

## Graphing and Properties of Ellipses

Date \_\_\_\_\_ Period \_\_\_\_\_

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

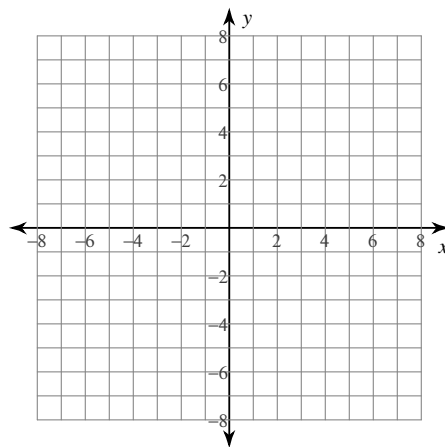
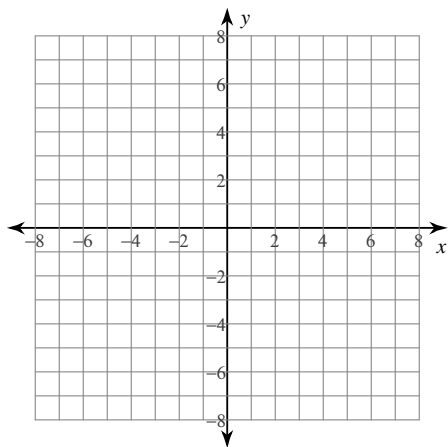
7)  $\frac{(x-3)^2}{49} + \frac{(y-9)^2}{4} = 1$

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

Graph each equation.

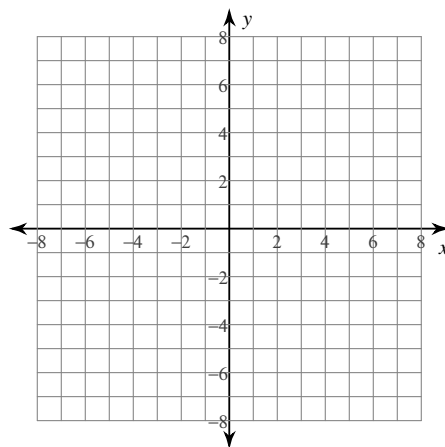
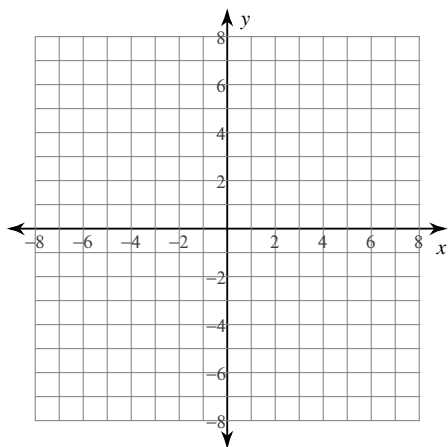
9)  $\frac{x^2}{4} + \frac{y^2}{9} = 1$

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

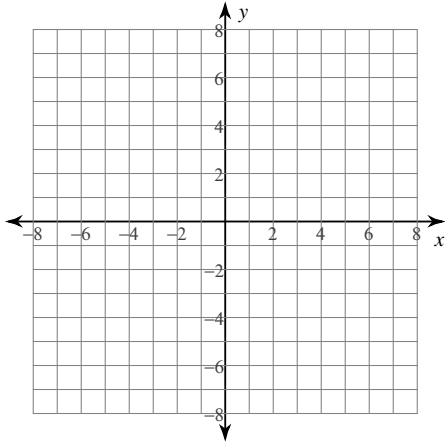


11)  $\frac{x^2}{36} + \frac{y^2}{25} = 1$

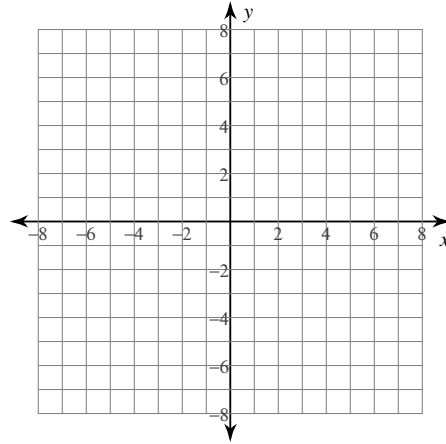
12)  $\frac{x^2}{9} + \frac{y^2}{49} = 1$



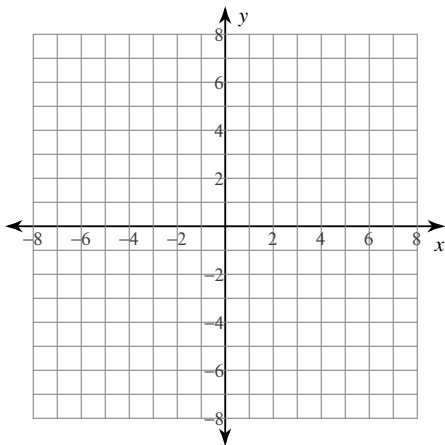
$$13) \frac{x^2}{49} + \frac{(y-3)^2}{16} = 1$$



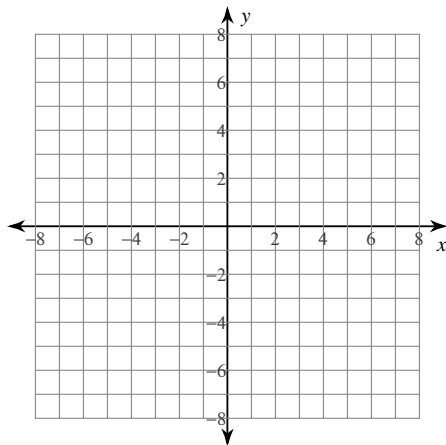
$$14) \frac{(x-1)^2}{4} + \frac{y^2}{49} = 1$$



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



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



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

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

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

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

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

## Answers to Graphing and Properties of Ellipses

- 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) 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) 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

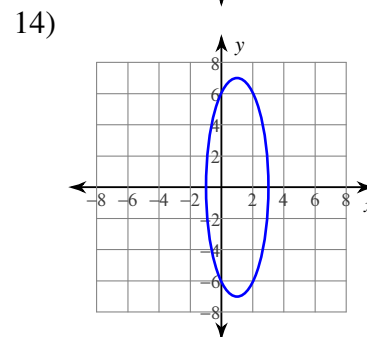
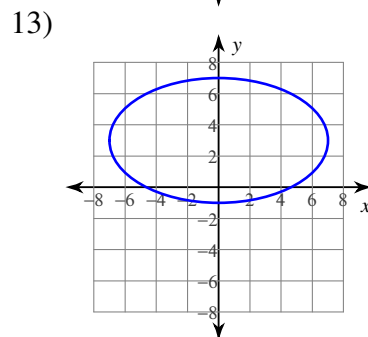
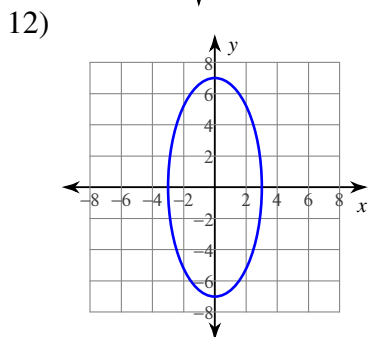
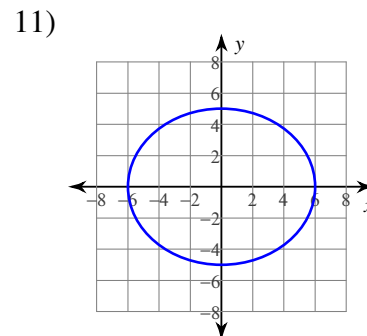
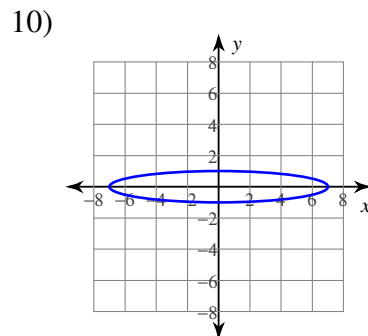
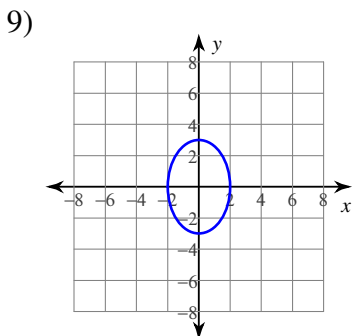
- 4) Center:  $(0, 0)$   
 Vertices:  $(13, 0), (-13, 0)$   
 Co-vertices:  $(0, 8), (0, -8)$   
 Foci:  $(\sqrt{105}, 0), (-\sqrt{105}, 0)$   
 Major Axis: 26 units  
 Minor Axis: 16 units

- 5) 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

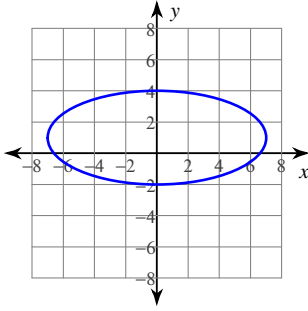
- 6) Center:  $(-5, 1)$   
 Vertices:  $(-5, 13), (-5, -11)$   
 Co-vertices:  $(4, 1), (-14, 1)$   
 Foci:  $(-5, 1 + 3\sqrt{7}), (-5, 1 - 3\sqrt{7})$   
 Major Axis: 24 units  
 Minor Axis: 18 units

- 7) 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) 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



15)

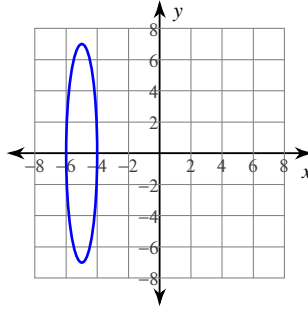


18) Major Axis: 26 units  
Minor Axis: 4 units

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

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

16)



19) Major Axis: 16 units  
Minor Axis: 4 units

Latus Rectum: 1 unit

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

17) Major Axis:  $4\sqrt{5}$  units  
Minor Axis:  $2\sqrt{10}$  units  
Latus Rectum:  $2\sqrt{5}$  units  
Eccentricity:  $\frac{\sqrt{2}}{2} \approx 0.707$

20) Major Axis: 24 units  
Minor Axis: 16 units

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

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