

**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.

$$(6, -7)$$

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

$$x = 1$$

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

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

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

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

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

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

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

Equation:

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

Vertex:  $(-1, 3)$

Focus:  $(3, 3)$

Directrix:  $x = -5$

Axis:  $y = 3$

Equation:

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

Vertex:  $(6, 2)$

Focus:  $(6, 1)$

Directrix:  $y = 3$

Axis:  $x = 6$

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

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

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), **vertices**, **co-vertices**, and **foci**.

10.  $3x^2 + 4y^2 - 36x + 32y + 120 = 0$

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

Equation:

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

Center:  $(6, -4)$

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

Vertices:  $(2, -4)$  &  $(10, -4)$

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

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

Equation:

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

Center:  $(-2, 3)$

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

Vertices:  $(-2, -3)$  &  $(-2, 9)$

Co-vertices:  $(-5, 3)$  &  $(1, 3)$

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