Exercise 177

The area of an isosceles triangle with equal sides of length x is $\frac{1}{2}x^2 \sin\theta$, where θ is the angle formed by the two sides. Find the area of an isosceles triangle with equal sides of length 8 in. and angle $\theta = 5\pi/12$ rad.

Solution

The given numbers are

$$x = 8 \text{ in}$$

$$\theta = \frac{5\pi}{12} \text{ rad.}$$

Therefore,

$$\begin{aligned} A &= \frac{1}{2}x^2 \sin\theta \\ &= \frac{1}{2}(8 \text{ in})^2 \sin\frac{5\pi}{12} \\ &= 8\sqrt{2}(1+\sqrt{3}) \text{ in}^2 \\ &\approx 30.9 \text{ in}^2. \end{aligned}$$