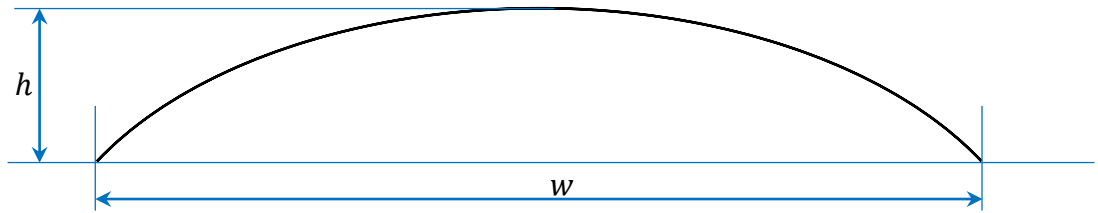


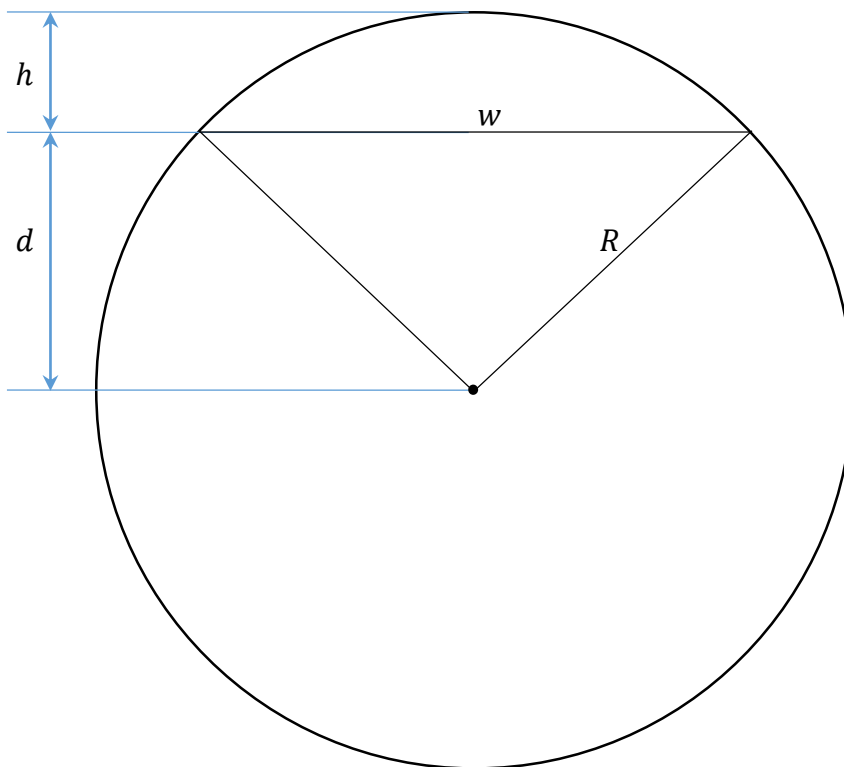
Answer on Question#38265 – Math - Geometry

We have:



Let h be the arch height and w be the arch width. We must find the radius R that creates the arch.

Let's construct a picture:



From the picture:

$$\left(\frac{w}{2}\right)^2 = R^2 - d^2$$
$$d = R - h$$

Then

$$\frac{w^2}{4} = R^2 - (R - h)^2 = R^2 - R^2 + 2Rh - h^2$$
$$w^2 = 4h(2R - h)$$
$$2R - h = \frac{w^2}{4h}$$
$$2R = h + \frac{w^2}{4h}$$

$$R = \frac{h}{2} + \frac{w^2}{8h}$$

Answer:

$$R = \frac{\mathbf{h}}{2} + \frac{\mathbf{w^2}}{\mathbf{8h}}$$