

**Student:** Cole Lamers  
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**Instructor:** Kelly Galarneau  
**Course:** CA&T Internet (70263)  
Galarneau

**Assignment:** 2.2, 10.2 Circle and The  
Parabola

1. Determine the center and radius of the circle described by the equation.

$$(x + 5)^2 + (y - 3)^2 = 4$$

center =  (Type your answer as an ordered pair.)

radius =

2. Specify the center and the radius of the circle below.

$$(x + 4)^2 + (y + 1)^2 = 17$$

What is the center of the circle?

(Type an ordered pair.)

What is the radius of the circle?

(Simplify your answer. Type an exact answer, using radicals as needed.)

3. a. Find the center and radius of the circle  $3x^2 + 3y^2 + 60y = 0$ .

- b. Find the x- and y-intercepts of the graph of the circle  $3x^2 + 3y^2 + 60y = 0$ .

a. The center of the circle is .

(Type an ordered pair.)

The radius of the circle is .

(Simplify your answer. Type an exact answer, using radicals as needed.)

b. The x-intercept(s) of the graph of the circle is/are .

(Type an integer or a simplified fraction. Use a comma to separate answers as needed.)

The y-intercept(s) of the graph of the circle is/are .

(Type an integer or a simplified fraction. Use a comma to separate answers as needed.)

4. a. Find the center and radius of the given circle.

- b. Find the x- and y-intercepts of the graph of the given circle.

$$x^2 + y^2 + 2x - 8y + 1 = 0$$

The center is .

(Type an ordered pair.)

The radius is .

(Simplify your answer. Type an exact answer, using radicals as needed.)

Select the correct choice below and fill in any answer boxes within your choice.

- A. The x-intercept(s) is/are .

(Use a comma to separate answers as needed. Type an exact answer, using radicals as needed.)

- B. There is no x-intercept.

Select the correct choice below and fill in any answer boxes within your choice.

- A. The y-intercept(s) is/are .

(Use a comma to separate answers as needed. Type an exact answer, using radicals as needed.)

- B. There is no y-intercept.

5. A parabola is the set of all points P in the plane that are equidistant from a fixed line called the \_\_\_\_\_ and a fixed point not on the line called the \_\_\_\_\_.

A parabola is the set of all points P in the plane that are equidistant from a fixed line called the directrix \_\_\_\_\_ and a fixed point not on the line called the focus \_\_\_\_\_.

6. The point at which the axis intersects the parabola is called the \_\_\_\_\_ of the parabola.

The point at which the axis intersects the parabola is called the vertex \_\_\_\_\_ of the parabola.

7. State whether the following statement is true or false.

The vertex of a parabola is midway between its focus and its directrix.

Choose the correct answer below.

- True  
 False

8. Find the focus and directrix of the parabola with the given equation. Then match the equation to one of the graphs labeled A through D.

$$y^2 = -3x$$

What is the focus of the parabola?

$$\left( -\frac{3}{4}, 0 \right)$$

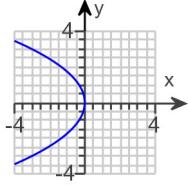
(Simplify your answer. Type an ordered pair. Use integers or fractions for any numbers in the expression.)

What is the directrix of the parabola?

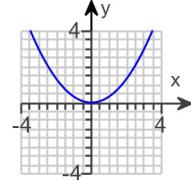
- A.  $y = \frac{3}{4}$   
 B.  $y = -\frac{3}{4}$   
 C.  $x = \frac{3}{4}$   
 D.  $x = -\frac{3}{4}$

Match the given equation to one of the graphs below.

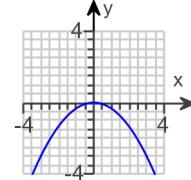
A.



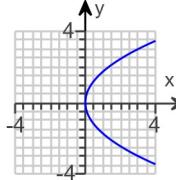
B.



C.



D.



9. Find the focus and directrix of the parabola with the equation  $4x^2 = -9y$ . Then graph the parabola.

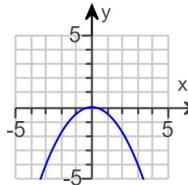
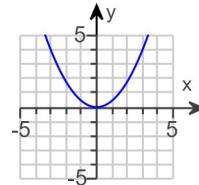
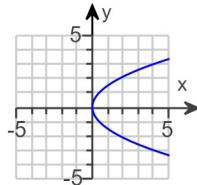
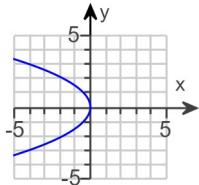
The focus is  $\left( 0, -\frac{9}{16} \right)$ .

(Simplify your answer. Type an ordered pair. Type an integer or a fraction.)

The equation for the directrix is  $y = \frac{9}{16}$ .

(Simplify your answer. Type an equation. Use integers or fractions for any numbers in the equation.)

Choose the correct graph for  $4x^2 = -9y$  below.



10. Find the focus and directrix of the parabola with the given equation. Then match the equation to one of the graphs labeled A through D.

$$y^2 = 6x$$

What is the focus of the parabola?

$$\left(\frac{3}{2}, 0\right)$$

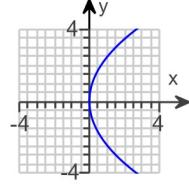
(Simplify your answer. Type an ordered pair. Use integers or fractions for any numbers in the expression.)

What is the directrix of the parabola?

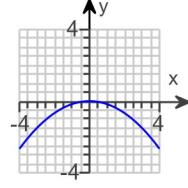
- A.  $x = -\frac{3}{2}$
- B.  $x = \frac{3}{2}$
- C.  $y = \frac{3}{2}$
- D.  $y = -\frac{3}{2}$

Match the given equation to one of the graphs below.

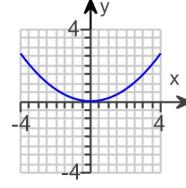
A.



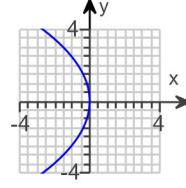
B.



C.



D.



11. Find the standard equation of the parabola that satisfies the given conditions. Also find the length of the latus rectum of the parabola.

Focus: (0,8); directrix:  $y = 10$

The standard equation of the parabola that satisfies the given conditions is  $x^2 = -4(y - 9)$ .  
(Type an equation. Type your answer in standard form. Simplify your answer.)

The length of the latus rectum is .

(Simplify your answer.)

12. Find the standard equation of the parabola that satisfies the given conditions. Also, find the length of the latus rectum of each parabola.

focus: (-1,0); directrix:  $x = 2$

Choose the correct standard equation below.

- A.  $y^2 = 4(x + 1)$
- B.  $y^2 = -6\left(x - \frac{1}{2}\right)$
- C.  $x^2 = -6\left(y - \frac{1}{2}\right)$
- D.  $x^2 = 4(y + 1)$

Find the length of the latus rectum.

(Simplify your answer.)

13. Watch the video and then solve the problem given below.

[Click here to watch the video.<sup>1</sup>](#)

Specify the focus and directrix of the parabola  $y^2 = -12x$ .

The focus is . (Type an ordered pair.)

The directrix is . (Type an equation.)

1: [http://mediaplayer.pearsoncmg.com/assets/gfG0dzsv\\_12\\_WO9Zcix66vfyOYGDpJH?clip=1](http://mediaplayer.pearsoncmg.com/assets/gfG0dzsv_12_WO9Zcix66vfyOYGDpJH?clip=1)

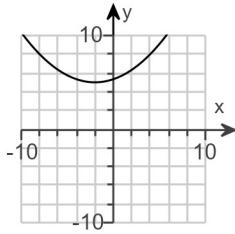
14. Watch the video and then solve the problem given below.

[Click here to watch the video.<sup>2</sup>](#)

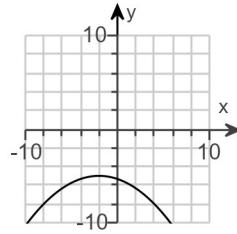
Sketch the graph of the parabola  $x^2 + 4x - 12y + 64 = 0$ .

Choose the correct graph below.

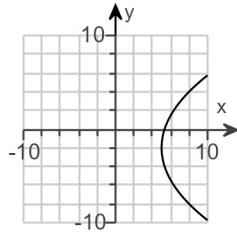
A.



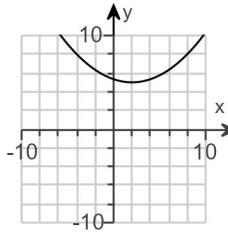
B.



C.



D.



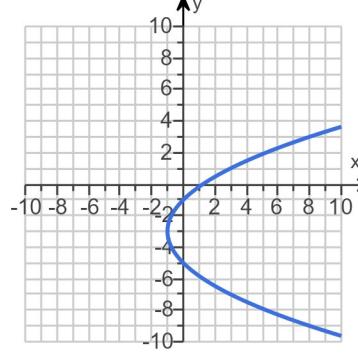
2: [http://mediaplayer.pearsoncmg.com/assets/gfG0dzsv\\_12\\_WO9Zcix66vfyOYGDpJH?clip=3](http://mediaplayer.pearsoncmg.com/assets/gfG0dzsv_12_WO9Zcix66vfyOYGDpJH?clip=3)

15.

Find the vertex, focus, and directrix of the parabola. Then graph the parabola.

$$(y + 3)^2 = 4(x + 1)$$

The vertex of the parabola is . (Type an ordered pair.)



The focus of the parabola is . (Type an ordered pair.)

The directrix of the parabola is . (Type an equation. Simplify your answer.)

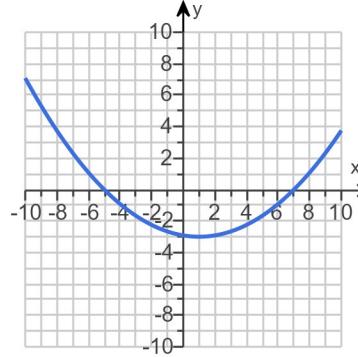
Use the graphing tool to graph the parabola only.

16.

Find the vertex, focus, and directrix of the parabola. Then graph the parabola.

$$(x - 1)^2 = 12(y + 3)$$

The vertex of the parabola is . (Type an ordered pair.)



The focus of the parabola is . (Type an ordered pair.)

The directrix of the parabola is . (Type an equation. Simplify your answer.)

Use the graphing tool to graph the parabola only.

17. A satellite dish is shaped like a paraboloid of revolution. The signals that emanate from a satellite strike the surface of the dish and are reflected to a single point, where the receiver is located. If the dish is 10 feet across at its opening and 4 feet deep at its center, at what position should the receiver be placed?

The receiver should be placed  feet from the base of the dish, along its axis of symmetry. (Type an exact answer in simplified form.)

18. A parabolic flashlight reflector is to be 12 inches across and 6 inches deep. Where should the lightbulb be placed?

The lightbulb should be placed at  $\frac{3}{2}$  inches from the vertex.  
(Type an integer or a simplified fraction.)

19. The cables of a suspension bridge are in the shape of a parabola. The towers supporting the cable are 300 feet apart and 100 feet high. If the cables touch the road surface midway between the towers, what is the height of the cable at a point 75 feet from the center of the bridge?

The cable is 25 feet from the road surface at a point 75 feet from the center of the bridge.

20. The average variable cost  $y$ , in dollars, of a monthly output of  $x$  tons of a company producing a metal is given by

$$y = \frac{1}{10}x^2 - 4x + 70. \text{ Find the output and cost at the vertex of the parabola.}$$

The output at the vertex of the parabola is 20 tons.

The cost at the vertex of the parabola is \$ 30.  
(Round to the nearest cent as needed.)