

# Trigonometry

Janine Flynn

Matthew Grant

Jacinta Murphy

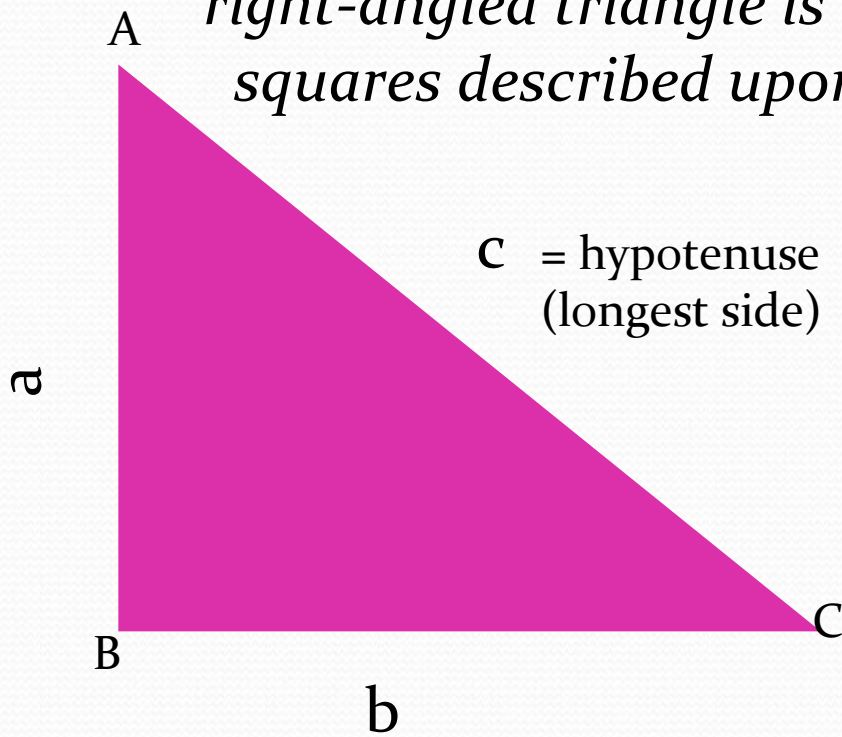
Tisa Way

# Overview

- Solve problems using Pythagorean Theorem
- Solve problems using trigonometric functions (Sine, Cosine & Tangent)
- Solve problems for special triangles
- Solve problems for reciprocal identities of trigonometric functions
- Trigonometric Activity

# Pythagorean Theorem

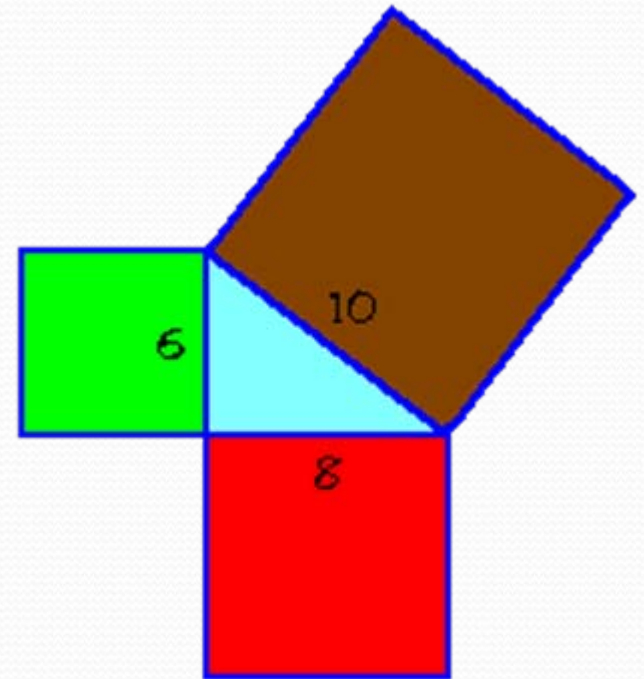
- *“The square described upon the hypotenuse of a right-angled triangle is equal to the sum of the squares described upon the other two sides”.*



$$a^2 + b^2 = c^2$$

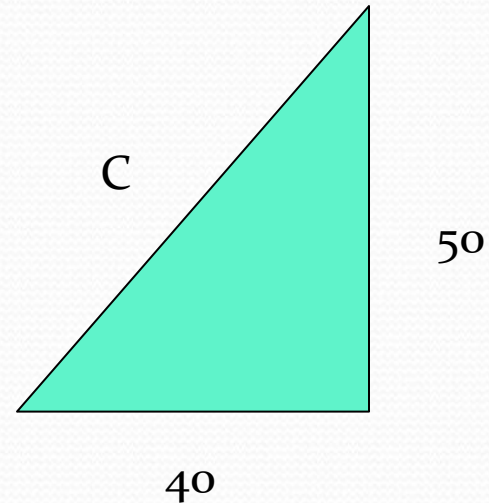
# Proof of Pythagorean Theorem

- Area of the hypotenuse's square (brown) equals the areas of the other two squares together.



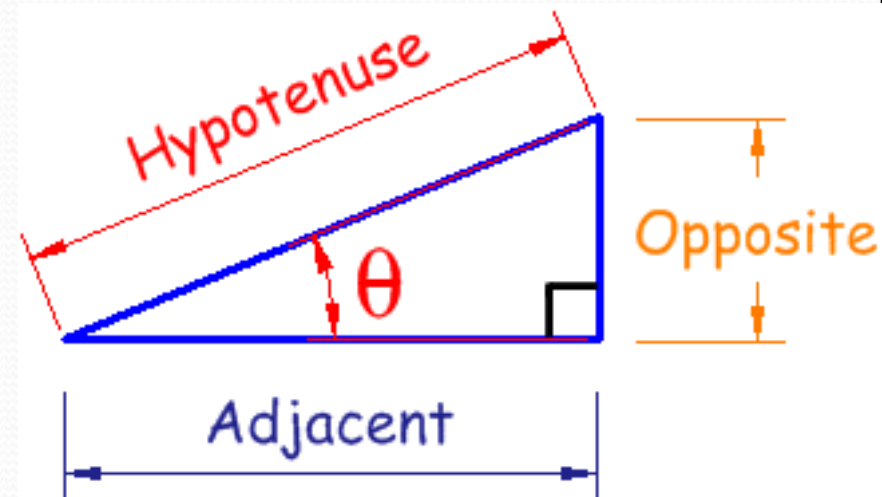
# Problem

- Find the length of the hypotenuse, denoted by  $c$ , using the Pythagorean Theorem.



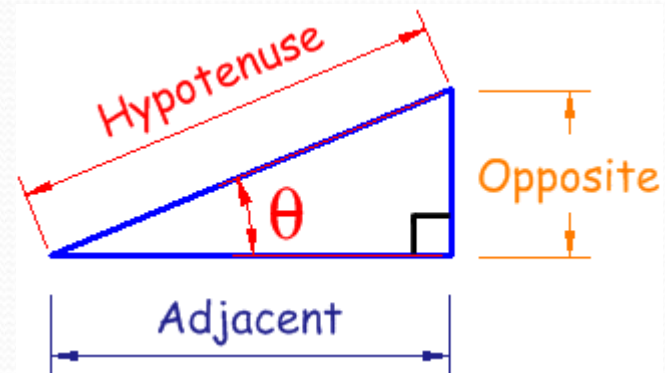
# Trigonometric Functions

- "Opposite" is opposite to the angle  $\theta$
- "Adjacent" is adjacent (next to) to the angle  $\theta$
- "Hypotenuse" is the longest side



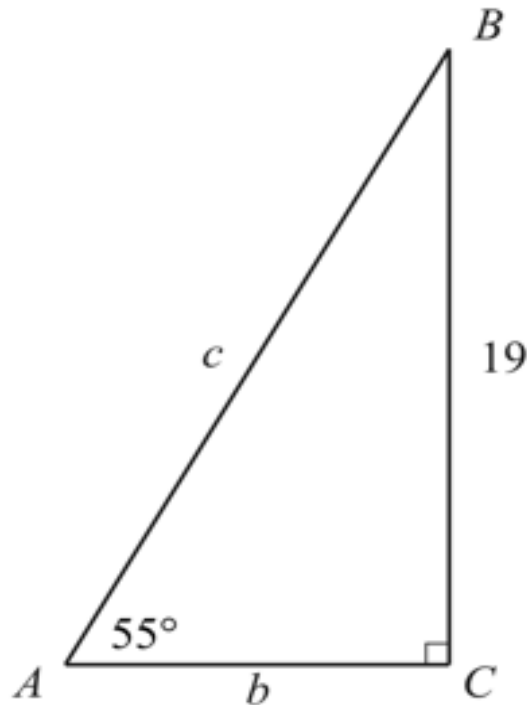
# Trigonometric Functions

- The three main functions in trigonometry are **Sine**, **Cosine** and **Tangent**.
- **Abbreviated as:** sin, cos and tan
- For a triangle with an angle  $\theta$ , the functions are calculated as:
  - $\text{Sin} = \text{Opposite} / \text{Hypotenuse}$
  - $\text{Cos} = \text{Adjacent} / \text{Hypotenuse}$
  - $\text{Tan} = \text{Opposite} / \text{Adjacent}$



# Problem

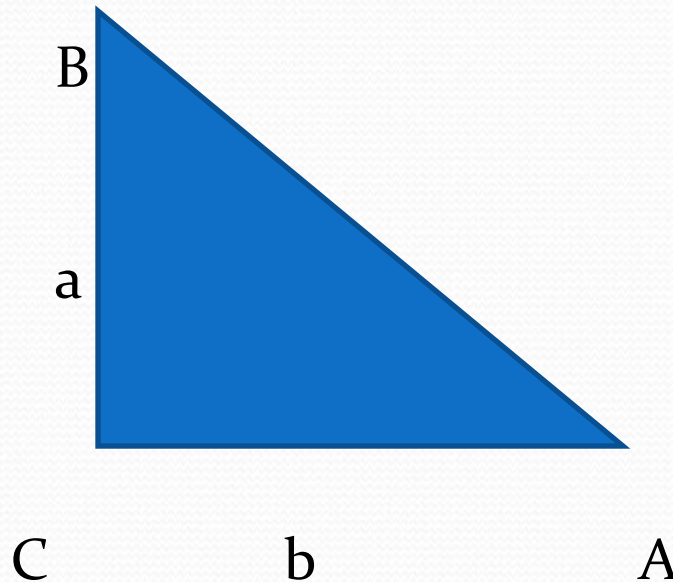
- Using your knowledge of Pythagorean Theorem and Trigonometric Functions, find the values of sides B and C, in the triangle below:





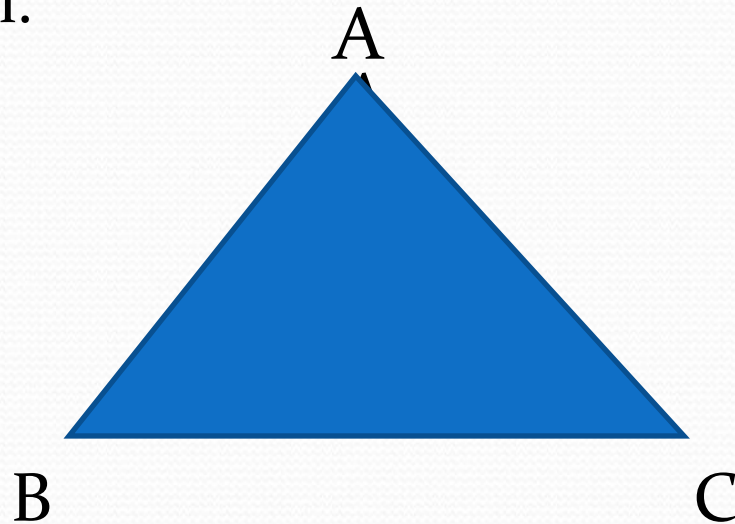
# Isosceles Triangle

- Isosceles Triangle:
  - two sides and two angles are equal
- Isosceles Right triangle?



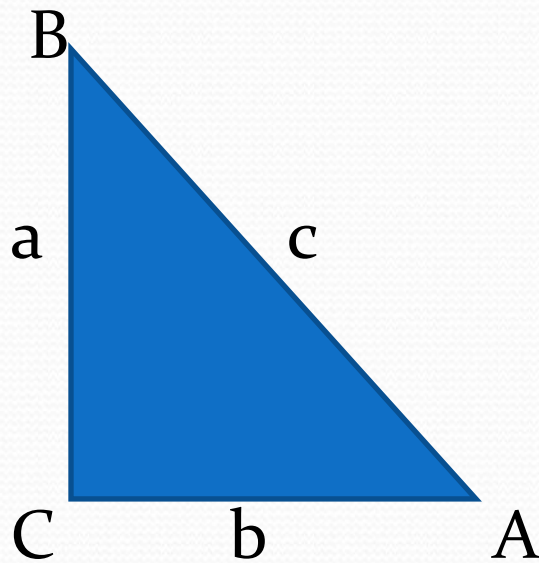
# Equilateral Triangle

- Equilateral triangle:
  - all three side lengths and all three angle measurements are equal.



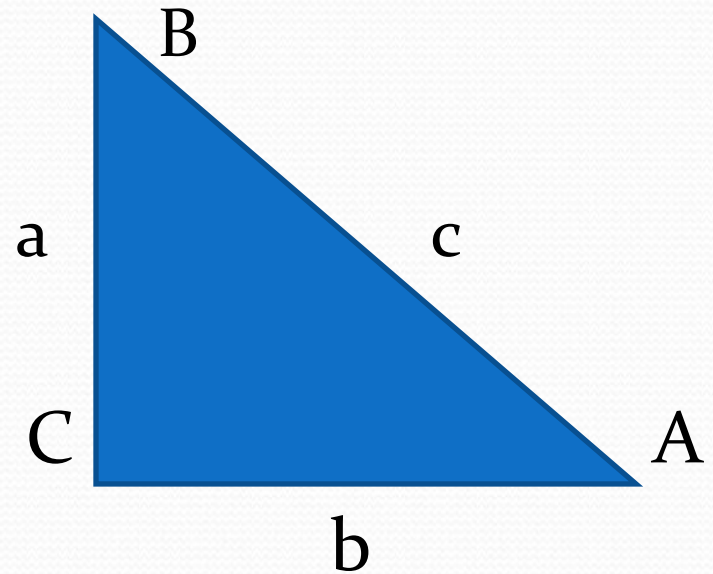
# Problem

- A 12 foot ladder leaning against a wall makes a  $60^\circ$  angle with the ground. How far is the foot of the ladder from the base of the wall? And how high is the top of the ladder?



# Reciprocal Trig Identities

- Secant =  $1/\text{Cosine} = c/b$
- Cosecant =  $1/\text{Sine} = c/a$
- Cotangent =  $1/\text{Tangent} = b/a$
- Abbreviations:
  - Secant = sec
  - Cosecant = csc
  - Cotangent = cot



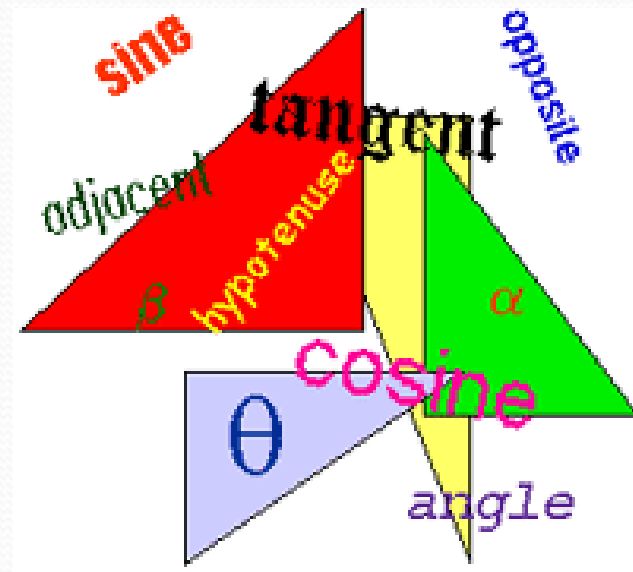
# Finding Values of sec, csc, cot:

- Examples:

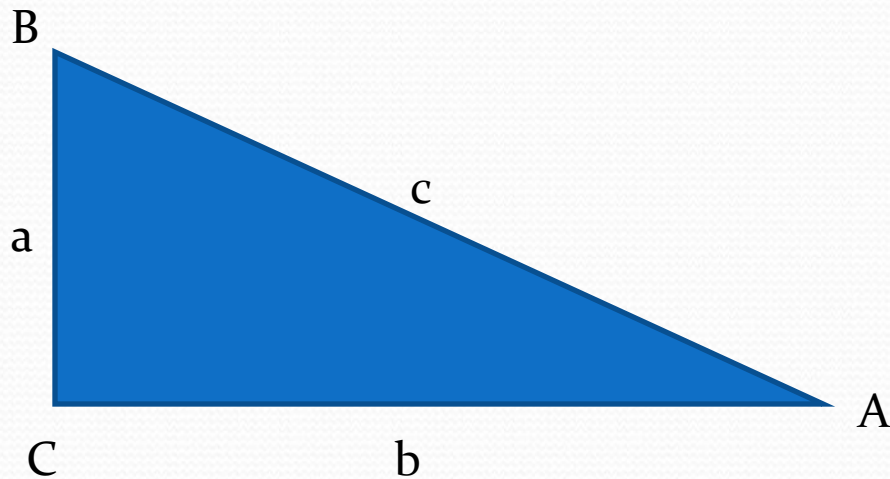
(1)  $\sec 45^\circ$

(2)  $\csc 30^\circ$

(3)  $\cot 60^\circ$



# Trig Example



- $\angle A$  is acute and  $\triangle ABC$  is right.
- $\sin(A) = 1/2$ .
- Find all Trigonometric function values for  $\angle A$