

Geometry

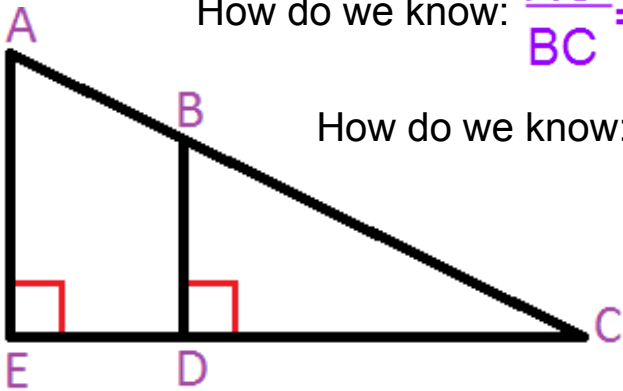
Chapter 8
Section 8-3

Using Similar Triangles and Proportions

How do we know $\triangle ACE \sim \triangle BCD$?

How do we know: $\frac{AC}{BC} = \frac{EC}{DC}$?

How do we know: $\frac{AC}{EC} = \frac{BC}{DC}$?



AA~

Proportions of similar triangles

Switch diagonals from previous question

Trigonometric Ratios in Right Triangles

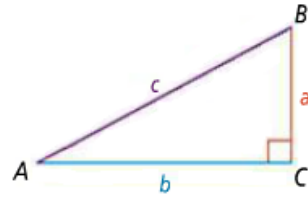
Take note

Key Concept Trigonometric Ratios

$$\text{sine of } \angle A = \frac{\text{length of leg opposite } \angle A}{\text{length of hypotenuse}} = \frac{a}{c}$$

$$\text{cosine of } \angle A = \frac{\text{length of leg adjacent to } \angle A}{\text{length of hypotenuse}} = \frac{b}{c}$$

$$\text{tangent of } \angle A = \frac{\text{length of leg opposite } \angle A}{\text{length of leg adjacent to } \angle A} = \frac{a}{b}$$



Abbreviations: $\sin A$, $\cos A$, and $\tan A$

Memory Trick

- Sine is Opposite over Hypotenuse.
- Cosine is Adjacent over Hypotenuse.
- Tangent is Opposite over Adjacent.

SOH - CAH - TOA

$$\sin = \frac{O}{H}$$

$$\cos = \frac{A}{H}$$

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

Using the Ratios

An *identity* is an equation that is always true.
Show why is the following equation always true.

$$\sin = (\cos)(\tan)$$

$$\sin = \frac{O}{H}$$

$$\cos = \frac{A}{H}$$

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

$$(\cos)(\tan) = \frac{A}{H} \cdot \frac{O}{A} = \frac{O}{H} = \sin$$

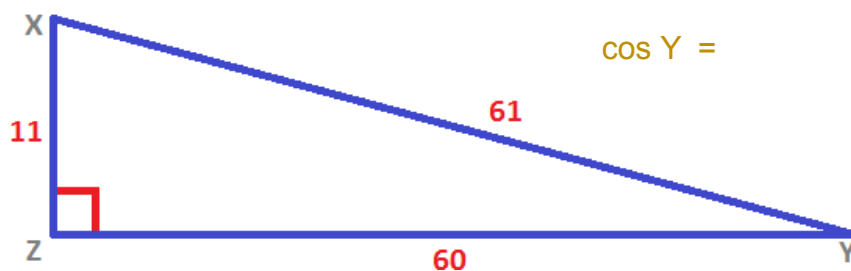
Using Trig. Ratios

$$\sin X =$$

$$\cos X =$$

$$\tan Y =$$

$$\cos Y =$$



$$60 / 61$$

$$11 / 61$$

$$11 / 60$$

$$60 / 61$$

Approximating Sides of a Triangle

What is the length of the second leg?

$$\tan 54 = \frac{y}{14}$$

$$14 \tan 54 = y$$

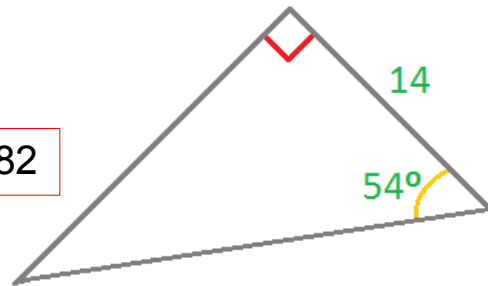
$$y = 19.27$$

What is the length of the hypotenuse?

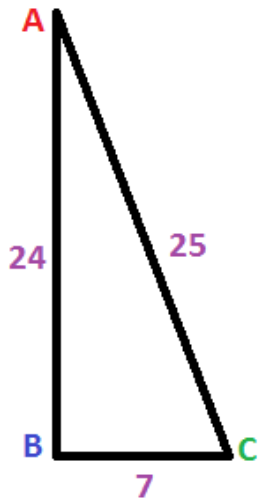
$$\cos 54 = \frac{14}{x}$$

$$x = \frac{14}{\cos 54}$$

$$x = 23.82$$



Inverse Trigonometry



$$\sin A = \frac{7}{25}$$

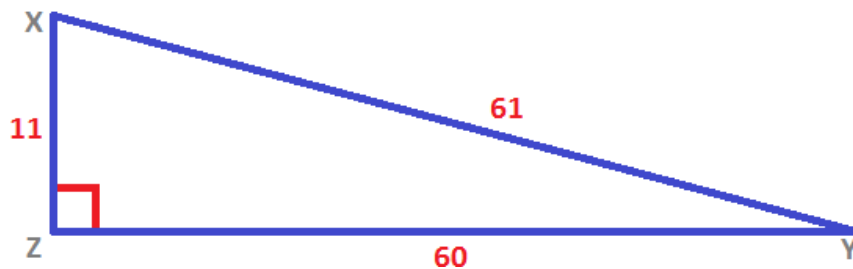
$$m\angle A = \sin^{-1}\left(\frac{7}{25}\right)$$

***We know this is a right triangle by the Converse of the Pythagorean Theorem. (7, 24, and 25 form a Pythagorean Triple)

Using Trig. Ratios

$$m\angle X = \sin^{-1}\left(\frac{60}{61}\right)$$

$$m\angle Y = \cos^{-1}\left(\frac{60}{61}\right)$$



15 / 19

4 / 19

4 / 15

15 / 19

Homework

Pages 510 - 511

12 - 24 even, 30, 32, 38