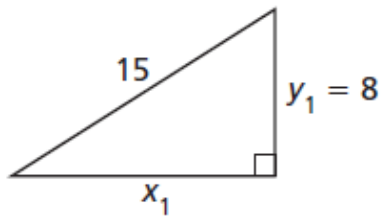
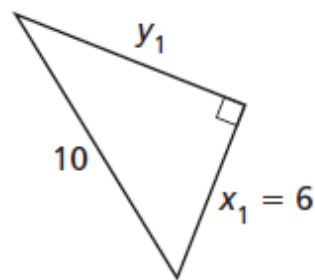


Find the measure of the missing leg in the right triangle, and then calculate the ratio $\frac{y_1}{x_1}$.

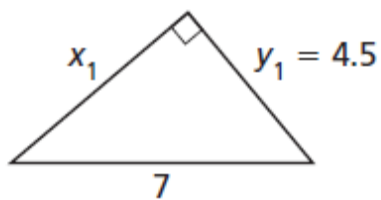
1.



2.



3.



Draw a segment with the given length. Construct the point that divides the segment into the given ratio.

1. 4 in.; 2 to 3

2. 7 cm; 1 to 4

3. 12 cm; 3 to 5

Essential Question

How is a right triangle used to find the tangent of an acute angle? Is there a unique right triangle that must be used?

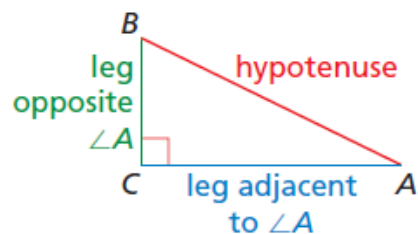
Core Concept

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.

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



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

$$\tan S = \frac{80}{18}$$

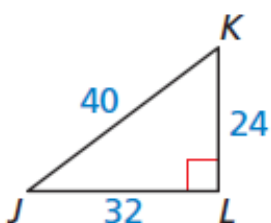
$$\tan S = 4.4444$$

$$\tan R = \frac{18}{80} = 0.2250$$



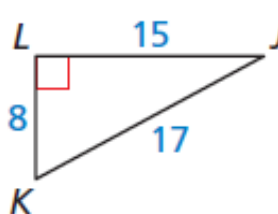
Find $\tan J$ and $\tan K$. Write each answer as a fraction and as a decimal rounded to four places.

1.



$$\tan J = \frac{24}{32}$$
$$\tan K = \frac{32}{24}$$

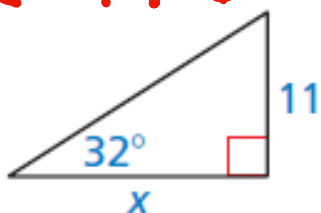
2.



$$\tan J = \frac{8}{15}$$
$$\tan K = \frac{15}{8}$$

Find the value of x . Round your answer to the nearest tenth.

$$x = 17.6$$



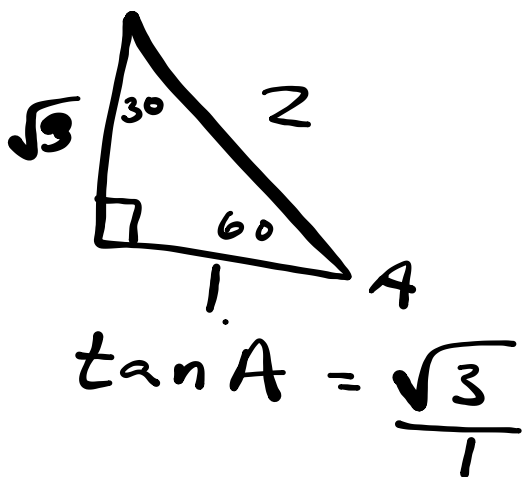
$$\tan 32^\circ = \frac{11}{x}$$

$$x \tan 32^\circ = 11$$

$$x = \frac{11}{\tan 32^\circ}$$



Use a special right triangle to find the tangent of a 60° angle.



$$\tan A = \frac{\sqrt{3}}{1}$$

You are measuring the height of a spruce tree. You stand 45 feet from the base of the tree. You measure the angle of elevation from the ground to the top of the tree to be 59° . Find the height h of the tree to the nearest foot.

$$\tan 59^\circ = \frac{h}{45}$$
$$h = 45 \tan 59^\circ$$
$$h = 75 \text{ feet}$$

