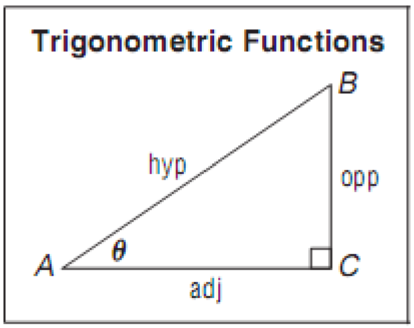
esson 9.1: Right Triangle Trigonometry

earning Targets:

- can find values of the six trigonometric functions (sine, cosine, tangent, cosecant, secant, and cotangent) for acute angles.
- I can solve equations involving inverse trigonometric functions.
- I can solve problems involving right triangles.

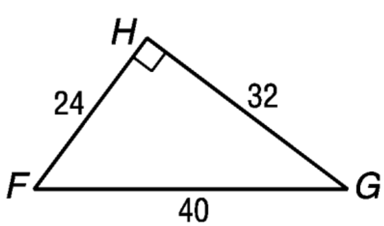


$\sin\theta =$ $\csc\theta =$

$\cos\theta =$ $\sec\theta =$

$\tan\theta =$ $\cot\theta =$

<u>Example 1:</u>

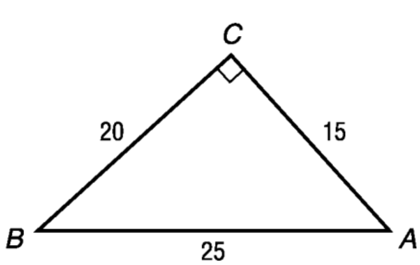


$\sin G =$ $\csc G =$

$\cos G =$ $\sec G =$

$\tan G =$ $\cot G =$

<u>Example 2:</u> Think, Pair, Share!



$\sin A =$ $\csc A =$

$\cos A =$ $\sec A =$

$\tan A =$ $\cot A =$

<u>Example 3:</u> ***Multiple-Choice Test Item***

If $\tan A = \frac{5}{3}$, find the value of csc *A*.

A. $\frac{3}{5}$ B. $\frac{4}{3}$

C. $\sqrt{34}$ D. $\frac{\sqrt{34}}{5}$

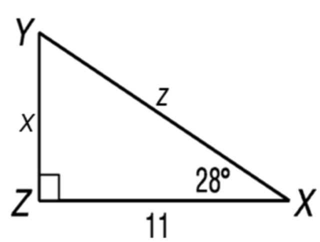
<u>Example 4:</u> ***Multiple-Choice Test Item*** Think, Pair, Share!

If $\sin B = \frac{2}{3}$, find the value of cos *B*.

A. $\frac{\sqrt{5}}{2}$ B. $\frac{3}{5}$

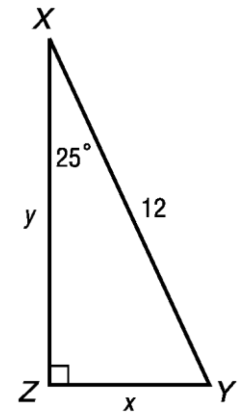
C. $\frac{\sqrt{5}}{3}$ D. $\frac{5}{3}$

<u>Example 5:</u> Solve ΔXYZ. Round measures of sides to the nearest tenth and measures of angles to the nearest degree.

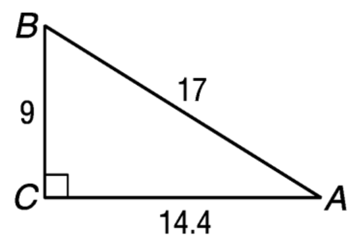


Think, Pair, Share!

Example 6: Solve ΔXYZ. Round measures of sides to the nearest tenth and measures of angles to the nearest degree.

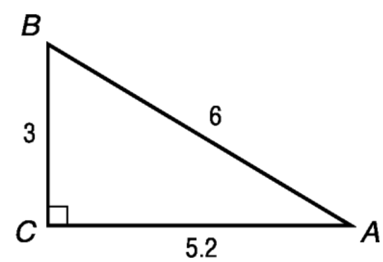


Example 7: Solve ΔABC. Round measures of sides to the nearest tenth and measures of angles to the nearest degree.



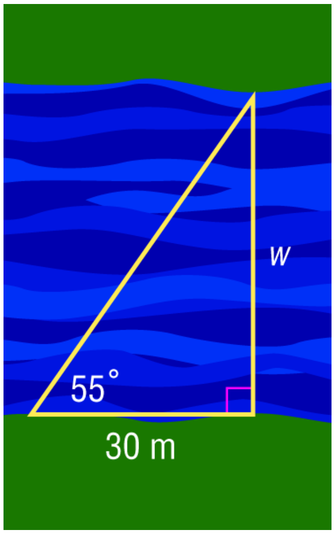
Think, Pair, Share!

Example 8: Solve ΔABC. Round measures of sides to the nearest tenth and measures of angles to the nearest degree.



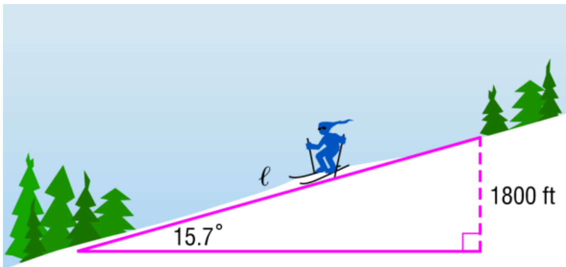
Example 9:

Bridge Construction: In order to construct a bridge across a river, the width of the river must be determined. A stake is planted on one side of the river directly across from a second stake on the opposite side. At a distance 30 meters to the left of the stake, an angle of 55° is measured between the two stakes.
Find the width of the river.



Example 10:

Skiing: A run has an angle of elevation of 15.7° and a vertical drop of 1800 feet.
Estimate the length of this run.



Lesson 9.2: The Law of Sines

Learning Target:

I can solve problems by using the Law of Sines.

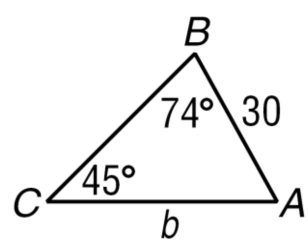
The Law of Sines

In ANY triangle ΔABC,

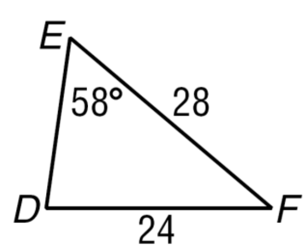
<u>When to Use the Law of Sines:</u>

The Law of Sines is especially useful when solving triangles given _____, _____, or _____.

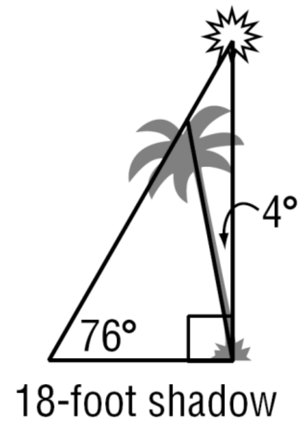
<u>Example 1:</u> Find b.



<u>Example 2:</u> In ΔDEF, find $m\angle D$.



Example 3: When the sun's angle of elevation is 76°, a tree tilted at an angle of 4° from the vertical casts an 18-foot shadow. Find the height of the tree, to the nearest tenth of a foot.



Example 4: A ranger tower at point *A* is 42 kilometers north of a ranger tower at point *B*. A fire at point *C* is observed from both towers. If $\angle BAC$ measures 43° and $\angle ABC$ measures 68°, which ranger tower is closer to the fire?

Lesson 9.3: The Law of Cosines

Learning Targets:

- I can solve problems by using the Law of Cosines.
- I can determine whether a triangle can be solved by first using the Law of Sines or the Law of Cosines.

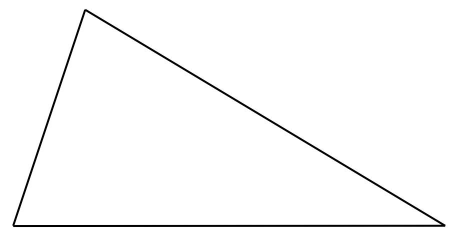
The Law of Cosines

In ANY triangle ΔABC,

____

____

____

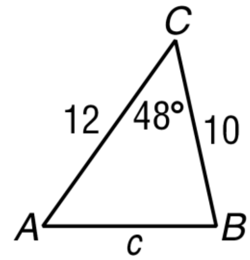


When to Use the Law of Cosines:

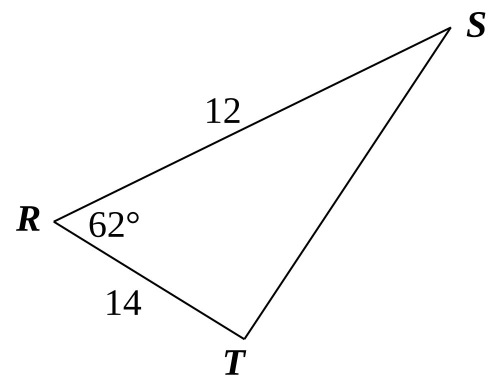
The Law of Cosines is especially useful when solving triangles given ______ or ______.

Using the Law of Cosines to Find the Missing Side

Example 1: In ΔABC, find c.



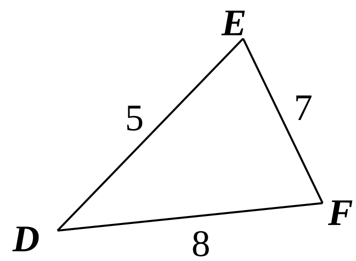
<u>Example 2:</u> In ΔRST , find *r*.



<u>Example 3:</u> A ranger tower at point *A* is directly north of a ranger tower at point *B*. A fire at point *C* is observed from both towers. The distance from the fire to tower *A* is 60 miles, and the distance from the fire to tower *B* is 50 miles. If $m\angle ACB = 62°$, find the distance between the towers.

Using the Law of Cosines to Find a Missing Angle

Example 4: In ΔDEF, find $m\angle D$.



Think, Pair, Share!

Example 5: In ΔJKL, find $m\angle L$.