



# Math Virtual Learning

# College Algebra

May 12, 2020



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## Lesson: May 12, 2020

**Objective/Learning Target:** Students will be able to solve application problems involving conic sections.

## Warm Up Activity:

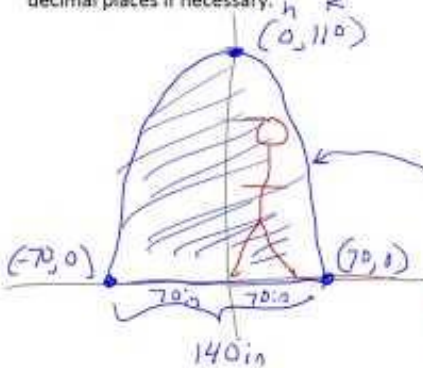
Click the link below and practice your knowledge about conic sections.

[Conics Quiz](#)

## Lesson:

Here are two examples of conic applications. We encourage you to have your own sheet of paper out and work along with the video. If you would like more examples click [here](#).

bottom of the door and 110 inches high. Find an equation describing the door's shape. If you are 72 inches tall, how far must you stand from the edge of the door to keep from hitting your head? Round to three decimal places if necessary.



Step 1: Find equation

$$(x-h)^2 = 4p(y-k)$$

Find P  
 using (70, 0)  
 $70^2 = 4p(-110)$   
 $4900 = -440p$   
 $\frac{4900}{-440} = \frac{-440p}{-440}$   
 $P = -11.136$

$$x^2 = -44.544(y-110)$$

Step 2: Use equation to answer the question

## Practice:

1. The walls of an elliptical room are given by the equation  $\frac{x^2}{25} + \frac{y^2}{16} = 1$ . Two people want to stand at the foci of the ellipse so they can whisper to hear each other without anybody else hearing ( like in Grand Central Station!). What are the coordinates of the foci?



## Practice:

2. Two Loran stations are located 200 miles apart along a coast. If a ship records a time difference of 0.00043 seconds and continues on the hyperbolic path corresponding to that difference, where does it reach shore? (Speed of radio signal is 186,000mps,  $d=rt$ )



## Practice:

3. If the parabolic sound dish the sideline crew is holding has a 2 ft diameter at the opening and the microphone is located 6in from the vertex, find the equation that governs the center cross section of the parabolic sound dish.

## Practice:

4. A couple buys a rectangular piece of property advertised as 10 acres (about 400,000 square feet). They want two fences to divide the land into an internal grazing area and a surrounding riding path. If they want the riding path to be 20 feet wide, one fence will enclose the property and one internal fence will sit 20 feet inside the outer fence. If the internal grazing field is 237,600 square feet, how many linear feet of fencing should they buy?



## Practice: ANSWERS

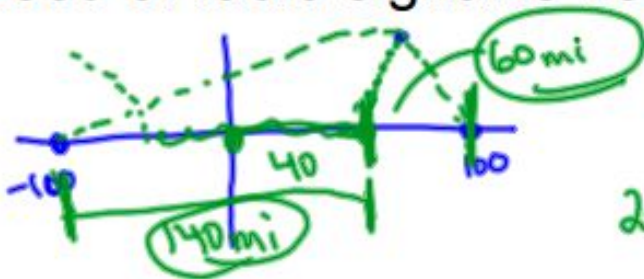
1. 15. The walls of an elliptical room are given by the equation  $\frac{x^2}{25} + \frac{y^2}{16} = 1$ . Two people want to stand at the foci of the ellipse so they can whisper to hear each other without anybody else hearing (like in Grand Central Station!). What are the coordinates of the foci?

$$c^2 = 25 - 16 = 9$$

$$c = 3 \quad \leftarrow \text{on } x \text{ axis! (major)}$$

$$\begin{matrix} (-3, 0) \\ (3, 0) \end{matrix}$$

2. (speed of radio signal is 186,000 mph<sup>sec</sup>,  $d=rt$ )



$$d = 186,000 (.00043)$$

$$d = 80$$

$$2a = 80$$

$$a = 40$$

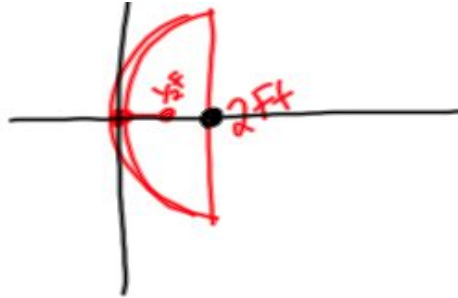
## Practice: ANSWERS

3.

$$y^2 = 4px$$

$$y^2 = 4\left(\frac{1}{2}\right)x$$

$$y^2 = 2x$$



4. Answer and work found [here](#)

## Additional Practice:

- 1) An engineer designs a satellite dish with a parabolic cross-section. The dish is 15 ft. wide at the opening and the depth is 4 feet. Find the position of the light source (the focus). How far is it from the deepest part of the dish?

## Additional Practice:

- 2) According to Kepler's Laws, planets have elliptical orbits, with the sun at one of the foci. The farthest Pluto gets from the sun is 7.4 billion kilometers. The closest it gets to the sun is 4.4 billion kilometers. Find the equation of Pluto's orbit assuming a center at  $(0,0)$ .

## Additional Practice Answers:

1)  $(0, 3.516)$

2)  $\frac{x^2}{5.9^2} + \frac{y^2}{5.7^2} = 1$

[Solutions to Additional Problems](#)