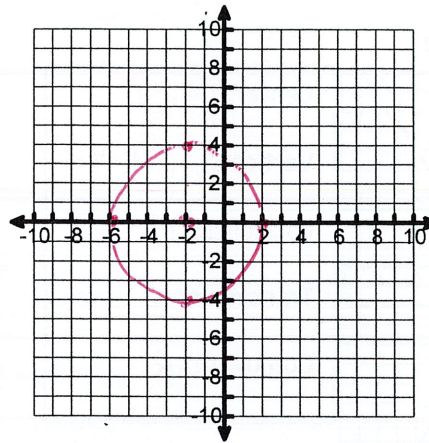


Identify each type of conic.

- $\frac{(x+3)^2}{12} - \frac{(y-4)^2}{12} = 1$ Hyperbola
- $x^2 + y^2 = 9$ Circle
- $y^2 - 2y - 4x - 7 = 0$ Parabola
- $7x^2 - 42x - 2y^2 + 8y - 27 = 0$ Hyperbola
- $9x^2 + 18x + 25y^2 - 10y + 38 = 0$ Ellipse

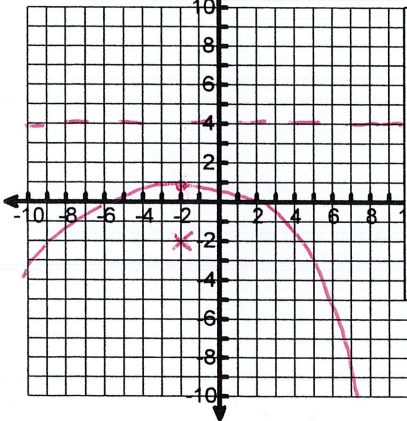
6. Graph the circle: $(x+2)^2 + y^2 = 16$



Center: $(-2, 0)$
 Radius: 4

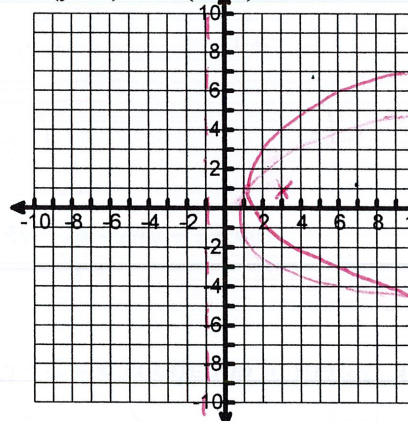
Graph each of the following:

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



Vertex: $(-2, 1)$
 Focus: $(-2, -2)$
 Directrix: $y = 4$
 AOS: $x = -2$

8. $(y-1)^2 = 8(x-1)$

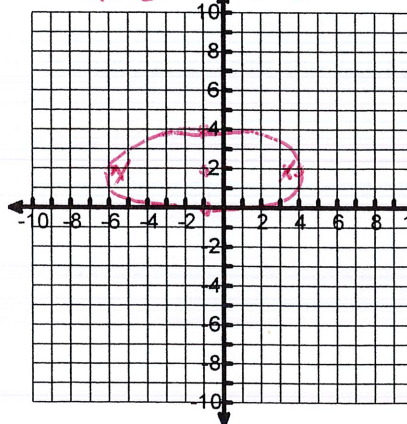


Vertex: $(1, 1)$
 Focus: $(3, 1)$
 Directrix: $x = -1$
 AOS: $y = 1$

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

$a = 5$ $b = 2$

$c^2 = a^2 - b^2$
 $c^2 = 25 - 4$
 $c = \sqrt{21} \approx 4.6$

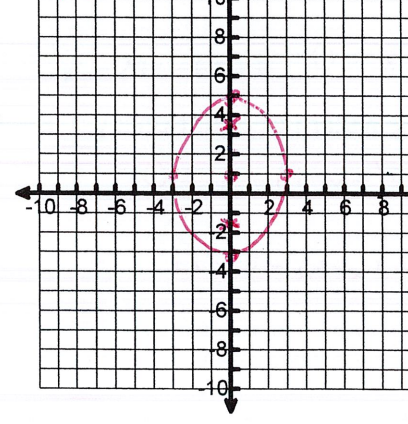


Center: $(-1, 2)$
 Vertices: $(-6, 2)$ $(4, 2)$
 Co-vertices: $(-1, 4)$ $(-1, 0)$
 Foci: $(3.6, 2)$ $(-5.6, 2)$
 Major: 10
 Minor: 4

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

$b = 3$ $a = 4$

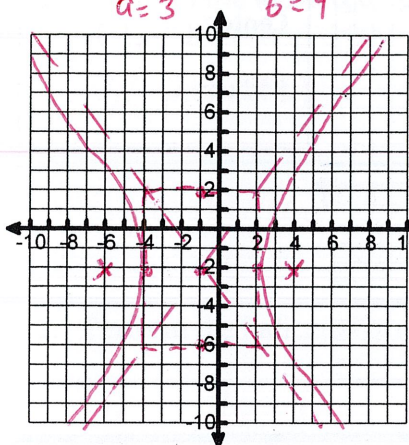
$c^2 = a^2 - b^2$
 $c^2 = 16 - 9$
 $c = \sqrt{7} \approx 2.6$



Center: $(0, 1)$
 Vertices: $(0, 5)$ $(0, -3)$
 Co-vertices: $(-3, 1)$ $(3, 1)$
 Foci: $(0, 3.6)$ $(0, -1.6)$
 Major: 8
 Minor: 6

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

$a=3$ $b=4$ $c=5$

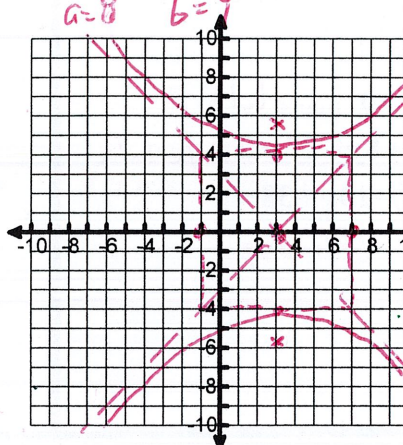


Center: $(-1, -2)$
 Vertices: $(-4, -2), (2, -2)$
 Foci: $(-6, -2), (4, -2)$
 Transverse: 6
 Conjugate: 8

12. $\frac{y^2}{16} - \frac{(x-3)^2}{16} = 1$

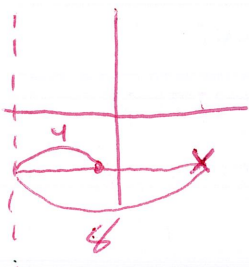
$a=4$ $b=4$

$c^2 = a^2 + b^2$
 $c^2 = 16 + 16$
 $c = \sqrt{32} \approx 5.7$



Center: $(3, 0)$
 Vertices: $(3, 4), (3, -4)$
 Foci: $(3, 5.7), (3, -5.7)$
 Transverse: 8
 Conjugate: 8

13. Write the equation of the parabola with focus $(3, -2)$ and directrix $x = -5$.



$c = (-1, -2)$

$p = 4$

$(y-k)^2 = 4p(x-h)$

$(y+2)^2 = 16(x+1)$

14. Solve the following system of equations: $x = 2 + y$; $x^2 + y^2 = 100$.

$(2+y)^2 + y^2 = 100$

$y^2 + 4y + 4 + y^2 = 100$

$2y^2 + 4y + 4 = 100$

$y^2 + 2y + 2 = 50$

$y^2 + 2y - 48 = 0$

$(y+8)(y-6)$

$y = -8, 6$

$(-6, -8)$

$(8, 6)$

15. Solve the following system of equations: $y = -x - 1$; $y^2 - x - 2y - 3 = 0$

$(-x-1)^2 - x - 2(-x-1) - 3 = 0$

$x^2 + 2x + 1 - x + 2x + 2 - 3 = 0$

$x^2 + 3x = 0$

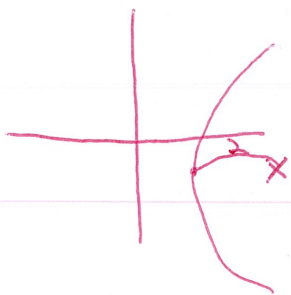
$x(x+3) = 0$

$x = 0, -3$

$(0, -1)$

$(-3, 2)$

16. Write the equation of the parabola with vertex (2, -1) and focus (4, -1)



$$(y-k)^2 = 4p(x-h)$$

$$(y+1)^2 = 8(x-2)$$

17. Write the equation of the circle with center (3, 4) and Area = 25π

$$A = \pi r^2$$

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

$$25\pi = \pi r^2$$

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

$$25 = r^2$$

$$r = 5$$

18. Identify and write the equation of the given conic: $x^2 + 4y^2 - 2x - 24y + 33 = 0$

A) Ellipse (x^2 and $4y^2$ are positive & different coefficients)

$$B) x^2 - 2x + 4y^2 - 24y = -33$$

$$(x^2 - 2x + 1) + 4(y^2 - 6y + 9) = -33 + 1 + 36$$

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

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

19. Identify and write the equation of the given conic: $4x^2 - 25y^2 - 24x - 64 = 0$

A) Hyperbola ($-25y^2$ is negative)

$$B) 4x^2 - 24x - 25y^2 = 64$$

$$4(x^2 - 6x + 9) - 25y^2 = 64 + 36$$

$$\frac{4(x-3)^2}{4 \cdot 25} - \frac{25y^2}{4 \cdot 25} = \frac{100}{4 \cdot 25}$$

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

Cumulative Review Questions:

1. Perform the indicated operation: $\begin{bmatrix} 3 & 0 \\ 2y & 1 \end{bmatrix} * \begin{bmatrix} -2 & 3 \\ x & -4 \end{bmatrix}$

$$\begin{bmatrix} 3(-2) + 0(x) & 3(3) + 0(-4) \\ 2y(-2) + 1(x) & 2y(3) + 1(-4) \end{bmatrix} = \begin{bmatrix} -6 & 9 \\ -4y+x & 6y-4 \end{bmatrix}$$

2. Perform the indicated operation: $\begin{bmatrix} x & 2 \\ -1 & 4 \end{bmatrix}^{-1}$

$$\det = 4x - (-2) \\ = 4x + 2$$

$$\frac{1}{4x+2} \begin{bmatrix} 4 & -2 \\ 1 & x \end{bmatrix}$$

3. If $|X| = 26$, then find the value of r: $X = \begin{bmatrix} 3 & r \\ -5 & 2 \end{bmatrix}$

$$3(2) - (-5)(r) = 26$$

$$6 + 5r = 26$$

$$5r = 20$$

$$\boxed{r = 4}$$

4. Solve the following system: $2x - 3y = 16$
 $x - 2y = 9$

$$\begin{bmatrix} 2 & -3 \\ 1 & -2 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 16 \\ 9 \end{bmatrix}$$

$$\begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 2 & -3 \\ 1 & -2 \end{bmatrix}^{-1} \begin{bmatrix} 16 \\ 9 \end{bmatrix}$$

$$\begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 5 \\ -2 \end{bmatrix}$$

$$\boxed{(5, -2)}$$