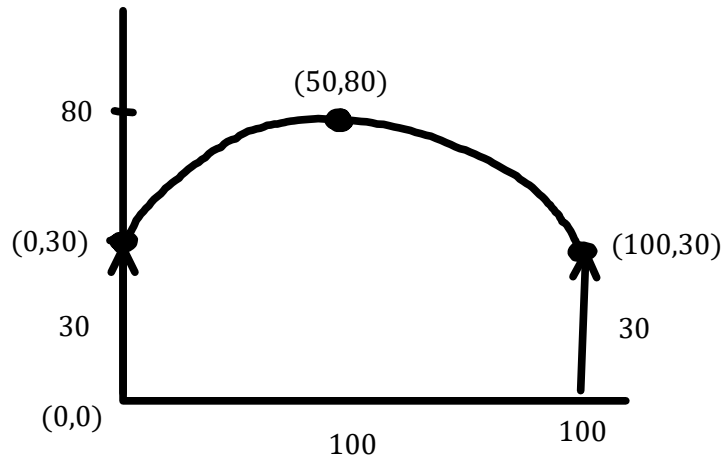# C11 - 3.8 - Bridge Find Equation Notes

A bridge has pillars 30 m tall and are 100 m apart. The maximum at the center of the bridge is 80 m tall. Find the equation of the parabolic bridge. What is the height 5 m away from each pillar.

$$y = a(x-p)^2 + q$$
$$y = a(x-50)^2 + 80$$
$$30 = a(0-50)^2 + 80$$
$$30 = a(50)^2 + 80$$
$$\frac{-80 \qquad\qquad -80}{}$$
$$-\frac{50}{2500} = \frac{2500a}{-2500}$$
$$a = -\frac{1}{50}$$

$$\boxed{y = -\frac{1}{50}(x-50)^2 + 80}$$

$$y = -\frac{1}{50}(x-50)^2 + 80$$
$$y = -\frac{1}{50}(5-50)^2 + 80$$
...
$$\boxed{y = 39.5}$$

$$y = -\frac{1}{50}(x-0)^2 + 80$$