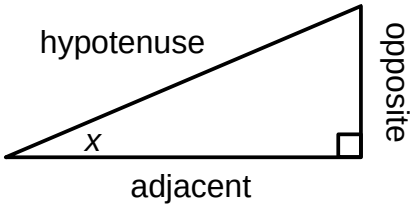
Name: _____ Date: _____

MFM2P: Foundations of Mathematics 10 Similarity and Trigonometry

Finding Angles Using Trigonometry

1. Recall the three **primary trigonometric ratios**:

$$\sin x = \frac{\text{opp}}{\text{hyp}} \qquad \cos x = \frac{\text{adj}}{\text{hyp}} \qquad \tan x = \frac{\text{opp}}{\text{adj}}$$

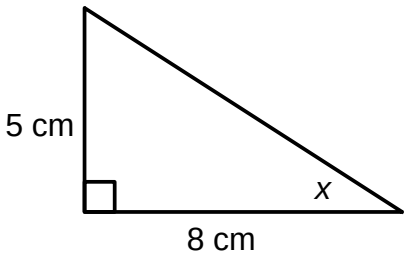


A mnemonic to remember these three ratios is **SOH-CAH-TOA**.

2. If we know any two sides in a right triangle (e.g. opposite and adjacent), we can use a trigonometric ratio to find the measure of an angle. To do this, we use the **inverse** functions.

3. Examples

A. Determine the measure of the angle marked *x*.

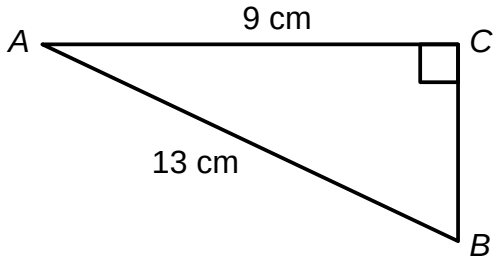


Since we know the lengths of the opposite and adjacent sides, we can use the tangent ratio to determine the measure of *x*.

$$\begin{aligned} \tan x &= \frac{\text{opp}}{\text{adj}} \\ \tan x &= \frac{5}{8} \\ \tan x &= 0.375 \\ x &= \tan^{-1}(0.375) \\ x &\approx 32^\circ \end{aligned}$$

Therefore, *x* is approximately 32°.

B. Determine the measures of angles *A* and *B*.



Since we know the measures of the hypotenuse and the side adjacent to angle *A*, we can use the cosine ratio to find the measure of angle *A*.

$$\begin{aligned} \cos A &= \frac{\text{adj}}{\text{hyp}} \\ \cos A &= \frac{9}{13} \\ \cos A &\approx 0.6923 \\ A &\approx \cos^{-1}(0.6923) \\ A &\approx 46^\circ \end{aligned}$$

Therefore, angle *A* is approximately 46°. While we could use another trigonometric ratio to solve for angle *B*, remember that the sum of the angles in any triangle is 180°.

$$\begin{aligned} B &\approx 180^\circ - 90^\circ - 46^\circ \\ B &\approx 44^\circ \end{aligned}$$

Therefore, angle C is approximately 44°.