# Conic Applications BONUS

DO ALL WORK ON SEPARATE PAPER & SHOW ALL WORK

1. Each cable of a suspension bridge is suspended (in the shape of a parabola) between two towers that are 120 meters apart. The top of each tower is 30 meters above the roadway. The cables touch the roadway halfway between the towers. <u>Assume the base of the *tower on the left* is at the origin of a coordinate grid.</u> *Note the x-axis and the y-axis marked on the drawing.*
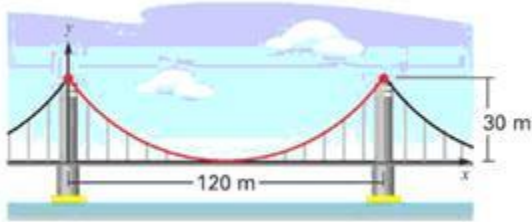
a. Find the vertex of the parabola.

b. The directrix of the parabola is y = -30, find the focus.

c. Write the equation of the parabola in standard form.

**2.** Sharon's family made her a racecar cake for her birthday. The track consists of two externally tangent circles, as shown below. Write an equation for **each** circle if each is 20 cm in diameter, the circles intersect at the origin, and the centers are on the y-axis.

a. Equation of left circle

b. Equation of right circle

3. The head of a metal detector has an elliptical shape, as shown below. The height of the ellipse is 10 inches. The width is 6 inches.

a. Identify the center of the ellipse.

b. Find a.

c. Find b.

d. Write the equation for the ellipse.
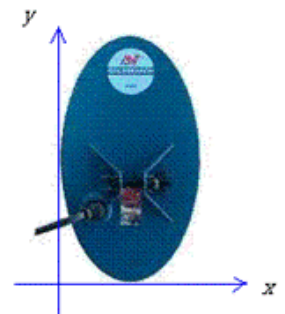
4. The train at a zoo encloses an area designated as the children's zoo. The track is in the shape of an ellipse that is 500 yards long and 300 yards wide. The track is shown here placed on a coordinate grid.

a. Identify the center of the ellipse.

b. Find a.

c. Find b.

d. Write an equation that represents the ellipse.
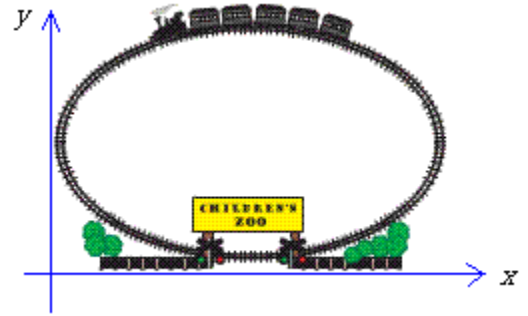
5. A golfer has 125 yards left to the hole. The approach shot can be modeled by $2x^2 - 240x + 180y = 0$, where x and y are measured in yards, and the origin is the point of impact. Write the equation in <u>standard form</u> for the path of the shot.