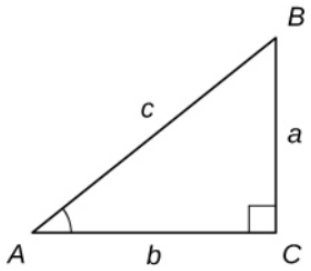
Exercise 134

For the following exercises, consider triangle ABC, a right triangle with a right angle at C. a. Find the missing side of the triangle. b. Find the six trigonometric function values for the angle at A. Where necessary, round to one decimal place.



$$b = 28,\ c = 35$$

Solution

The sides of a right triangle are related by the Pythagorean theorem.

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

Plug in the numbers for b and c, and solve for a.

$$a^2 + 28^2 = 35^2$$

$$a^2 = 35^2 - 28^2$$

$$a^2 = 441$$

$$a = 21$$

Therefore, the six trigonometric functions are

$$\sin A = \frac{a}{c} = \frac{21}{35}$$

$$\cos A = \frac{b}{c} = \frac{28}{35}$$

$$\tan A = \frac{a}{b} = \frac{21}{28}$$

$$\csc A = \frac{c}{a} = \frac{35}{21}$$

$$\sec A = \frac{c}{b} = \frac{35}{28}$$

$$\cot A = \frac{b}{a} = \frac{28}{21}.$$