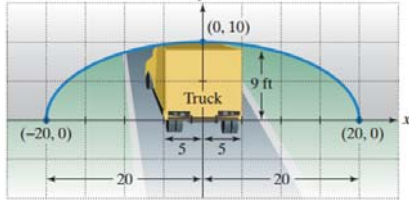## Chapter 9 Application Review

(1) A semi-elliptical archway over a one-way road has a height of 10 feet and a width of 40 feet (see Figure 9.11). Your truck has a width of 10 feet and a height of 9 feet. Will your truck clear the opening of the archway?


(2) 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. The cables touch the roadway midway between the towers.

(a) Draw a sketch of the bridge. Locate the origin of a rectangular coordinate system at the center of the roadway. Label the coordinates of the known points.

(b) Write an equation that models the cables.

(c) Complete the table by finding the height y of the suspension cables over the roadway at a distance of x meters from the center of the bridge.

Distance, x	Height, y
0	
100	
250	
400	
500	

(3) A tunnel is in the shape of a semielliptical arch which is 50 feet wide. At the center, the arch is 20 feet high. Can a truck which is 15 feet high pass through this tunnel at a distance of 5 feet from the side?

(4) A semielliptical arch supports a bridge that spans a river 20 yards wide. The center of the arch is 6 yards above the river's center. Write an equation for the ellipse so that the *x*-axis coincides with the water level and the *y*-axis passes through the center of the arch.

6 yd

20 yd
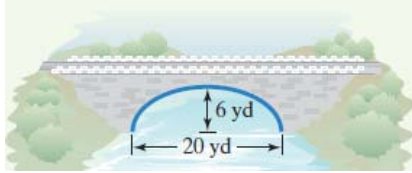
(5) A suspension bridge has towers that are 85 feet tall and 350 feet apart. The cables form a parabola that touches the roadway halfway between the towers. What is the equation of this parabola? What is the height of the cable at a point 22 feet from the midpoint of the span?

(6)Highway engineers design a parabolic curve for an entrance ramp from a straight street to an interstate highway. Find an equation of the parabola.

y

800   Interstate
                    (1000, 800)

400

                400   800   1200   1600 x

−400

                            (1000, −800)
−800   Street