

# Chapter 9- Lesson 5

## Knowing the Code Names

### Goals

- Learn names of trigonometric ratios.
- Translate trigonometric notation into words.
- Use graphic organizer and mnemonics for remembering the three fundamental trigonometric ratios.
- Be able to solve problems involving the “code names” of the three main trigonometric ratios quickly and accurately.

In the previous lessons you have learned:

- Where trigonometric ratios come from and why they work.
- How to use trigonometric ratios and trigonometric tables to:
  - find the reference angle when you knew the length of two sides of a right triangle
  - find the length of a side of a right triangle when you knew the length of one other side and the measure of the reference angle.

In this lesson you will learn the “code names” of the 6 trigonometric ratios. This is important in order to be able to read, understand, and solve problems involving trigonometry.

### Knowing the Code Names

Here is a “decoding” table for the six trigonometric ratios. The first three are critical for our class, the other will become important in future years. I’ve included them all for the sake of completeness.

Code Name	Abbreviation	Ratio	Example
Cosine	cos	$\frac{\text{Length of adjacent side}}{\text{Length of hypotenuse side}}$	$\cos(30^\circ) = \frac{\sqrt{3}}{2}$ $\approx 0.8660$
Sine	sin	$\frac{\text{Length of opposite side}}{\text{Length of hypotenuse side}}$	$\sin(30^\circ) = \frac{1}{2}$ $= 0.5$
Tangent	tan	$\frac{\text{Length of opposite side}}{\text{Length of adjacent side}}$	$\tan(30^\circ) = \frac{\sqrt{3}}{3}$ $\approx 0.5774$
Secant	sec	$\frac{\text{Length of hypotenuse side}}{\text{Length of adjacent side}}$	$\sec(30^\circ) = \frac{2\sqrt{3}}{3}$ $\approx 1.1547$
Cosecant	csc	$\frac{\text{Length of hypotenuse side}}{\text{Length of opposite side}}$	$\csc(30^\circ) = \frac{2}{1}$ $= 2$
Cotangent	cot	$\frac{\text{Length of adjacent side}}{\text{Length of hypotenuse side}}$	$\cot(30^\circ) = \sqrt{3}$ $\approx 1.7321$

## Chapter 9- Lesson 5: Code Names

As you probably surmised, remembering which code name goes with which ratio can be a problem. In order to work quickly and accurately you will need to memorize these— but just the first three for now!

There are some clever way to help. Here is a graphical organizer that I learned from a student overseas.

Another helpful hint is that if you have the hypotenuse, you will always be dividing by it. Also, “c” comes first in the alphabet, so the adjacent side goes with cosine.

A very common way is to memorize the meaning of the code words is the mnemonic “soh-cah-toa” which stands for:

$$\text{sine} = \text{opposite} \div \text{hypotenuse}$$

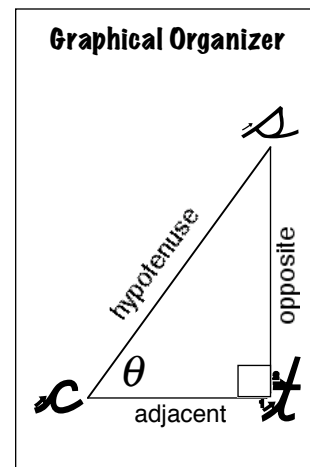
$$\text{cosine} = \text{adjacent} \div \text{hypotenuse}$$

$$\text{tangent} = \text{opposite} \div \text{adjacent}$$

Another way is to remember the sentence “Some Old Horse Caught Another Horse Taking Oats Away”.

Of course you can come up with your own way— whatever works for you— but ***you must become fluent in the code of trigonometry as quickly as possible.***

### Try Some Problems



### Keeping it Meaningful

All these weird names can quickly overwhelm even the best minds. I suggest that when you see any of the code names— sin, cos, tan— you:

1. Quickly put in where the angle goes:  $\sin(\theta)$ ,  $\cos(\theta)$ ,  $\tan(\theta)$
2. Chant the meaning. For example:

“Sine of the angle is equal to the ratio of the length of the opposite side to the length of the hypotenuse.”

OR

“Cosine of the angle is equal to the length of the adjacent side divided by the length of the hypotenuse.”

# Chapter 9- Lesson 5

## Knowing the Code Names- Partner Challenge 1



**Set 1**

Give the definition for each of these code names.

1.  $\sin(\theta)$
2.  $\cos(\theta)$
3.  $\tan(\theta)$
4.  $\cos(\theta)$
5.  $\tan(\theta)$
6.  $\sin(\theta)$

**Set 2**

Give the code name for each of these definitions.

1.  $\frac{\text{length of opposite side}}{\text{length of adjacent side}}$
2.  $\frac{\text{length of opposite side}}{\text{length of hypotenuse side}}$
3.  $\frac{\text{length of adjacent side}}{\text{length of hypotenuse side}}$
4.  $\frac{\text{length of opposite side}}{\text{length of hypotenuse side}}$
5.  $\frac{\text{length of opposite side}}{\text{length of adjacent side}}$
6.  $\frac{\text{length of adjacent side}}{\text{length of hypotenuse side}}$

**Set 3**

If code name, give definition. If definition, give code name.

1.  $\frac{\text{length of adjacent side}}{\text{length of hypotenuse side}}$
2.  $\sin(\theta)$
3.  $\cos(\theta)$
4.  $\frac{\text{length of opposite side}}{\text{length of adjacent side}}$
5.  $\tan(\theta)$
6.  $\frac{\text{length of opposite side}}{\text{length of hypotenuse side}}$

**Set 3**

**Answers**

1.  $\cos(\theta)$
2.  $\frac{\text{length of opposite side}}{\text{length of hypotenuse side}}$
3.  $\frac{\text{length of adjacent side}}{\text{length of hypotenuse side}}$
4.  $\tan(\theta)$
5.  $\frac{\text{length of opposite side}}{\text{length of adjacent side}}$
6.  $\sin(\theta)$

**Set 2**

**Answers**

1.  $\tan(\theta)$
2.  $\sin(\theta)$
3.  $\cos(\theta)$
4.  $\sin(\theta)$
5.  $\tan(\theta)$
6.  $\cos(\theta)$

**Set 1**

**Answers**

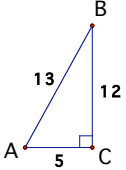
1.  $\frac{\text{length of opposite side}}{\text{length of hypotenuse side}}$
2.  $\frac{\text{length of adjacent side}}{\text{length of hypotenuse side}}$
3.  $\frac{\text{length of opposite side}}{\text{length of adjacent side}}$
4.  $\frac{\text{length of adjacent side}}{\text{length of hypotenuse side}}$
5.  $\frac{\text{length of opposite side}}{\text{length of adjacent side}}$
6.  $\frac{\text{length of opposite side}}{\text{length of hypotenuse side}}$

# Chapter 9- Lesson 5

## Knowing the Code Names- Partner Challenge 2

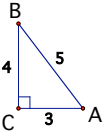
**Don't write on this!**

**Set 1**  
Solve for x.



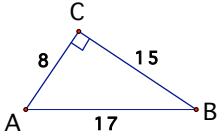
- $\sin(\angle A) = x$
- $\cos(\angle A) = x$
- $\tan(\angle A) = x$
- $\sin(\angle B) = x$
- $\cos(\angle B) = x$
- $\tan(\angle B) = x$

**Set 2**  
Solve for x.



- $\sin(\angle A) = x$
- $\cos(\angle A) = x$
- $\tan(\angle A) = x$
- $\sin(\angle B) = x$
- $\cos(\angle B) = x$
- $\tan(\angle B) = x$

**Set 3**  
Solve for x.



- $\sin(\angle A) = x$
- $\cos(\angle A) = x$
- $\tan(\angle A) = x$
- $\sin(\angle B) = x$
- $\cos(\angle B) = x$
- $\tan(\angle B) = x$

**Set 3**  
Answers

- $x = \frac{17}{15}$
- $x = \frac{17}{8}$
- $x = \frac{8}{15}$
- $x = \frac{17}{8}$
- $x = \frac{17}{15}$
- $x = \frac{8}{15}$

**Set 2**  
Answers

- $x = \frac{5}{4}$
- $x = \frac{5}{3}$
- $x = \frac{3}{4}$
- $x = \frac{5}{3}$
- $x = \frac{5}{4}$
- $x = \frac{4}{3}$

**Set 1**  
Answers

- $x = \frac{13}{12}$
- $x = \frac{13}{5}$
- $x = \frac{5}{12}$
- $x = \frac{13}{5}$
- $x = \frac{13}{12}$
- $x = \frac{5}{12}$