

Trigonometry Student Success Sheet (SSS)

Right Triangle Trig

Olathe East High School – Intermediate Algebra

Name: _____

Hour: _____

Reminders:

- Homework is completed in **homework packet**.
- **All pages** in homework notebook should be done in pencil!

Need Help? Support is available!

- www.mhollan.weebly.com
- www.srushingoe.weebly.com

“There are no secrets to success. It is the result of preparation, hard work, and learning from failure.”

Concept #	What we will be learning...	# of Videos
1	Right Triangle Trig Ratios	1 Video
2	Applying Trig Ratios	1 Video
3	Finding Angles of a Right Triangle	1 Video
4	Angles of Rotation	1 Video

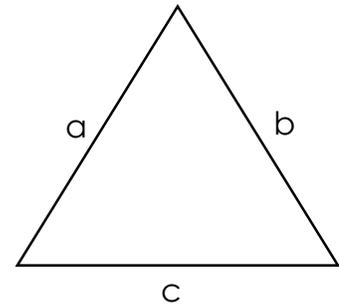
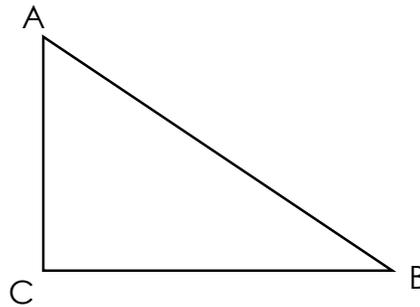
CONCEPT 1: RIGHT TRIANGLE TRIG RATIOS

Trigonometry and Triangles

Trigonometry → trigonon: "triangle" + metron "measure"
 Trigonometry is literally the measuring (of angles and sides) of triangles
Labeling Triangles
 Since all triangles have 3 angles and 3 sides, there is a standard way to label these angles and sides.

- CAPITAL LETTERS are used to name _____
- lower case letters are used to name _____
- The capital letter that names an **angle** should be opposite the **side** that named by its corresponding lower case letter. For example, angle A should be opposite from side a.
- In a right triangle, you want to name the _____ angle C when possible. This way when using, $a^2 + b^2 = c^2$, c will be the _____ because it is always opposite the right angle.

The letters used to label will typically be A, B, C, a, b, and c. However, as long as the letters correspond capital with lower case, the letters can be altered.



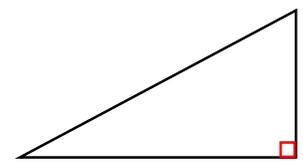
Right Triangle Trig

First, we must be able to identify the parts of a right triangle correctly.

Parts you should already know:

Hypotenuse: Longest side of a right triangle that is opposite from the right angle.

Right angle: _____ degree angle denoted by a box in its corner

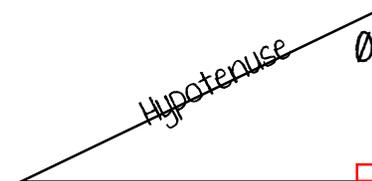
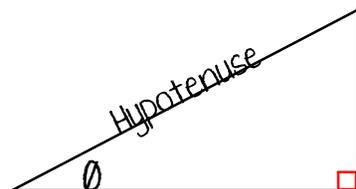


Some new parts:

Theta - θ : Theta is a greek symbol that is just a complicated way of writing the unknown, like "x". It is key to determining the following sides...

Opposite side: The side opposite from θ

Adjacent side: The side next to θ that is not they hypotenuse

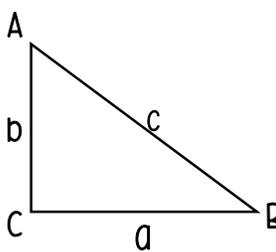
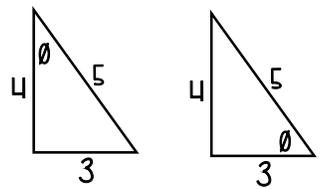
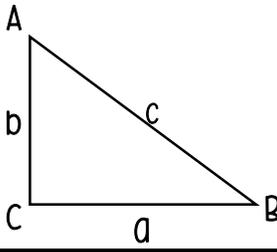
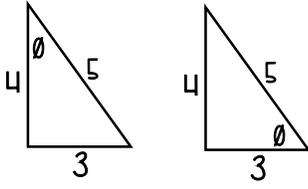
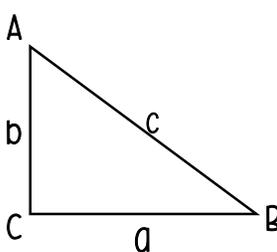
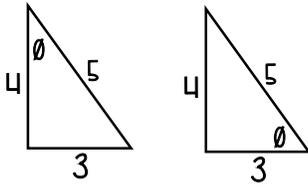


Trigonometric Functions

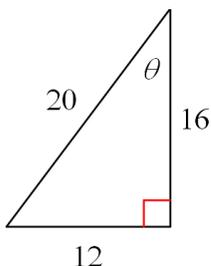
What are Trigonometric Functions?

- A **trigonometric function** is a function whose rule is given by a trigonometric _____.
- A **trigonometric ratio** compares the lengths of two _____ of a right triangle.
- The Greek letter theta, θ , is traditionally used to represent the measure of an acute angle in a right triangle. The values of the trigonometric ratios depend upon θ . *Note θ is just a variable that represents an unknown value, thus it could be x or some other variable.

3 BASIC TRIG FUNCTIONS

TRIG FUNCTION	TRIG RATIO USING TRIANGLE ABC	EXAMPLE
<p>SINE</p> <p>WRITTEN AS: $\sin \theta$</p> <p>*TO REMEMBER*</p> <p>SOH</p> <p>SIN = OPP. \div HYP.</p>	 <p>IF θ IS ANGLE A...</p> $\sin A = \frac{\text{Opposite}}{\text{Hypotenuse}} = \frac{a}{c}$ <p>IF θ IS ANGLE B...</p> $\sin B = \frac{\text{Opposite}}{\text{Hypotenuse}} = \frac{b}{c}$	
<p>COSINE</p> <p>WRITTEN AS: $\cos \theta$</p> <p>*TO REMEMBER*</p> <p>CAH</p> <p>COS = ADJ. \div HYP.</p>	 <p>IF θ IS ANGLE A...</p> $\cos A = \frac{\text{adjacent}}{\text{Hypotenuse}} = \frac{b}{c}$ <p>IF θ IS ANGLE B...</p> $\cos B = \frac{\text{Adjacent}}{\text{Hypotenuse}} = \frac{a}{c}$	
<p>Tangent</p> <p>WRITTEN AS: $\tan \theta$</p> <p>*TO REMEMBER*</p> <p>TOA</p> <p>TAN = OPP. \div ADJ.</p>	 <p>IF θ IS ANGLE A...</p> $\tan A = \frac{\text{Opposite}}{\text{Adjacent}} = \frac{a}{b}$ <p>IF θ IS ANGLE B...</p> $\tan B = \frac{\text{Opposite}}{\text{Adjacent}} = \frac{b}{a}$	

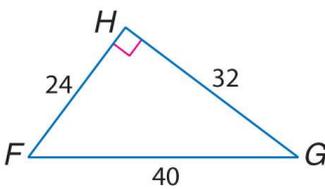
Find the 3 basic trig ratios, sine, cosine, and tangent for θ .



$$\sin \theta =$$

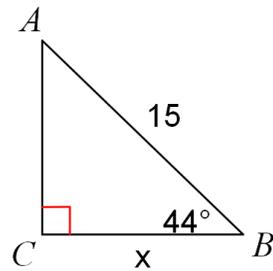
$$\cos \theta =$$

$$\tan \theta =$$

Using $\angle G$... Opposite side: Adjacent side: Hypotenuse:	<p>Find the values of the three trigonometric functions for angle G.</p>  <p> $\sin G =$ $\cos G =$ $\tan G =$ </p>
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CONCEPT 2: APPLYING TRIG RATIOS

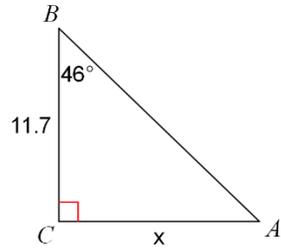
Using Trig Ratios to Find Missing Lengths of a Triangle	<p>To find a missing side length, you are just using the trig ratios in a reverse manner.</p> <p>Find the measure of each side indicated by x. Then find the remaining side missing using Pythagorean Theorem. Round to the nearest tenth.</p> <p><i>Steps:</i></p> <p>1st – Circle the given angle measure, and figure out which side is...</p> <ul style="list-style-type: none"> - the hypotenuse: _____ - opposite: _____ - & adjacent: _____ <p>2nd – Determine what side(s) you know, and which side you need to find.</p> <p>SOH, CAH, TOA</p> <p>3rd - Set up a trig ratio using the information you have, and includes the side you need as an unknown $\rightarrow \text{trig}(\#^\circ) = \text{---}$</p> <p>4th – Make the equation resemble a proportion and apply the cross product property to solve for the unknown side.</p>
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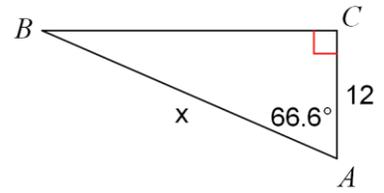
Know: _____ Finding: _____

Practice

1.

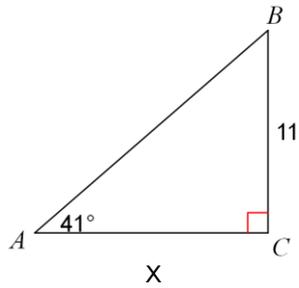


2.



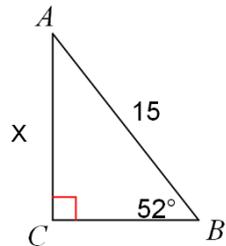
Solving Right
Triangles

Solve for x . Round answers to the nearest tenth.



Practice.

1.



CONCEPT 3: Finding Angles of a Right Triangle

Using Trig Ratios to Find Missing Angles of a Triangle

Similar to finding missing side lengths, we can use trig ratios to find missing angle measures.

Use the 2^{nd} button with your trig function to find the angle θ .

$$\rightarrow \text{Trig}^{-1}\left(\frac{\#}{\#}\right) \quad \sin A = \frac{12}{13} \quad \cos A = \frac{2}{3}$$

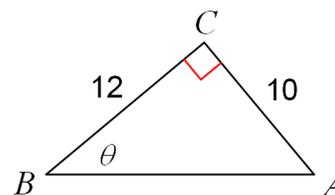
$$\tan B = \frac{4}{3} \quad \cos B = \frac{6}{13}$$

Find the measure of each angle indicated. Then find the remaining missing angle. Round to the nearest tenth.

Steps

1st – Using theta (circle the angle), figure out which side is...

- the hypotenuse: _____
- opposite: _____
- & adjacent: _____



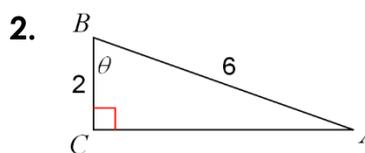
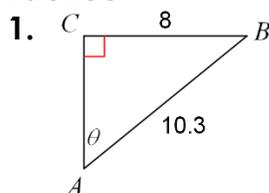
2nd - Determine what sides you have information about in relation to theta in use to set up a trig ratio

3rd - Use the 2^{nd} button with your trig function to find the angle θ .

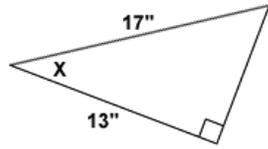
$$\rightarrow \text{Trig}^{-1}\left(\frac{\#}{\#}\right)$$

4th – Knowing that all angles in a triangle add up to 180° , find the remaining unknown angle.

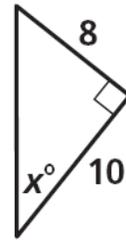
Practice



3.



4.

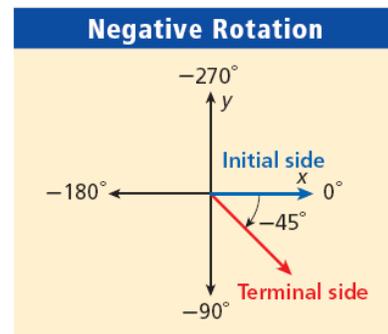
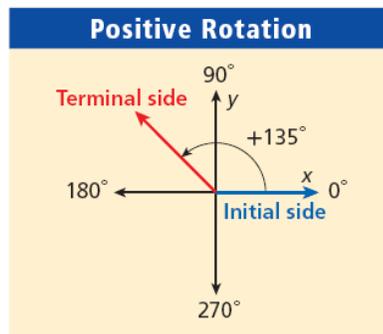


CONCEPT 4: ANGLES OF ROTATION

Standard Position

Standard Position of an Angle

- **Standard position:** an angle is in standard position when its vertex is at the origin and one ray is on the positive x-axis.
- The **initial side** of the angle is the ray on the x-axis.
- The other ray is called the **terminal side**.

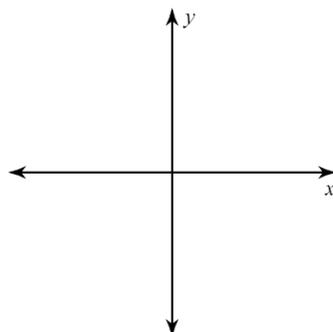


- **Angle of rotation:** an angle of rotation is formed by rotating the **terminal side** and keeping the **initial side** in place.
- If the terminal side is rotated *counterclockwise*, the angle of rotation is *positive*
- If the terminal side is rotated *clockwise*, the angle of rotation is *negative*

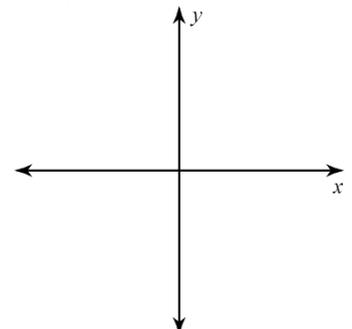
Drawing Angles in Standard Position

Draw an angle with the given measure in standard position.

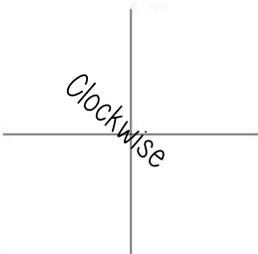
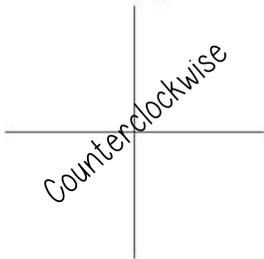
a) 320°



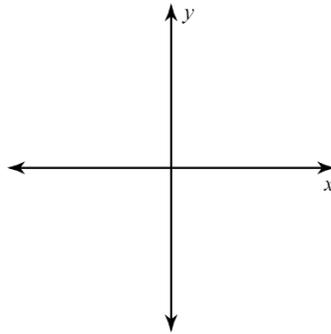
b) -110°



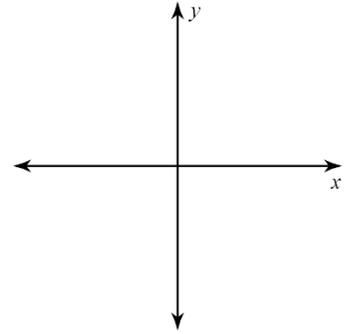
*If the angle measure goes past 360° , determine how many full 360° rotations there are first



c) 990°



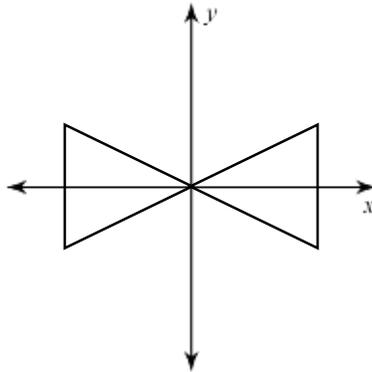
d) 510°



Reference Angles

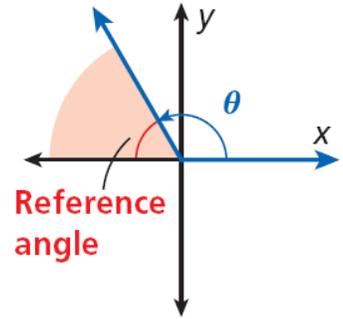
What is a reference angle?

- A reference angle is formed by “dropping” a perpendicular from the terminal side of a standard position angle to the x-axis.



Reference angles are always part of the “bowtie”

For an angle θ in standard position, the **reference angle** is the positive acute angle formed by the terminal side of θ and the x-axis.



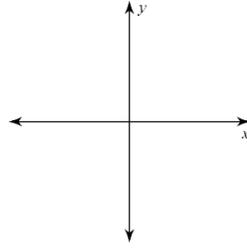
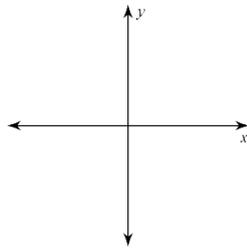
Finding Reference Angles

Find the reference angle for each given angle.

(Is it closer to 180 or 360? How far away from 180 or 360 is it?)

a) $\theta = 135^\circ$

b) $\theta = -105^\circ$



c) $\theta = 325^\circ$

d) $\theta = -115^\circ$

