

Trigonometry is a branch of mathematics that studies relationships involving lengths and angles of triangles.

A **Trigonometric Ratio** is a ratio (relationship between 2 numbers, e.g. fraction) of the lengths of 2 sides of a right triangle. The three basic trigonometric ratio are sine, cosine, and tangent. They are abbreviated as **sin**, **cos**, and **tan**.

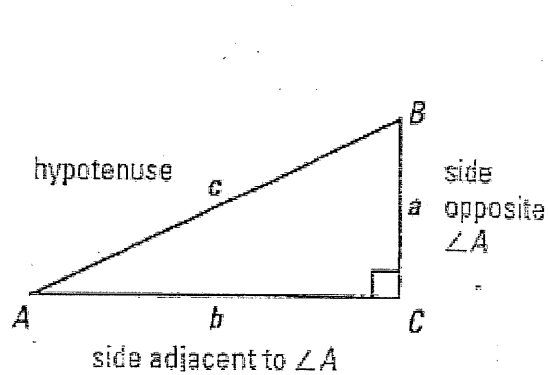
Trigonometric Ratios:

Let $\triangle ABC$ be a right triangle. The sine, the cosine, and the tangent of the acute angle $\angle A$ are defined as follows.

$$\sin A = \frac{\text{side opposite } \angle A}{\text{hypotenuse}} = \frac{a}{c}$$

$$\cos A = \frac{\text{side adjacent to } \angle A}{\text{hypotenuse}} = \frac{b}{c}$$

$$\tan A = \frac{\text{side opposite } \angle A}{\text{side adjacent to } \angle A} = \frac{a}{b}$$



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$$\sin = \frac{\text{Opp}}{\text{Hyp}}$$

$$\cos = \frac{\text{Adj}}{\text{Hyp}}$$

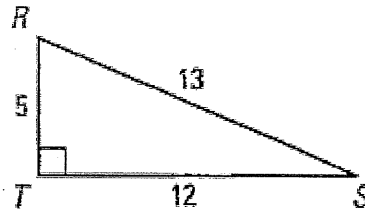
$$\tan = \frac{\text{Opp}}{\text{Adj}}$$

Example 1

Find the sine, the cosine, and the tangent of the indicated angle.

a. $\angle S$

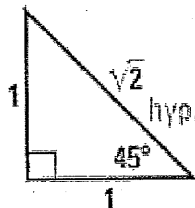
b. $\angle R$



$$\sin = \frac{\text{Opp}}{\text{Hyp}} \quad \cos = \frac{\text{Adj}}{\text{Hyp}} \quad \tan = \frac{\text{Opp}}{\text{Adj}}$$

Example 2

Find the sine, the cosine, and the tangent of 45° .



Example 3

Find the sine, the cosine, and the tangent of 30° .

