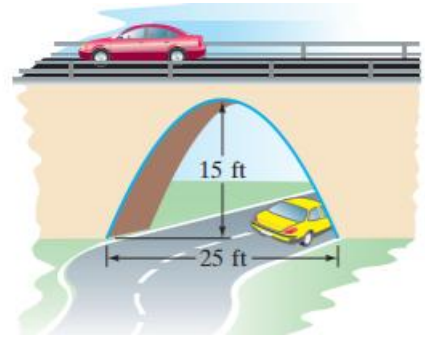
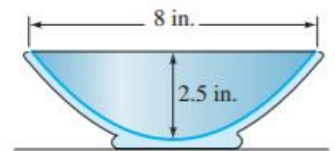


Answer the following:

1.) An arched underpass has the shape of a parabola. A road passing under the arch is 25 feet wide, and the maximum height of the arch is 15 feet. Write an equation for the parabolic arch.



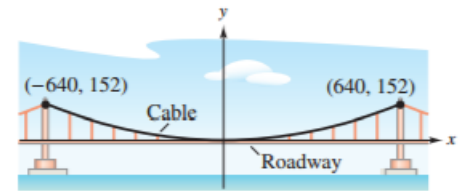
2.) A soup bowl has a cross section with a parabolic shape, as shown in the figure. The bowl has a diameter of 8 inches and is 2.5 inches deep. Write an equation for its shape.



3.) Trains traveling on the Settle–Carlisle Railway pass over a series of arch viaducts. The Ribbleshead viaduct has 24 semicircular arches that span a length of 440 yards. Given that the first arch is 5 feet from the end of the span, the span of the arch is 40 feet, and the distance between arches is 5 feet, write equations that model each of the first two arches.



4.) Each cable of the Golden Gate Bridge is suspended (in the shape of a parabola) between two towers that are 1280 meters apart. The top of each tower is 152 meters above the roadway (see figure). The cables touch the roadway at the midpoint between the towers. Write an equation for the parabolic shape of each cable.



5.) The radius of a forest fire is expanding at a rate of 4 miles per day. The current state of the fire is shown below, where a city is located 20 miles southeast of the fire.

- Write the equation of the circle at the current time and the equation of the circle at the time the fire reaches the city.
- Graph both circles.
- If the fire continues to spread at the same rate, how many days will it take to reach the city?

