

6.5 Triangle Trig Review

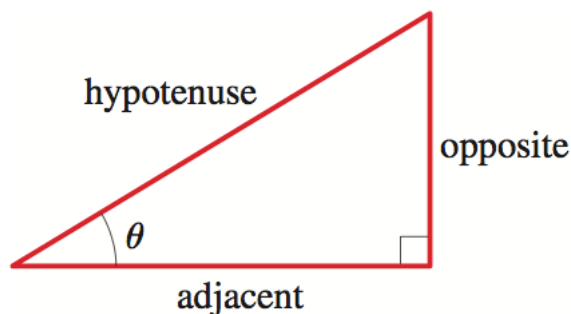
Practice Tasks

Recall that one of the most common applications of trigonometry involves right triangles. You can use trigonometric functions to find missing sides and angles of right triangles, and even non-right triangles.



I. Concepts and Procedures

Consider a right triangle with acute angle θ . Relative to the angle θ , the three sides of the right triangle are defined as follows:



Using this vocabulary, define the six trigonometric ratios as follows:

The Trigonometric Ratios:

$$\sin \theta = \frac{\text{opposite}}{\text{hypotenuse}}$$

$$\cos \theta = \frac{\text{adjacent}}{\text{hypotenuse}}$$

$$\tan \theta = \frac{\text{opposite}}{\text{adjacent}}$$

$$\csc \theta = \frac{\text{hypotenuse}}{\text{opposite}}$$

$$\sec \theta = \frac{\text{hypotenuse}}{\text{adjacent}}$$

$$\cot \theta = \frac{\text{adjacent}}{\text{opposite}}$$

1. For the triangle given below, find the trigonometric values. The first one is given.

a. $\sin \theta = \frac{3}{5}$

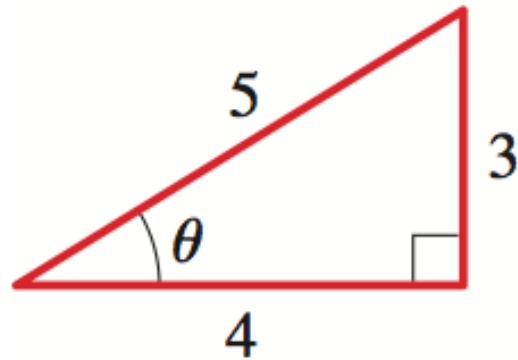
b. $\cos \theta =$

c. $\tan \theta =$

d. $\csc \theta =$

e. $\sec \theta =$

f. $\cot \theta =$



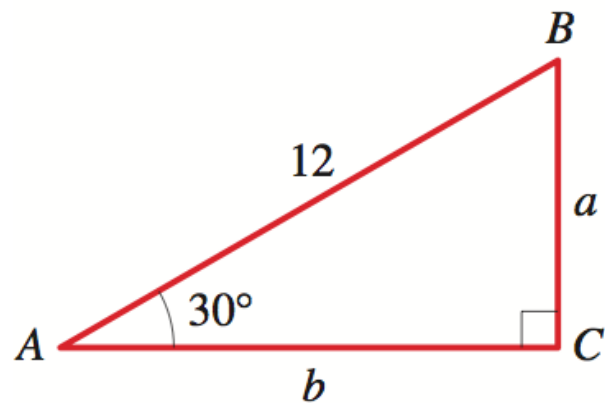
II. Problem Solving

1. Use trigonometric ratios to *solve the triangle* (find all missing sides and angles).

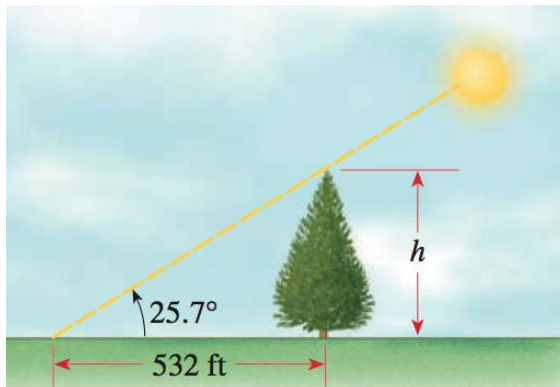
a. $\angle B =$

b. $a =$

c. $b =$



2. A tree casts a shadow 457 ft. long. Find the height of the tree if the angle of elevation of the sun is 25.7° (the angle of elevation is the angle between the line of sight and the horizontal.)

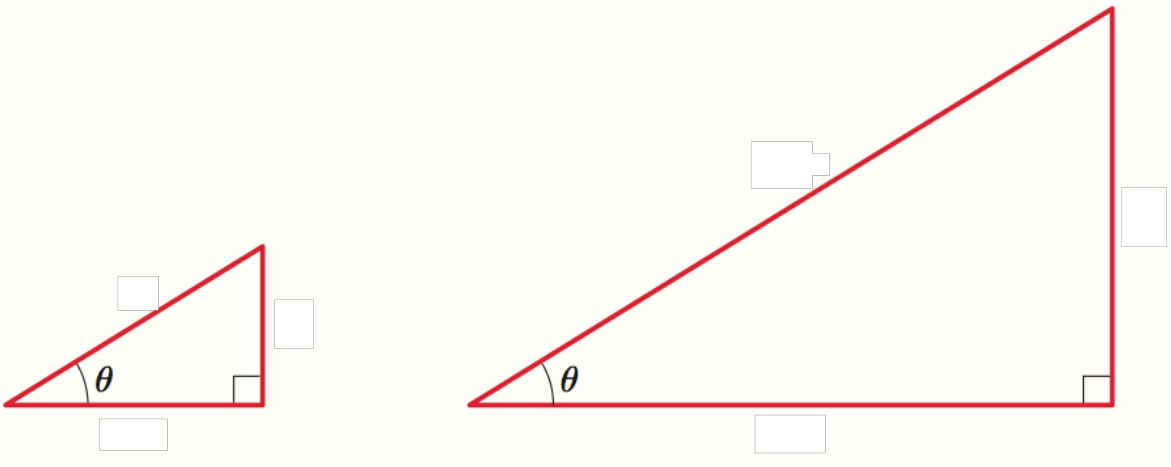


3. The angle of elevation to the top of the Empire State Building in New York is found to be 11° from the ground at a distance of 1 mile from the base of the building. Use this information to find the height of the Empire State Building.

III. Reasoning

1. What does it mean for two triangles to be similar?

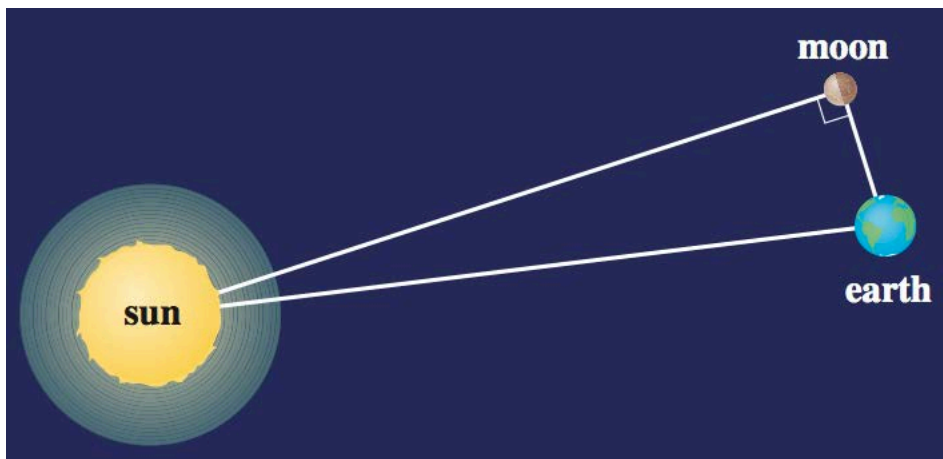
2. Below, draw two *right* triangles that are similar. Find $\sin \theta$, $\cos \theta$, and $\tan \theta$ for both triangles. What do you notice?



3. Make a conjecture about the trigonometric ratios of similar triangles.

IV. Modeling

1. When the moon is exactly half full, the earth, moon, and sun form a right angle.



- a. If you wanted to find the distance from the earth to the sun using right triangle trigonometry, what information would you need to know? Set up an equation that would allow you to find this distance below using variables instead of actual numbers.
- b. If you wanted to find the distance from the earth to the moon using right triangle trigonometry, what information would you need to know? Set up an equation that would allow you to find this distance below using variables instead of actual numbers.
- c. If the angle formed by the sun, earth, and moon is measured to be 89.85° , and the distance from the earth to the moon is 240,000 mi, estimate the distance from the earth to the sun.