3) \quad R = 6$$



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

$$a=5 \quad b=3$$

center  $(0,0)$



$$f^2 = a^2 - b^2$$

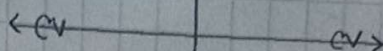
$$25 - 9$$

$$f^2 = 16$$

$$f = 4$$

$$\begin{aligned} V: (\pm 5, 0) \\ CV: (0, \pm 3) \\ F: (\pm 4, 0) \end{aligned}$$

$$32) \quad CV: (\pm 4, 0) \quad F: (0, \pm 3)$$



$$f^2 = a^2 - b^2$$

$$3^2 = a^2 - 4^2$$

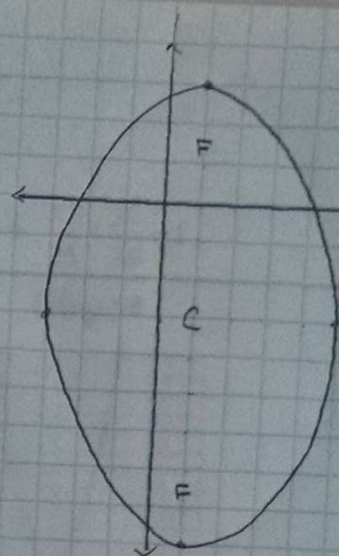
$$9 = a^2 - 16$$

$$25 = a^2$$

$$a = 5$$

$$\frac{x^2}{16} + \frac{y^2}{25} = 1$$

33)



Center  $(1, -3)$

$$a = 4$$

$$b = 6$$

$$f^2 = a^2 - b^2$$

$$f^2 = 36 - 16$$

$$f^2 = 20$$

$$f = 4.5$$

$$(1, 1.5) + (1, -7.5)$$

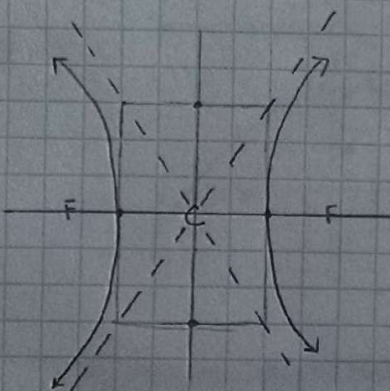
$$34) \quad \frac{x^2}{4} - \frac{y^2}{9} = 1$$

center  $(0,0)$

opens horizontally

$$a = 2$$

$$b = 3$$



$$f^2 = a^2 + b^2$$

$$4 + 9$$

$$f^2 = 13$$

$$f = 3.6$$

$$V: (\pm 2, 0)$$

$$CV: (0, \pm 3)$$

$$F: (\pm 3.6, 0)$$

$$Asy: y = \pm \frac{3}{2}x$$

$$36) \quad C(0,6), V(0,4), F(0,5)$$

CV

V

F

center  $(0,0)$

opens vertically

$$a = 4$$

$$b = ?$$

$$f = 5$$

$$f^2 = a^2 + b^2$$

$$25 = 16 + b^2$$

$$b^2 = 9$$

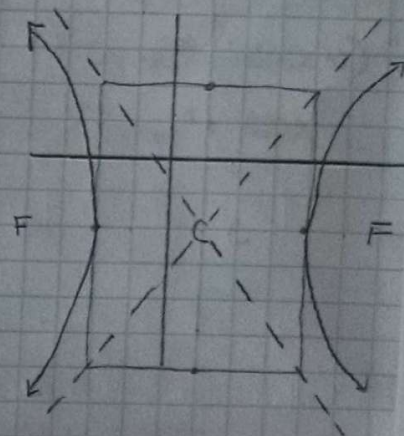
$$\frac{y^2}{16} - \frac{x^2}{9} = 1$$

$$37) \quad \frac{(x-1)^2}{9} - \frac{(y+2)^2}{16} = 1$$

Horizontal

C:  $(1, -2)$

$$a = 3 \quad b = 4$$



$$f^2 = a^2 + b^2$$

$$9 + 16$$

$$f^2 = 25$$

$$f = 5$$

$$\text{Asymptotes: } y = \pm \frac{4}{3}(x-1) - 2$$

$$\text{Foci: } (5, -2) + (-2, -2)$$

$$35) \quad \frac{x^2}{9} - \frac{y^2}{4} = 1$$

$$a = 3$$

$$b = 2$$

$$\frac{\Delta y}{\Delta x} = \pm \frac{2}{3}$$

$$y = \pm \frac{2}{3}x$$