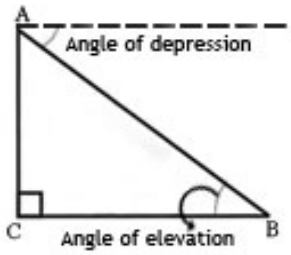
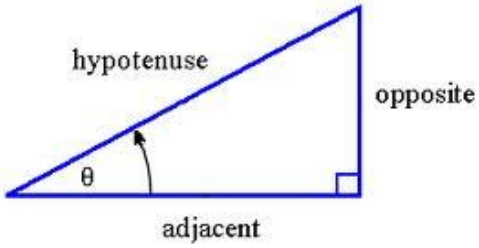
The Tangent Ratio

The **angle of inclination** of a line or line segment is the acute angle (< 90°) it makes with the horizontal.



The sides of a right triangle are named in relation to one of its acute angles.



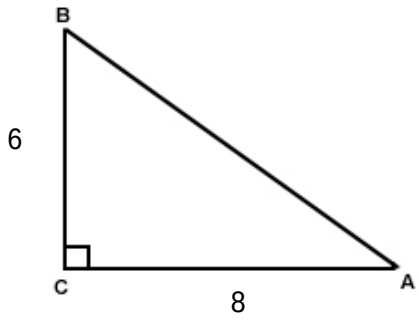
The **tangent ratio** for < A (tan A) is equal to:

$$\textbf{tan A} = \frac{\textit{length of side opposite} < A}{\textit{length of side adjacent to} < A}$$

The tangent ratio depends **only** on the measure of the angle, not on how large or small the triangle is! For example, if tan A = 1.2; then, in any similar right triangle with <A, the length of the side opposite <A is 1.2 times the length of the side adjacent to <A.

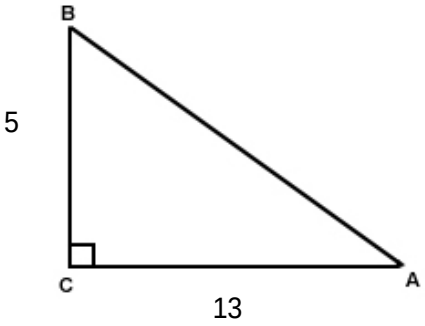
Example 1: Determining the Tangent Ratios for Angles

Find the tangent ratio for <A.



Example 2: Using the Tangent Ratio to Determine the Measure of an Angle

Determine the measures of <A and <B to the nearest tenth of a degree.



Example 3: Using the Tangent Ratio to Determine the Angle of Inclination

A wire is fastened to a cell phone tower 8.5-m above the ground. The wire is anchored to the ground 14.0-m from the base of the tower. What angle, to the nearest degree, does the wire make with the ground?

Example 4: Using the Tangent Ratio to Solve a Problem

A 19-m support cable is anchored to the ground 5-m from the base of a telephone pole. It is attached near the top of the pole. What angle, to the nearest degree, does the cable make with the ground?