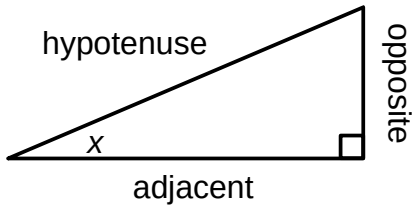
Name: _____ Date: _____

MFM2P: Foundations of Mathematics 10 Similarity and Trigonometry

Primary Trigonometric Ratios



1. In any **right triangle**, we can label the three sides based on their position relative to an angle, *x*.

2. The three **primary trigonometric ratios** are:

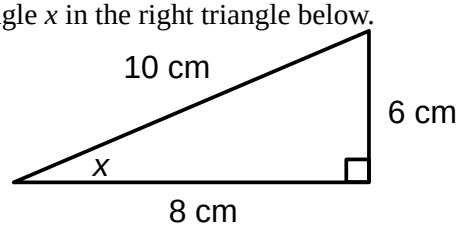
$$\sin x = \frac{\text{opp}}{\text{hyp}} \qquad \cos x = \frac{\text{adj}}{\text{hyp}} \qquad \tan x = \frac{\text{opp}}{\text{adj}}$$

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

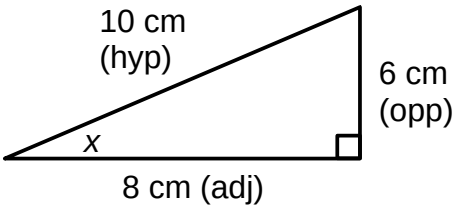
3. Since the triangle is right-angled, we can use the Pythagorean Theorem to determine the other two primary trigonometric ratios, if we are given any one of them.

4. Examples

A. State the three primary trigonometric ratios for angle *x* in the right triangle below.



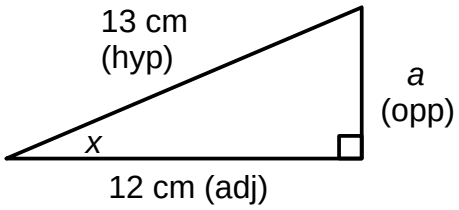
Label the sides of the triangle.



Using the definitions, $\sin x = \frac{6}{10} = \frac{3}{5}$, $\sin x = \frac{8}{10} = \frac{4}{5}$ and $\sin x = \frac{6}{8} = \frac{3}{4}$.

B. Sketch and label the three sides of a right triangle where $\cos x = \frac{12}{13}$.

Draw a triangle where the length of the adjacent side is 12, and the hypotenuse is 13.



Use the Pythagorean Theorem to calculate the length of the opposite side.

$$\begin{aligned} a^2 + 12^2 &= 13^2 \\ a^2 + 144 &= 169 \\ a^2 &= 169 - 144 \\ a^2 &= 25 \\ a &= \sqrt{25} \\ a &= 5 \end{aligned}$$

Therefore, the length of the opposite side is 5.
Complete the triangle.