Answers!

DIRECTIONS: For #1-2, respond in the provided blanks.

1. A parabola has its vertex at $(4, -7)$ and directrix of $x = 2$. Identify the **focus** of this parabola.

$\mathbf{(6, -7)}$

2. A parabola has its vertex at $(-2, -3)$ and focus at $(-5, -3)$. Identify the **directrix** of this parabola.

$\boldsymbol{x = 1}$

DIRECTIONS: For #3-4, **write equations** for the described parabolas in the provided blanks.

3. Focus $(6, 2)$; Vertex $(6, 7)$

$$\boldsymbol{y - 7 = -\frac{1}{20}(x - 6)^2}$$

4. Focus $(-2, 4)$; Directrix $y = 6$

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

DIRECTIONS: For #5-6, **rewrite the equations** in the standard form for parabolas. Then identify the **vertex**, **focus**, **directrix**, and **axis of symmetry** for the parabola.

5. $y^2 - 16x - 6y - 7 = 0$

Equation:

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

Vertex: $\mathbf{(-1, 3)}$

Focus: $\mathbf{(3, 3)}$

Directrix: $\boldsymbol{x = -5}$

Axis: $\boldsymbol{y = 3}$

6. $x^2 - 12x + 4y + 28 = 0$

Equation:

$$\boldsymbol{y - 2 = -\frac{1}{4}(x - 6)^2}$$

Vertex: $\mathbf{(6, 2)}$

Focus: $\mathbf{(6, 1)}$

Directrix: $\boldsymbol{y = 3}$

Axis: $\boldsymbol{x = 6}$

DIRECTIONS: For #7, **write an equation** for an ellipse with the given intercepts.

7. *x*-intercepts: ± 2 ; y-intercepts: ± 4 $\quad \frac{x^2}{4} + \frac{y^2}{16} = 1$

DIRECTIONS: For #8-9, **write equations** for ellipses with the given foci and sum of focal radii.

8. Foci: $(-2, 0), (2, 0)$;
Sum of focal radii $= 6$

$$\frac{x^2}{9} + \frac{y^2}{5} = 1$$

9. Foci: $(4, 2), (4, 8)$;
Sum of focal radii $= 16$

$$\frac{(x-4)^2}{55} + \frac{(y-5)^2}{64} = 1$$

DIRECTIONS: For #10-11, **rewrite the equations** in the standard form for ellipses. Then identify the **center**, direction of the **major axis** (horizontal or vertical), **verticies**, **co-verticies**, and **foci**.

10. $3x^2 + 4y^2 - 36x + 32y + 124 = 0$

Equation:

$$\frac{(x-6)^2}{16} + \frac{(y+4)^2}{12} = 1$$

Center: $(6, -4)$

Major axis: **Horizontal ($y = -4$)**

Verticies: $(2, -4)$ **&** $(10, -4)$

Co-verticies: $(6, -4 + 2\sqrt{3})$ **&** $(6, -4 - 2\sqrt{3})$

Foci: $(4, -4)$ **&** $(8, -4)$

11. $4x^2 + y^2 + 16x - 6y - 11 = 0$

Equation:

$$\frac{(x+2)^2}{9} + \frac{(y-3)^2}{36} = 1$$

Center: $(-2, 3)$

Major axis: **Vertical ($x = -2$)**

Verticies: $(-2, -3)$ **&** $(-2, 9)$

Co-verticies: $(-5, 3)$ **&** $(1, 3)$

Foci: $(-2, -3 + 3\sqrt{3})$ **&** $(-2, -3 - 3\sqrt{3})$