Determining an unknown side The first three functions given in **Table 8** can be used to determine any unknown side of a right triangle when one side and one of the non-right angles are known. For example, if $\theta = 30°$ and $a = 1.0$ m, the other two sides of the triangle can be found as follows:

$$\sin\theta = \frac{a}{c}$$

$$c = \frac{a}{\sin\theta} = \frac{1.0\text{ m}}{\sin 30°}$$

$$\boxed{c = 2.0\text{ m}}$$

$$\tan\theta = \frac{a}{b}$$

$$b = \frac{a}{\tan\theta} = \frac{1.0\text{ m}}{\tan 30°}$$

$$\boxed{b = 1.7\text{ m}}$$

Determining an unknown angle In some cases, you might know the value of the sine, cosine, or tangent of an angle and need to know the value of the angle itself. The inverse sine, cosine, and tangent functions given in **Table 8** can be used for this purpose. For example, in **Figure 4,** suppose you know that side $a = 1.0$ m and side $c = 2.0$ m. To find the angle θ, you could use the inverse sine function, $\sin^{-1}$, as follows:

$$\theta = \sin^{-1}\left(\frac{a}{c}\right) = \sin^{-1}\left(\frac{1.0\text{ m}}{2.0\text{ m}}\right) = \sin^{-1}(0.50)$$

$$\boxed{\theta = 30°}$$

Converting from degrees to radians The two most common units used to measure angles are degrees and radians. A full circle is represented by 360 degrees (360°) or by 2π radians (2π rad). As such, the following conversions can be used:

$$[\text{angle (°)}] = \frac{180}{\pi}[\text{angle (rad)}]$$

$$[\text{angle (rad)}] = \frac{\pi}{180}[\text{angle (°)}]$$

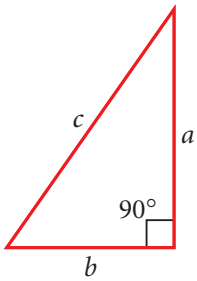

Figure 5

Pythagorean theorem Another useful equation when working with right triangles is the Pythagorean theorem. If a and b are the two legs of a right triangle and c is the hypotenuse, as in **Figure 5,** the Pythagorean theorem can be expressed as follows:

$$c^2 = a^2 + b^2$$

In other words, the square of the hypotenuse of a right triangle equals the sum of the squares of the other two legs of the triangle. The Pythagorean