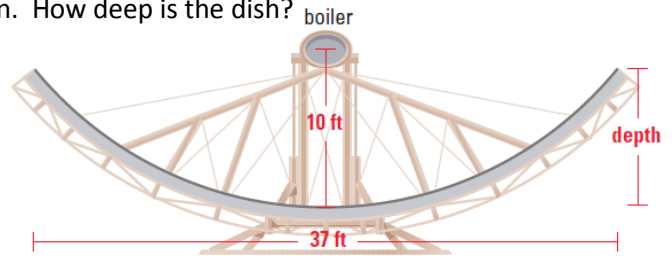


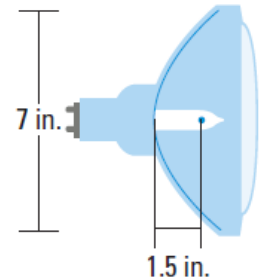
## Parabola Application Problems

Name: \_\_\_\_\_

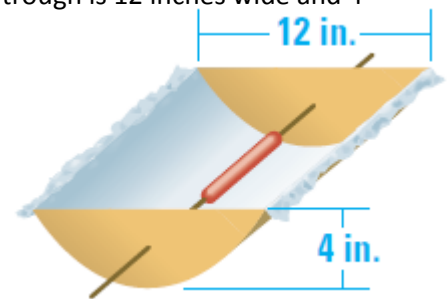
1) Sunfire is a glass parabola used to collect solar energy. The sun's rays are reflected from the mirrors toward two boilers located at the focus of the parabola. When heated, the boilers produce steam that powers an alternator to produce electricity. Write an equation for Sunfire's cross section. How deep is the dish?



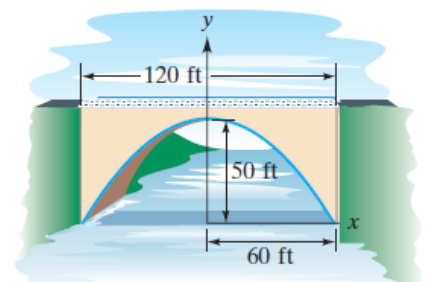
2) The filament of a lightbulb is a thin wire that glows when electricity passes through it. The filament of a car headlight is at the focus of a parabolic reflector, which sends light out in a straight beam. Given that the filament is 1.5 inches from the vertex, find the equation for the cross section of the reflector. If the reflector is 7 inches wide, how deep is it?



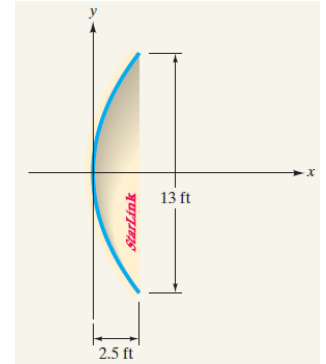
3) You can make a solar hot dog cooker using foil-lined cardboard shaped as a parabolic trough. The drawing below shows how to suspend a hot dog with a wire through the focus of each piece. If the trough is 12 inches wide and 4 inches deep, how far from the bottom should the wire be placed?



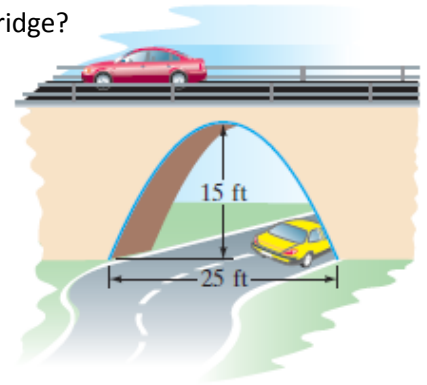
4) A concrete bridge is designed with an arch in the shape of a parabola. The road over the bridge is 120 feet long and the maximum height of the arch is 50 feet. Write an equation for the parabolic arch. How far above the water is the bridge 10 feet from the shore?



5) A satellite dish receiver is in the shape of a parabola. A cross section of the dish shows a diameter of 13 feet at a distance of 2.5 feet from the vertex of the parabola. Write an equation for the parabola. The receiver for the satellite dish is located at the focus of the parabola. How far from the vertex of the satellite dish is the receiver positioned?



6) 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. An 18-wheeler is driving along the road when it comes upon this bridge. The 18 wheeler is 8 feet 6 inches wide and 8 feet 6 inches tall. If the driver side of the 18-wheeler is exactly in the middle of the road, will it be able to drive safely under the bridge?



7) A surveyor finds that the cross section of the bottom of a circular pond has the shape of a parabola. The pond is 24 feet in diameter. The middle of the pond is the deepest part at 8 feet deep. At a point 2 feet from the shore the water is 3 feet deep. How deep is the pond at a point 6 feet from shore?

8) A soccer player who is 27 feet from a goal attempted to kick the ball in into the goal. The flight of the ball is modeled by a parabola. The ball reached a maximum height of 10 feet when it was 15 feet from the soccer player. The goal has a height of 8 feet. Will the soccer ball land in the goal?