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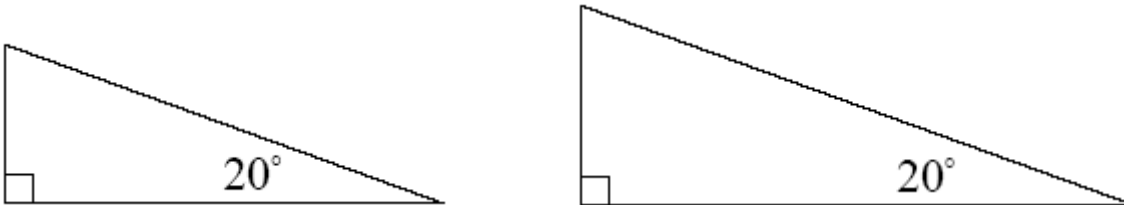
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(A) Lesson Objectives:

- a. Introduce trigonometric ratios from the viewpoint of similar right triangles
- b. Determine the three primary trigonometric ratios of a given angle
- c. Use a calculator to determine the trig ratios of an angle
- d. Use a calculator to determine the angle from a given trig ratio

(B) Investigation: Similar Right Triangles

- a. For each triangle, measure the length of each side to the nearest *tenth* of a *centimeter*, and then fill out the table below. Round each ratio to the nearest *hundredth*. When determining opposite and adjacent sides, refer to the 20° angle. To fill in the small box on the right, use your calculator, in **DEGREE MODE**, and express the values to the nearest *hundredth*.



	$\frac{\text{opposite}}{\text{adjacent}}$	$\frac{\text{opposite}}{\text{hypotenuse}}$	$\frac{\text{adjacent}}{\text{hypotenuse}}$	
Triangle #1				Tan $20^\circ =$
Triangle #2				Sin $30^\circ =$
				Cos $30^\circ =$

- b. Repeat Exercise #1 for the triangles show below that each have an acute angle of 50° .



	$\frac{\text{opposite}}{\text{adjacent}}$	$\frac{\text{opposite}}{\text{hypotenuse}}$	$\frac{\text{adjacent}}{\text{hypotenuse}}$	
Triangle #1				Tan $50^\circ =$
Triangle #2				Sin $50^\circ =$
				Cos $50^\circ =$

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(C) **The Three Trigonometric Ratios:**

- a. The Right Triangle Trigonometric Ratios – Although we won't prove this fact until a future geometry course, all right triangles that have a common acute angle are similar. Thus, the ratios of their corresponding sides are equal. A very long time ago, these ratios were given names. These trigonometric ratios (trig ratios) will be introduced through the following exercises, each of which refer to the diagram below.
- b. In a Right Triangle:

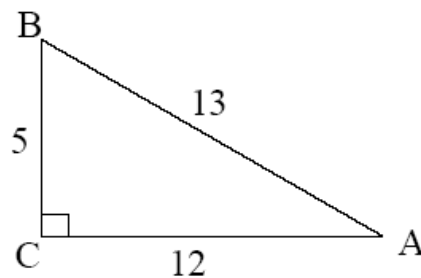
tangent ratio of an angle = $\frac{\text{leg opposite of the angle}}{\text{leg adjacent to the angle}}$		tan A =
sine ratio of an angle = $\frac{\text{leg opposite of the angle}}{\text{hypotenuse}}$		tan C =
cosine ratio of an angle = $\frac{\text{leg adjacent to the angle}}{\text{hypotenuse}}$		sin A =
		sin C =
		cos A =
		cos C =

A Helpful Mnemonic For Remembering the Ratios: SOH-CAH-TOA

Sine is **O**pposite over **H**ypotenuse – Cosine is **A**djacent over **H**ypotenuse – Tangent is **O**pposite over **A**djacent

(D) **Further Example:** Find each of the following ratios for the right triangle shown below.

- (a) $\sin A =$ (b) $\tan B =$
(c) $\cos A =$ (d) $\tan A =$
(e) $\cos B =$ (f) $\sin B =$



(E) **In Class Examples: Optional Methods**

We will use examples from

<http://www.teacherweb.com/NY/Arlington/AlgebraProject/U8L3.SimilarRightTriangles-IntrotoTrig.pdf>

(F) **Homework/Resources**

- **HW:** → <http://www.teacherweb.com/NY/Arlington/AlgebraProject/U8L4TrigonometryandtheCalculator.pdf>
- Video help from OnlineMathLearning with trig ratios:
 - o <http://www.onlinemathlearning.com/basic-trigonometric-ratios.html>
- Reading from PurpleMath
 - o <http://www.purplemath.com/modules/basirati.htm>