

## Graphing and Properties of Ellipses

Identify the center, vertices, co-vertices, foci, length of the major axis, and length of the minor axis of each.

1)  $\frac{x^2}{49} + \frac{y^2}{169} = 1$

2)  $\frac{x^2}{36} + \frac{y^2}{16} = 1$

3)  $\frac{x^2}{95} + \frac{y^2}{30} = 1$

4)  $\frac{x^2}{169} + \frac{y^2}{64} = 1$

5)  $\frac{x^2}{64} + \frac{(y-6)^2}{121} = 1$

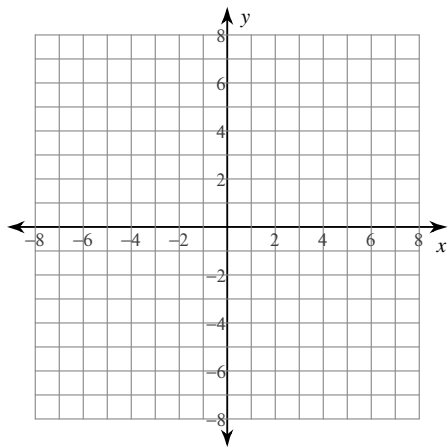
6)  $\frac{(x+5)^2}{81} + \frac{(y-1)^2}{144} = 1$

$$7) \frac{(x-3)^2}{49} + \frac{(y-9)^2}{4} = 1$$

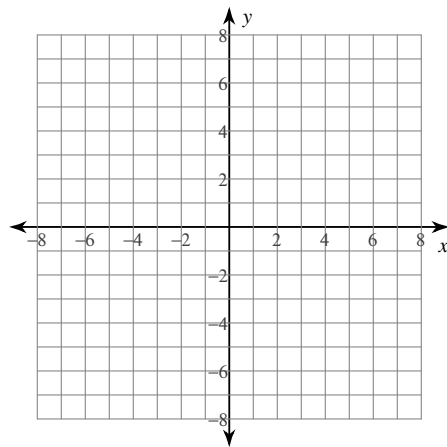
$$8) \frac{x^2}{64} + \frac{(y-8)^2}{9} = 1$$

**Graph each equation.**

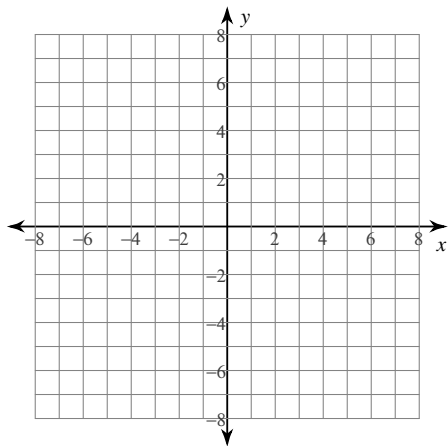
$$9) \frac{x^2}{4} + \frac{y^2}{9} = 1$$



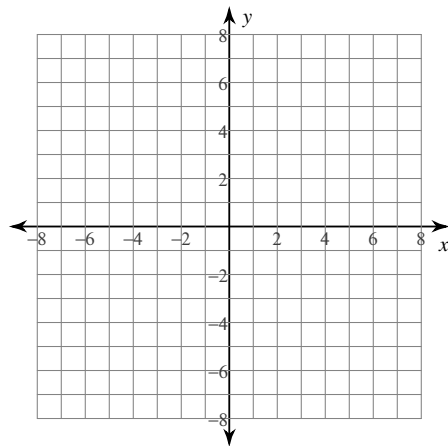
$$10) \frac{x^2}{49} + y^2 = 1$$



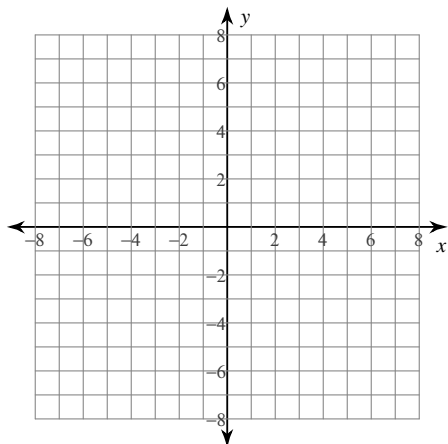
$$11) \frac{x^2}{36} + \frac{y^2}{25} = 1$$



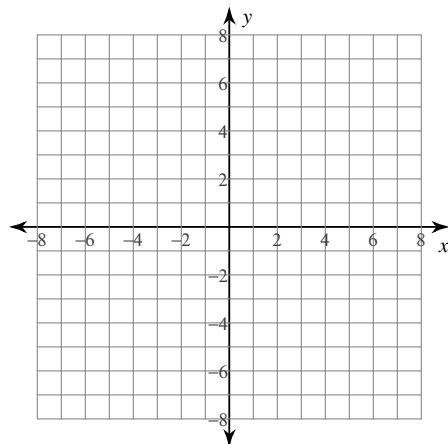
$$12) \frac{x^2}{9} + \frac{y^2}{49} = 1$$



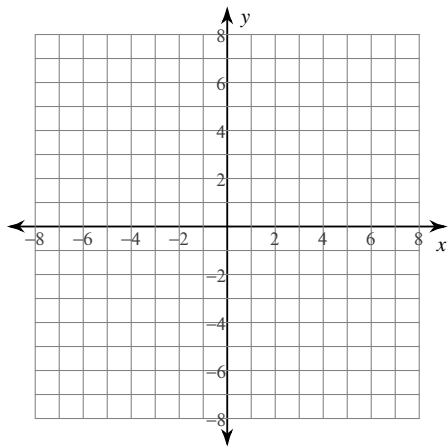
$$13) \frac{x^2}{49} + \frac{(y-3)^2}{16} = 1$$



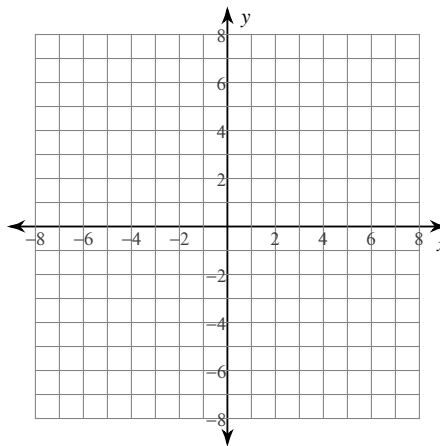
$$14) \frac{(x-1)^2}{4} + \frac{y^2}{49} = 1$$



$$15) \frac{x^2}{49} + \frac{(y-1)^2}{9} = 1$$



$$16) (x+5)^2 + \frac{y^2}{49} = 1$$



**Identify the length of the major axis, length of the minor axis, length of the latus rectum, and eccentricity of each.**

$$17) -16y + 52 = -2x^2 - 8x - y^2$$

$$18) 4y^2 - 338x + 32y = -169x^2 + 443$$

$$19) \frac{(x+4)^2}{4} + \frac{(y+9)^2}{64} = 1$$

$$20) 126y + 9y^2 - 8x - 131 = -4x^2$$

## Graphing and Properties of Ellipses

Identify the center, vertices, co-vertices, foci, length of the major axis, and length of the minor axis of each.

$$1) \frac{x^2}{49} + \frac{y^2}{169} = 1$$

Center: (0, 0)  
 Vertices: (0, 13), (0, -13)  
 Co-vertices: (7, 0), (-7, 0)  
 Foci: (0,  $2\sqrt{30}$ ), (0,  $-2\sqrt{30}$ )  
 Major Axis: 26 units  
 Minor Axis: 14 units

$$2) \frac{x^2}{36} + \frac{y^2}{16} = 1$$

Center: (0, 0)  
 Vertices: (6, 0), (-6, 0)  
 Co-vertices: (0, 4), (0, -4)  
 Foci: ( $2\sqrt{5}$ , 0), ( $-2\sqrt{5}$ , 0)  
 Major Axis: 12 units  
 Minor Axis: 8 units

$$3) \frac{x^2}{95} + \frac{y^2}{30} = 1$$

Center: (0, 0)  
 Vertices: ( $\sqrt{95}$ , 0), ( $-\sqrt{95}$ , 0)  
 Co-vertices: (0,  $\sqrt{30}$ ), (0,  $-\sqrt{30}$ )  
 Foci: ( $\sqrt{65}$ , 0), ( $-\sqrt{65}$ , 0)  
 Major Axis:  $2\sqrt{95}$  units  
 Minor Axis:  $2\sqrt{30}$  units

$$4) \frac{x^2}{169} + \frac{y^2}{64} = 1$$

Center: (0, 0)  
 Vertices: (13, 0), (-13, 0)  
 Co-vertices: (0, 8), (0, -8)  
 Foci: ( $\sqrt{105}$ , 0), ( $-\sqrt{105}$ , 0)  
 Major Axis: 26 units  
 Minor Axis: 16 units

$$5) \frac{x^2}{64} + \frac{(y-6)^2}{121} = 1$$

Center: (0, 6)  
 Vertices: (0, 17), (0, -5)  
 Co-vertices: (8, 6), (-8, 6)  
 Foci: (0,  $6 + \sqrt{57}$ ), (0,  $6 - \sqrt{57}$ )  
 Major Axis: 22 units  
 Minor Axis: 16 units

$$6) \frac{(x+5)^2}{81} + \frac{(y-1)^2}{144} = 1$$

Center: (-5, 1)  
 Vertices: (-5, 13), (-5, -11)  
 Co-vertices: (4, 1), (-14, 1)  
 Foci: ( $-5, 1 + 3\sqrt{7}$ ), ( $-5, 1 - 3\sqrt{7}$ )  
 Major Axis: 24 units  
 Minor Axis: 18 units

$$7) \frac{(x-3)^2}{49} + \frac{(y-9)^2}{4} = 1$$

Center: (3, 9)

Vertices: (10, 9), (-4, 9)

Co-vertices: (3, 11), (3, 7)

Foci:  $(3 + 3\sqrt{5}, 9)$ ,  $(3 - 3\sqrt{5}, 9)$

Major Axis: 14 units

Minor Axis: 4 units

$$8) \frac{x^2}{64} + \frac{(y-8)^2}{9} = 1$$

Center: (0, 8)

Vertices: (8, 8), (-8, 8)

Co-vertices: (0, 11), (0, 5)

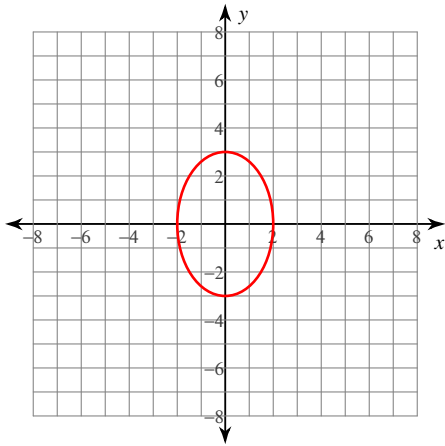
Foci:  $(\sqrt{55}, 8)$ ,  $(-\sqrt{55}, 8)$

Major Axis: 16 units

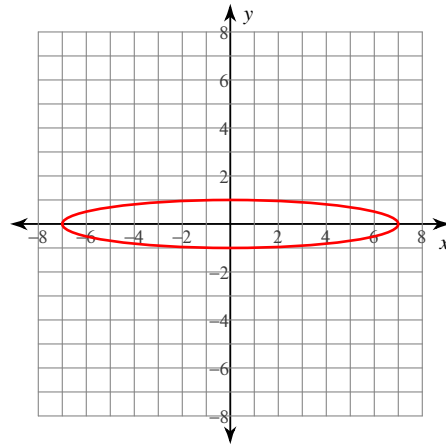
Minor Axis: 6 units

**Graph each equation.**

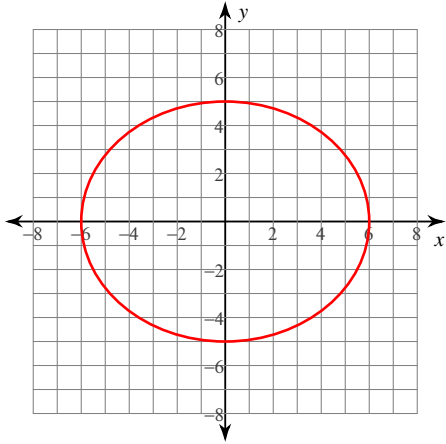
$$9) \frac{x^2}{4} + \frac{y^2}{9} = 1$$



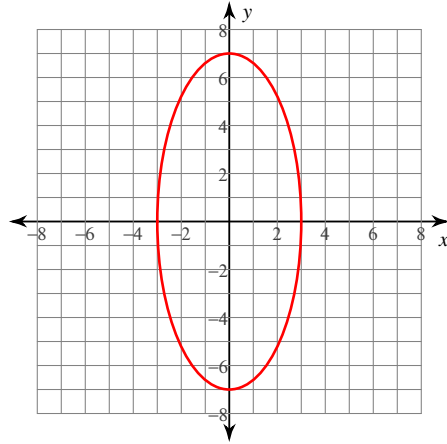
$$10) \frac{x^2}{49} + y^2 = 1$$



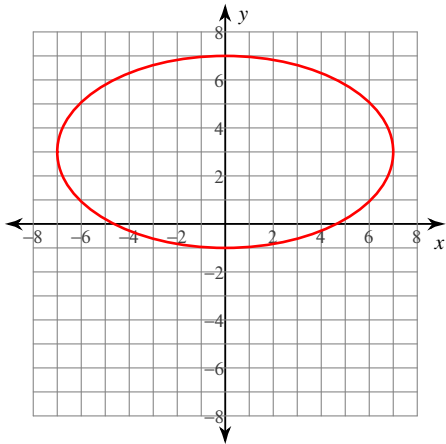
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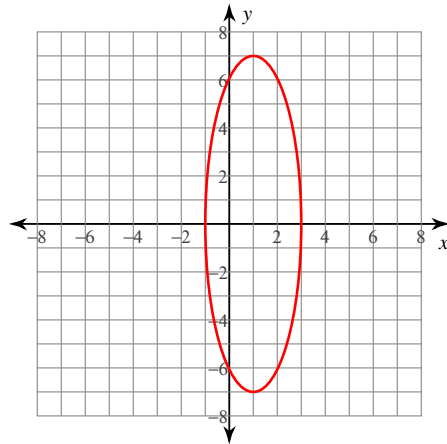
$$12) \frac{x^2}{9} + \frac{y^2}{49} = 1$$



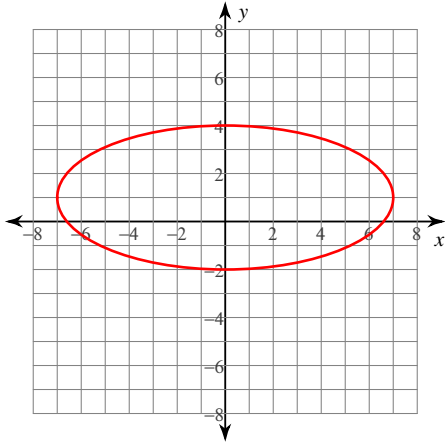
$$13) \frac{x^2}{49} + \frac{(y-3)^2}{16} = 1$$



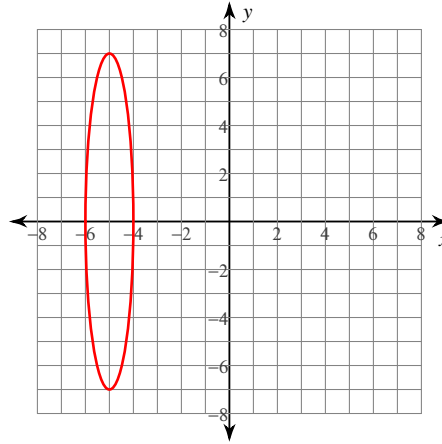
$$14) \frac{(x-1)^2}{4} + \frac{y^2}{49} = 1$$



$$15) \frac{x^2}{49} + \frac{(y-1)^2}{9} = 1$$



$$16) (x+5)^2 + \frac{y^2}{49} = 1$$



**Identify the length of the major axis, length of the minor axis, length of the latus rectum, and eccentricity of each.**

$$17) -16y + 52 = -2x^2 - 8x - y^2$$

Major Axis:  $4\sqrt{5}$  units

Minor Axis:  $2\sqrt{10}$  units

Latus Rectum:  $2\sqrt{5}$  units

Eccentricity:  $\frac{\sqrt{2}}{2} \approx 0.707$

$$18) 4y^2 - 338x + 32y = -169x^2 + 443$$

Major Axis: 26 units

Minor Axis: 4 units

Latus Rectum:  $\frac{8}{13}$  units

Eccentricity:  $\frac{\sqrt{165}}{13} \approx 0.988$

$$19) \frac{(x+4)^2}{4} + \frac{(y+9)^2}{64} = 1$$

Major Axis: 16 units

Minor Axis: 4 units

Latus Rectum: 1 unit

Eccentricity:  $\frac{\sqrt{15}}{4} \approx 0.968$

$$20) 126y + 9y^2 - 8x - 131 = -4x^2$$

Major Axis: 24 units

Minor Axis: 16 units

Latus Rectum:  $\frac{32}{3}$  units

Eccentricity:  $\frac{\sqrt{5}}{3} \approx 0.745$