

Pretest

Learning Goal: Today I will learn about trigonometric ratios.

Success Criteria: I am able to identify opposite, adjacent and hypotenuse and create sin, cos and tan ratios. I can solve for an unknown side.

8.3 Trigonometry

As derived from the Greek language, the word **trigonometry** means “measurement of triangles.” Initially, trigonometry dealt with relationships among the sides and angles of triangles and was used in the development of astronomy, navigation, and surveying.

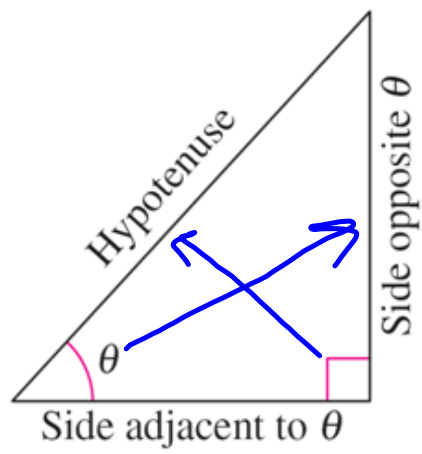
With the development of calculus and the physical sciences in the 17th century, a different perspective arose—one that viewed the classic trigonometric relationships as *functions* with the set of real numbers as their domains.

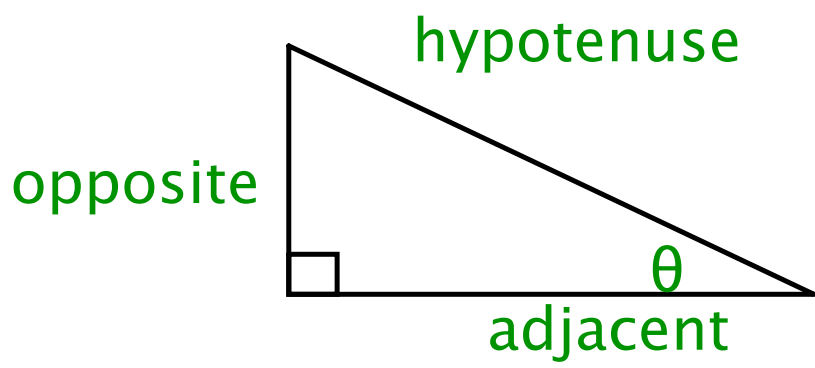


Angles

Consequently, the applications of trigonometry expanded to include a vast number of physical phenomena involving rotations and vibrations, including the following.

- sound waves
- light rays
- planetary orbits
- vibrating strings
- pendulums
- orbits of atomic particles





Trigonometry Ratios

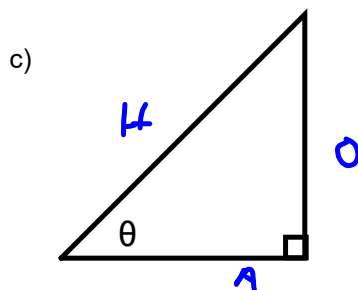
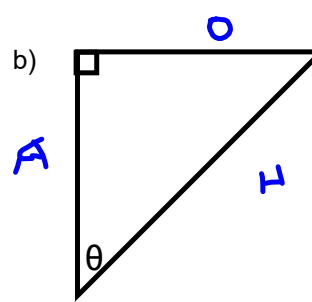
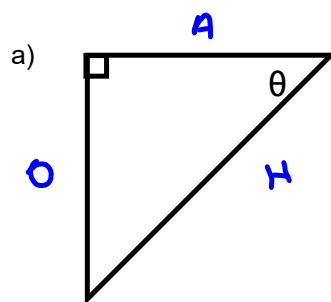
ys

The equivalent **ratios** of **corresponding** sides in two similar **right** triangles

The three primary trig ratios are: **Sine**, **Cosine**, and **Tangent**

Trigonometry

Label each side as opposite (O), adjacent (A) or hypotenuse (H).



soh - cah - toa

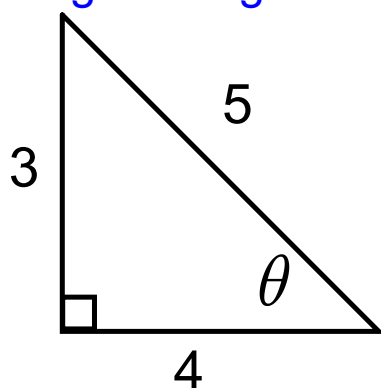
$$\sin \theta = \frac{\text{opp}}{\text{hyp}}$$

Can only be used
with right triangles

$$\cos \theta = \frac{\text{adj}}{\text{hyp}}$$

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

Find the following



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

$$\tan \theta = \frac{3}{4}$$

$$\cos \theta = \frac{4}{5}$$

Sine (Sin)

ys

The ratio of the leg **opposite** a certain angle to the **hypotenuse**.

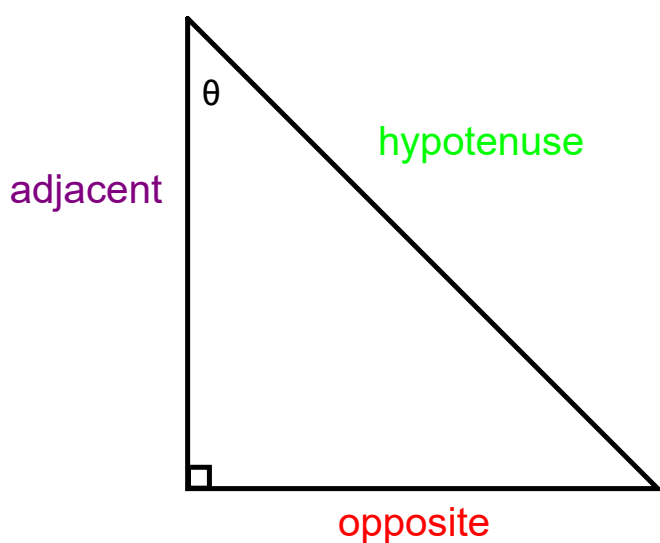
Cosine (Cos)

The ratio of the leg **adjacent** a certain angle to the **hypotenuse**.

Tangent (Tan)

The ratio of the leg **opposite** a certain angle to the leg **adjacent** to that angle.

Trigonometry



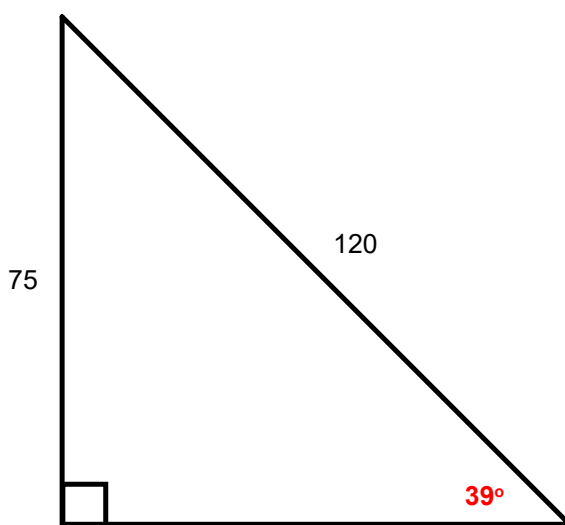
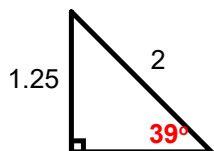
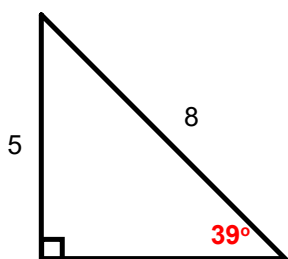
$$\text{sine } (\theta) = \frac{\text{opposite}}{\text{hypotenuse}}$$

$$\text{cosine } (\theta) = \frac{\text{adjacent}}{\text{hypotenuse}}$$

$$\text{tangent } (\theta) = \frac{\text{opposite}}{\text{adjacent}}$$

SOH CAH TOA

Trigonometry



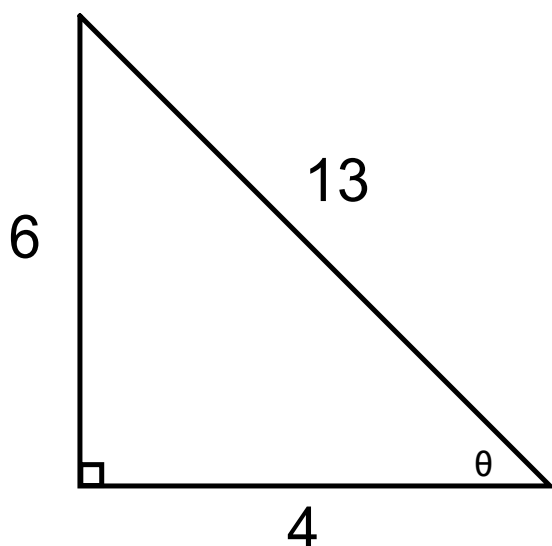
ratio or sides used

$$\sin(39) = \frac{5}{8} = \frac{75}{120} = 0.625$$

reference angle

Trigonometry

Label each side and write the trig ratios using numbers.



$$\sin(\theta) = \frac{6}{13}$$

$$\cos(\theta) = \frac{4}{13}$$


$$\tan(\theta) = \frac{6}{4}$$

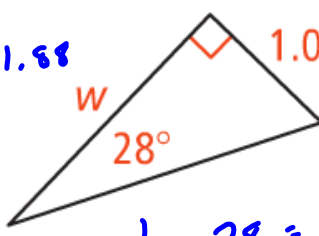
SOH CAH TOA

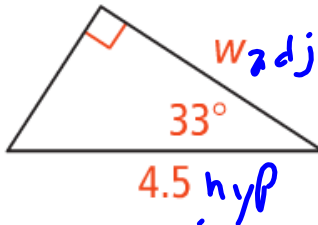
Trigonometry

Degree Mode

Find the value of w to the nearest tenth.

a.  $\sin 54 = \frac{w}{17}$
 $17 \sin 54$
 $w = 13.75$

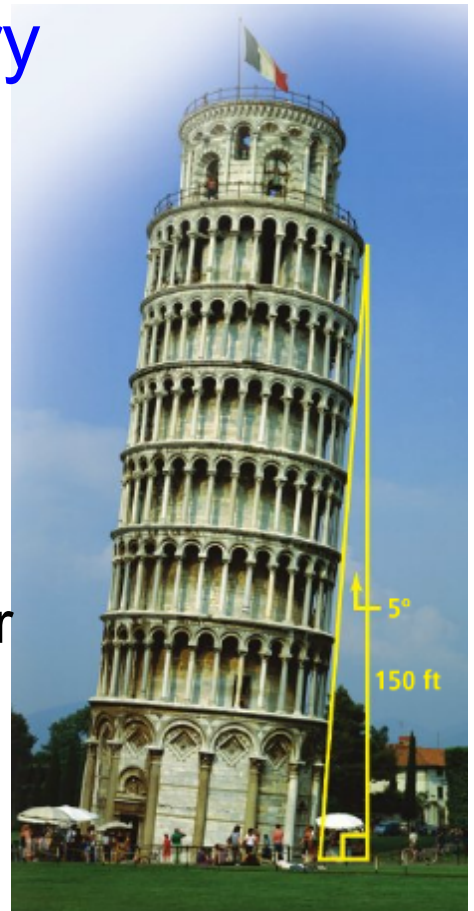
b.  $\tan 28 = \frac{1}{w}$
 $w = \frac{1}{\tan 28}$
 $w = 1.88$

c.  $\cos 33 = \frac{w}{4.5}$
 $4.5 \cos 33 = w$
 $w = 3.77$

$\cos 33 = \frac{w}{4.5}$
 $4.5 \cos 33 = w$
 $w = 3.77$

Trigonometry

In 1990, the Leaning Tower of Pisa was closed due to safety concerns. It was reopened in 2001 after a 10 year project to reduce its tilt from 5.5° to 5° . Suppose someone dropped an object from the tower at a height of 150 ft. How far from the tower would it land? Round to the nearest foot.



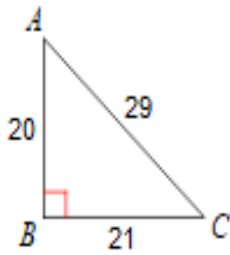
Closure: Today I learned how to set up trigonometric ratios and solve for a side.

SOH CAH TOA

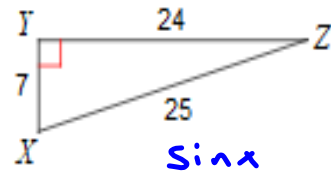
Practice

Find the value of each trigonometric ratio.

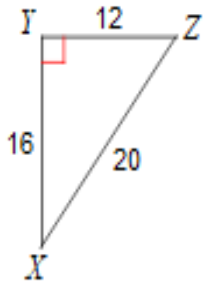
1) $\tan C = \frac{20}{21}$



2) $\sin X = \frac{24}{25}$



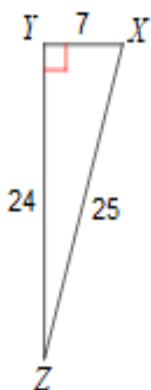
3) $\cos X = \frac{4}{5} = \frac{16}{20}$



4) $\sin Z = \frac{8}{17}$



5) $\tan X = \frac{24}{7}$



6) $\cos C = \frac{4}{5} = \frac{36}{45}$

