7.5 Apply the Tangent Ratio

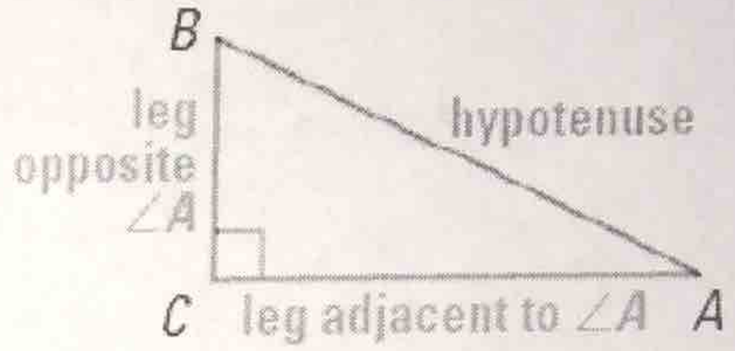
trigonometric ratio - ratio of the lengths of 2 sides in a right triangle

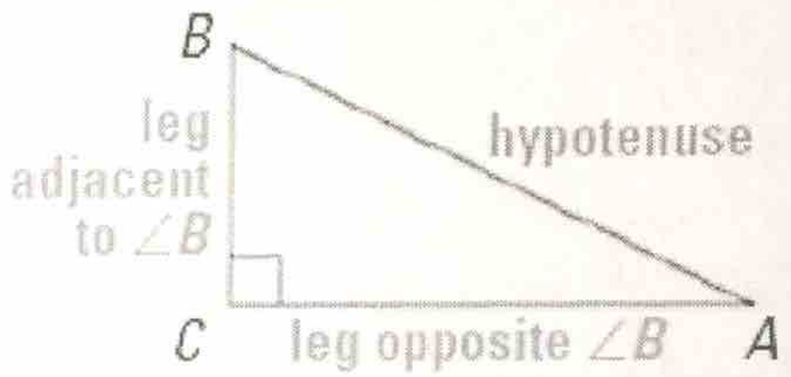
KEY CONCEPT *For Your Notebook*

Tangent Ratio

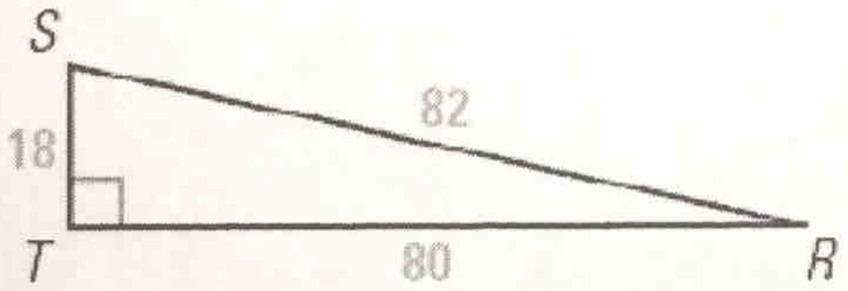
Let $\triangle ABC$ be a right triangle with acute $\angle A$. The tangent of $\angle A$ (written as $\tan A$) is defined as follows:

$$\tan A = \frac{\text{length of leg opposite } \angle A}{\text{length of leg adjacent to } \angle A} = \frac{BC}{AC}$$





Ex 1: Find tan S and tan R. Write each answer as a fraction and as a decimal rounded to four decimal places.



$\tan S = \frac{O}{A}$

$= \frac{TR}{TS}$

$= \frac{80}{18}$

$\approx \boxed{4.4444}$

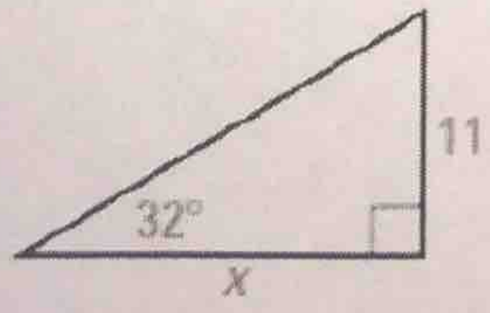
$\tan R = \frac{O}{A}$

$= \frac{ST}{TR}$

$= \frac{18}{80}$

$= \boxed{0.2250}$

Ex 2: Find the value of x.



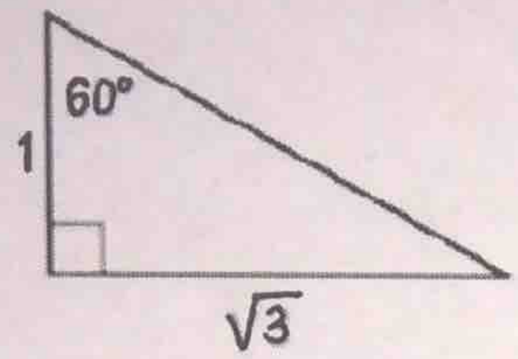
$\tan 32° = \frac{11}{x}$

$x \tan 32° = 11$

$x = \frac{11}{\tan 32°}$

$\boxed{x \approx 17.6}$

Ex 3: Use a special right triangle to find the tangent of a 60° angle. (create your own)



Since all 30°-60°-90° triangles are similar, you can choose 1 as the length of the shorter leg.

longer leg = shorter leg · $\sqrt{3}$

$x = 1 \cdot \sqrt{3}$

$\boxed{x = \sqrt{3}}$

$\tan 60° = \frac{O}{A}$

$\tan 60° = \frac{\sqrt{3}}{1}$

$\boxed{\tan 60° = \sqrt{3}}$

* Rounding to four decimal places for a whole number:

* Do not round in the middle of a problem! Round only final answer!