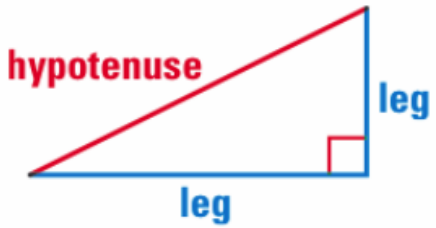
7.5 Apply the Tangent Ratio

A **trigonometric ratio** is a ratio of the lengths of two sides in a right triangle. You will use trigonometric ratios to find the measure of a side or an acute angle in a right triangle.



The ratio of the lengths of the legs in a right triangle is constant for a given angle measure. This ratio is called the **tangent** of the angle.

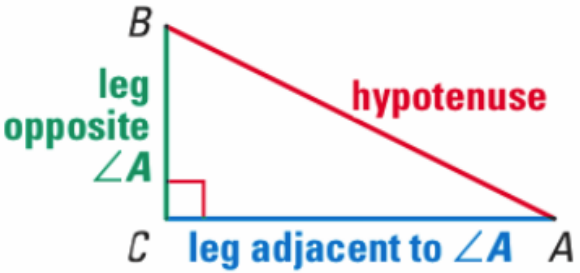
In 7.6, we will learn about the trigonometric ratios **sine and cosine**

KEY CONCEPT — For Your Notebook

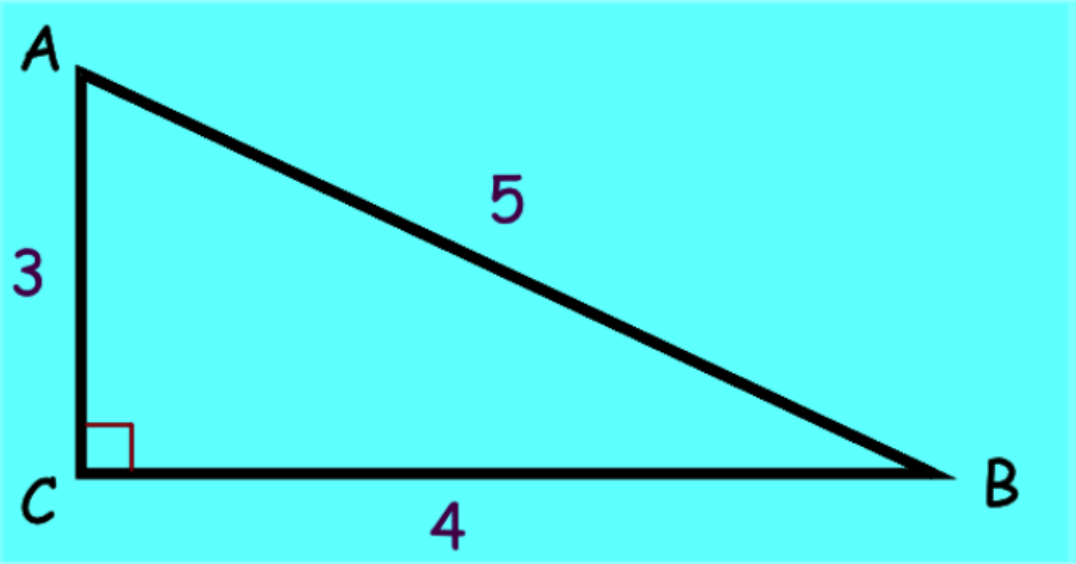
Tangent Ratio

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

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

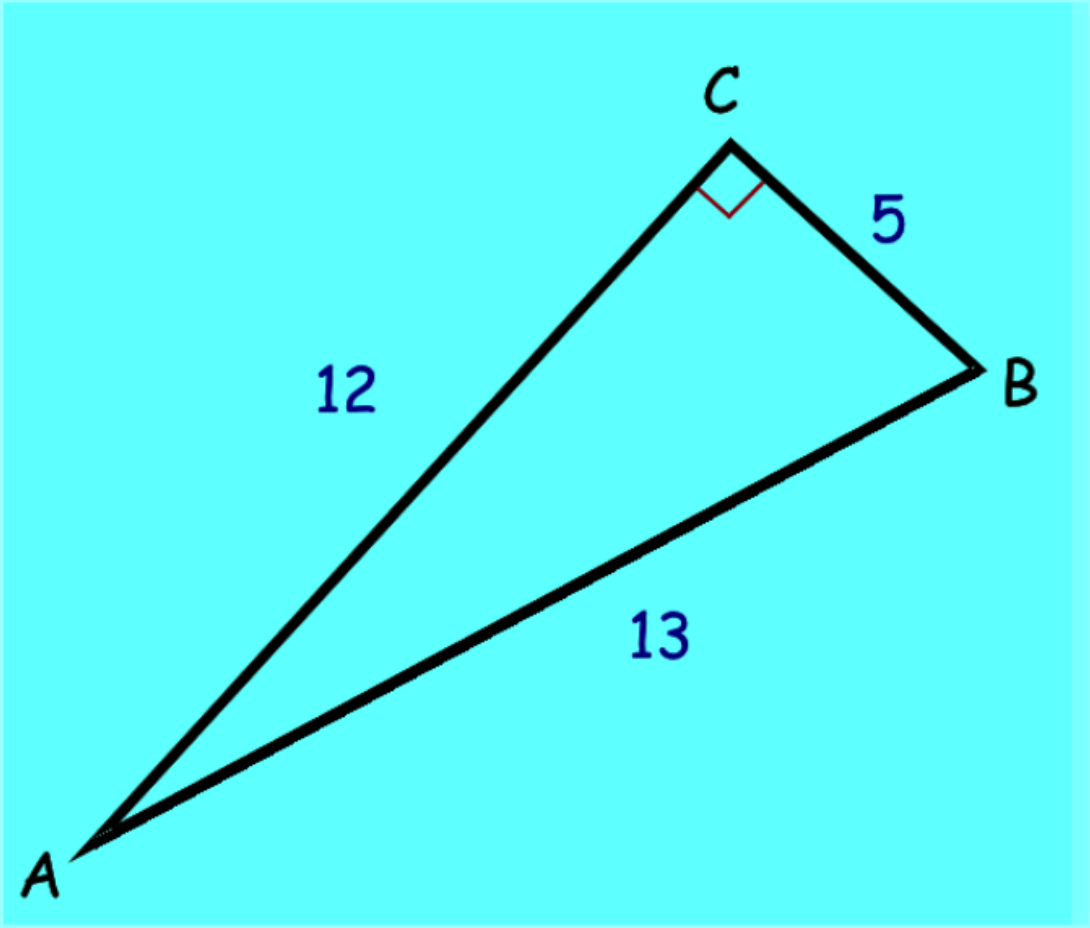


$$\tan = \frac{\text{opp}}{\text{adj}}$$



What is the tangent of $\angle A$?

What is the tangent of $\angle B$?

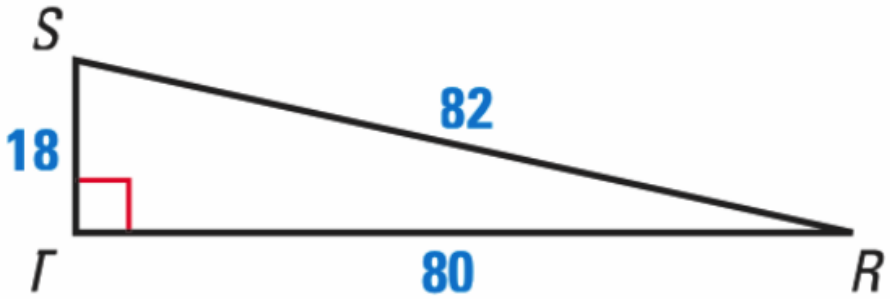


What is the tangent of $\angle A$?

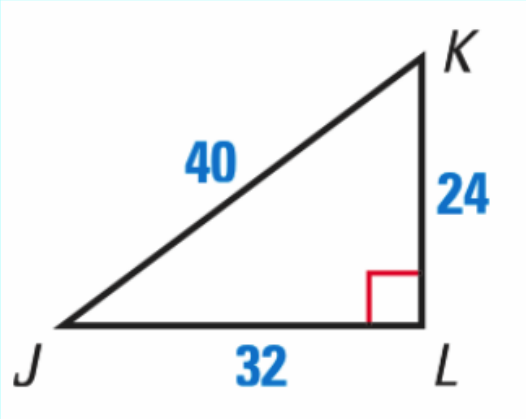
What is the tangent of $\angle B$?

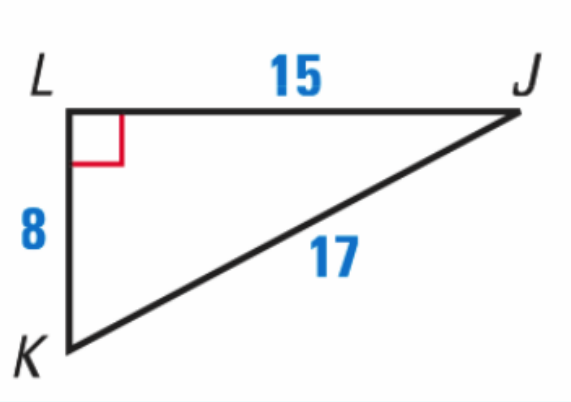
EXAMPLE 1 Find tangent ratios

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



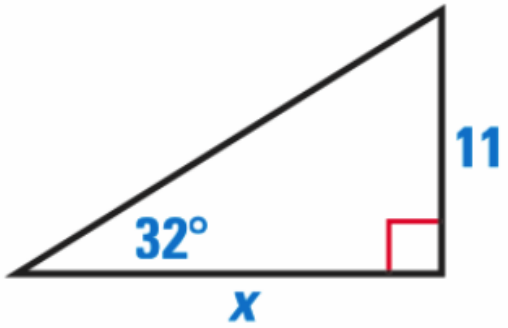
Find tan *J* and tan *K*. Round to four decimal places.





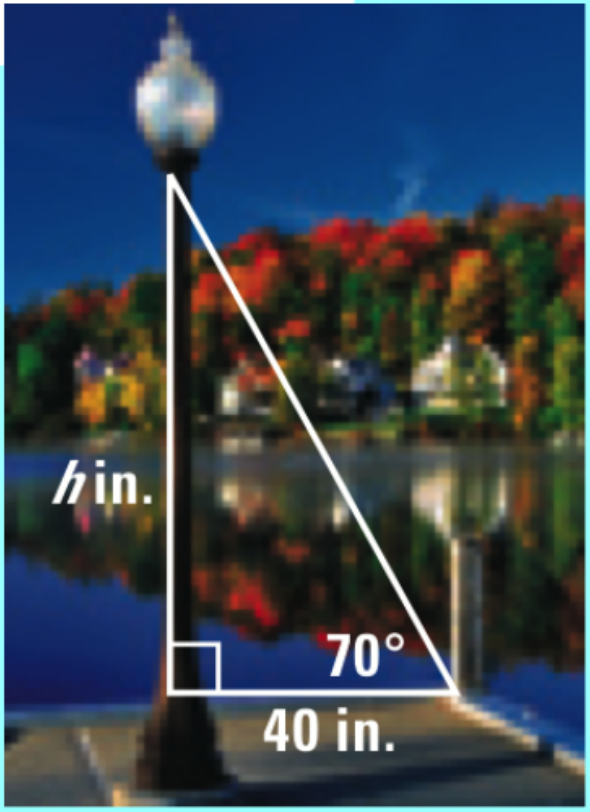
EXAMPLE 2 Find a leg length

ALGEBRA Find the value of x.

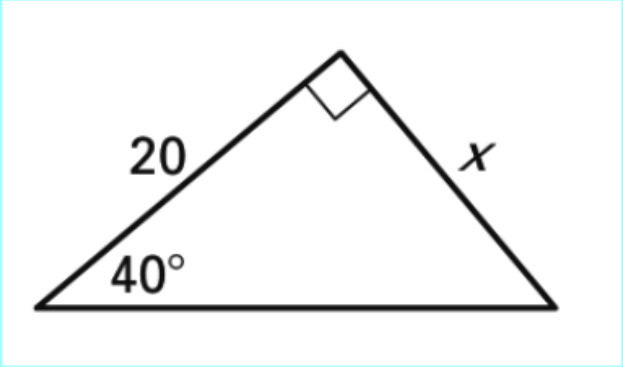


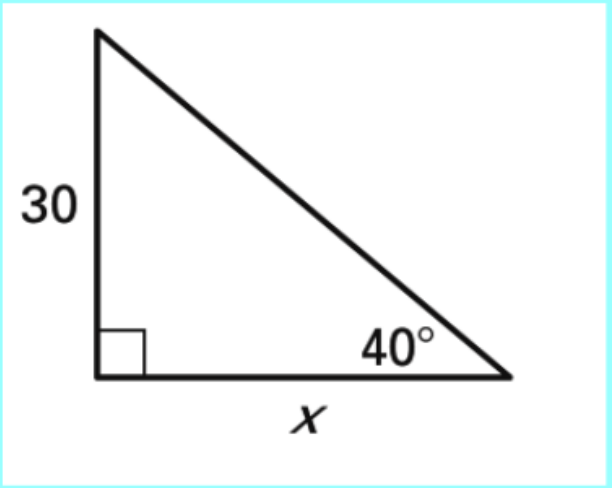
EXAMPLE 3 Estimate height using tangent

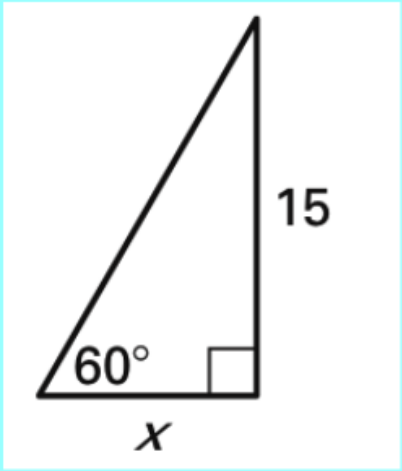
LAMPPOST Find the height h of the lamppost to the nearest inch.

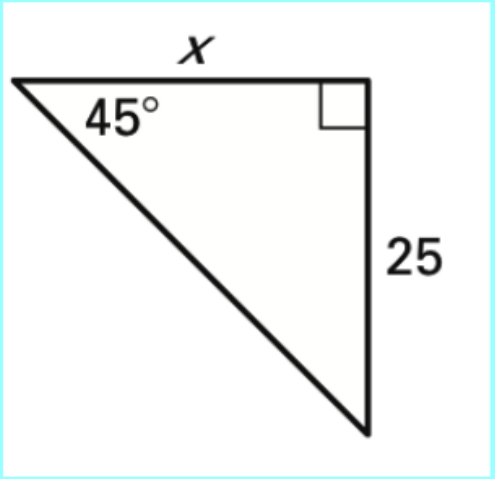


Find the value of x to the nearest tenth.






15
60°
x


x
45°
25

Assignment:

p. 469 (3-11, 18, 21, 24, 27, 31, 39-47)