

Identify each type of conic.

1. $4x^2 + 3y^2 - 2x + 5y - 60 = 0$

ellipse

2. $4x^2 + 4y^2 + 12x + 8y + 48 = 0$

Circle

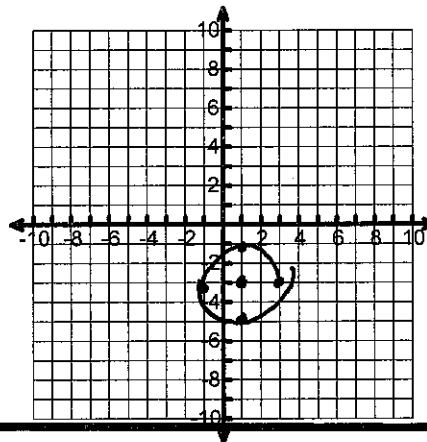
3. $y^2 - 6y + 24x = 4$

parabola

4. $4x^2 - 5y^2 + 12x + 15y = 20$

hyperbola

6. Graph the circle: $(x-1)^2 + (y+3)^2 = 4$



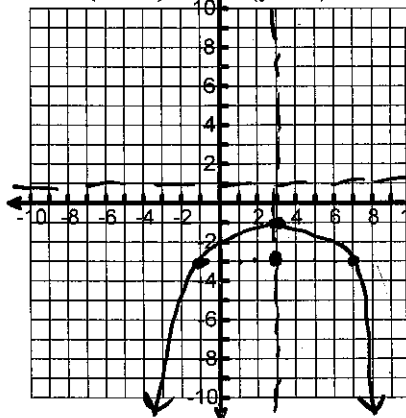
Center: $(1, -3)$

Radius: 2

Graph each of the following:

$4p = -8$
 $p = -2$

7. $(x-3)^2 = 8(y+1)$



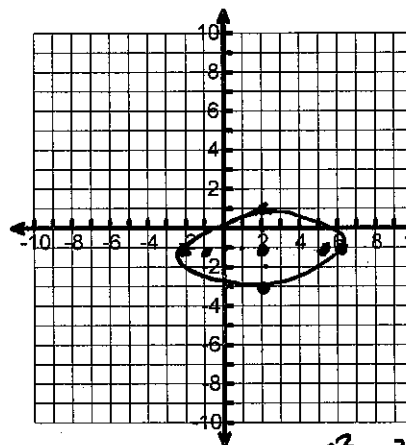
Vertex: $(3, -1)$

Foci: $(3, -3)$

Directrix: $y = 1$

AOS: $x = 3$

8. $\frac{(x-2)^2}{16} + \frac{(y+1)^2}{4} = 1$



Center: $(2, -1)$

Vertices:

~~(-2, -1)~~ $(6, -1)$ $(2, 1)$

Co-vertices:

$(2, 1)$ $(2, -3)$

Foci:

$(6 + 2\sqrt{3}, -1)$ $(-2 - 2\sqrt{3}, -1)$

Major: 8

Minor: 4

$c^2 = a^2 - b^2$
 $c^2 = 16 - 4$
 $c^2 = 12$ $c = 2\sqrt{3}$

10. Solve the following system:

$x^2 + 2y - 10 = 0$

$(x+1) = y$

$x^2 + 2(x+1) - 10 = 0$

$x^2 + 2x + 2 - 10 = 0$

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

$(x+4)(x-2) = 0$

$x = -4$ $x = 2$

$-4 + 1 = y$
 $-3 = y$

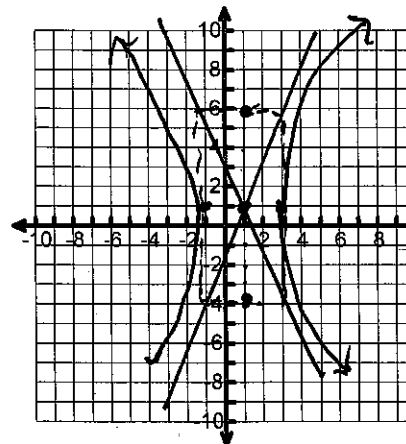
$2 + 1 = y$
 $3 = y$

$(-4, -3)$

$(2, 3)$

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

$c^2 = a^2 + b^2$
 $c^2 = 4 + 25$
 $c^2 = 29$
 $c = \sqrt{29}$



Center: $(1, 1)$

Vertices: $(3, 1)$
 $(-1, 1)$

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

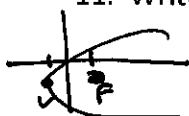
Transverse: 4

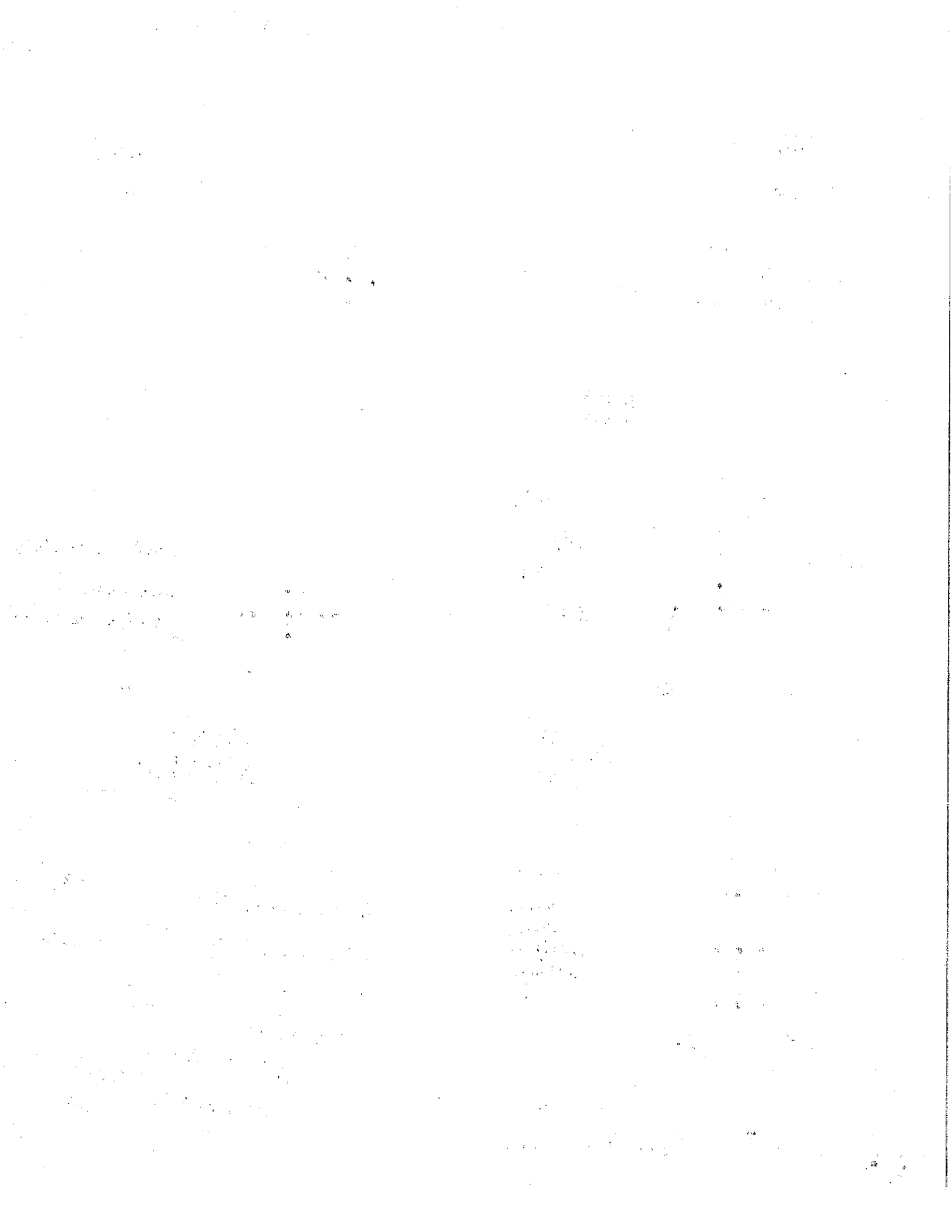
Conjugate: 10

11. Write the equation of the parabola with focus $(2, -1)$ and vertex at $(-1, -1)$

$p = 3$

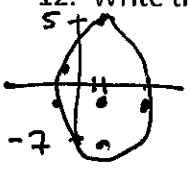
$(y+1)^2 = 12(x+1)$





Changed

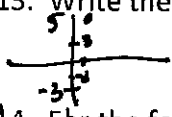
12. Write the equation of the ellipse given the following information:



major axis points: (2, 5) and (2, -7) $a=6$ ctr (2, -1)
minor axis points: (-1, -1) and (5, -1) $b=3$

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

13. Write the equation of the hyperbola with foci (1, 5) (1, -3) and vertices (1, 3) (1, -1)



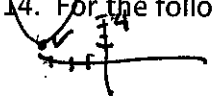
$$c^2 = a^2 + b^2$$

$$16 = 4 + b^2 \quad b^2 = 12 \quad c = 4$$

ctr (1, 1)
 $a=2$

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

14. For the following equation identify the focus, vertex, and directrix: $(x+3)^2 = 12(y-1)$



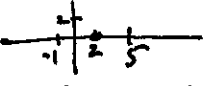
$$4p = 12$$

$$p = 3$$

$$V: (-3, 1) \quad F: (-3, 4) \quad D: y = -2$$

going up

15. Write the equation of the ellipse with vertices (5, 0) (-1, 0) and covertices (2, 2) (2, -2)



ctr (2, 0)

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

$b=2$

16. Write the equation of the circle with center (1, 4) and Area = 16π

$$(x-1)^2 + (y-4)^2 = 16$$

$$16\pi = \pi r^2$$

$$\frac{16\pi}{\pi} = \frac{\pi r^2}{\pi}$$

$$16 = r^2$$

$$4 = r$$

Cumulative Review Questions:

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

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

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

$$= \begin{bmatrix} -6 & 9 \\ -4y + x & 6y - 4 \end{bmatrix}$$

11 det!
down diagonals - up

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

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

$$26 = 6 - (-5r)$$

$$26 = \frac{6}{-6} + 5r$$

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

$$\frac{20}{5} = \frac{5r}{5}$$

$$r = 4$$

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

A X B

$$X = A^{-1} B = \begin{bmatrix} 5 \\ -2 \end{bmatrix}$$

so, $x = 5$
 $y = -2$

