

Hello!

- Park your phones
- Grab your calculators
- Take out HW from Thursday
(Labeling Triangles)

Did you get your Wednesday stamp??

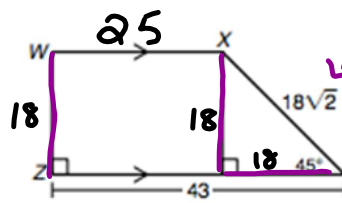
Trigonometry Notes

Name: _____

Date: 10/30/17

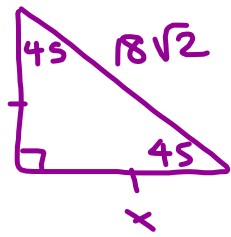
Warm Up

Find the perimeter of quadrilateral WXYZ.



Isosceles Right \triangle

AKA Hyp!



$$x^2 + x^2 = (18\sqrt{2})^2$$

$$2x^2 = 648$$

$$x^2 = \frac{648}{2} = 324$$

$$x = 18$$

$$18\sqrt{2} + 43 + 18 + 25$$

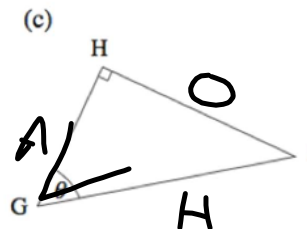
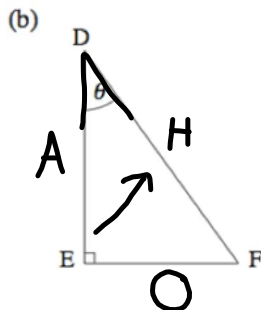
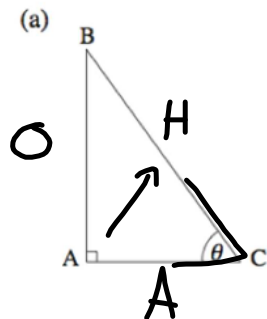
$$18\sqrt{2} + 86$$

What IS Trigonometry? The study of the Sides and Angles of Triangles.

What do we already know? Sum of Angles: $\triangle \text{ sum} = 180^\circ$

Pythagorean Theorem: $a^2 + b^2 = c^2$

- The three major trigonometric ratios will finally relate sides and angle in one equation for right triangles.
- Label each side with its corresponding lowercase letter. Then determine whether the side is hypotenuse, opposite, or adjacent to the angle θ .



The techniques in trigonometry are used for finding relevance in navigation particularly satellite systems and astronomy, naval and aviation industries, oceanography, land surveying, and in cartography (creation of maps)

Trigonometry Notes

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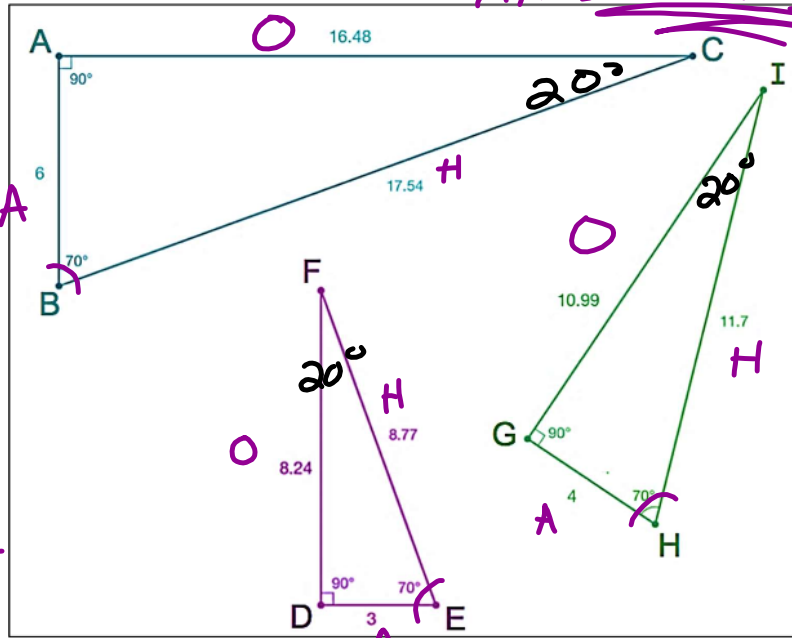
Discovering the Trig Ratios

1. Compare the three triangles in the box below. Are the three triangles **congruent**? Are they **similar**? Explain how you know.

$ABC \sim DEF \sim GHI$

AA similarity!!

2. Label the sides of each triangle as hypotenuse, opposite, and adjacent to the 70° angle.



Ratio: fraction

3. Fill in the following table with the ratios from the sides of each triangle. Round the divided ratios to nearest ten-thousandth (4 places after the decimal).

Triangle ABC	$\frac{\text{opposite}}{\text{hypotenuse}} = .9396$	$\frac{\text{adjacent}}{\text{hypotenuse}} = .3421$	$\frac{\text{opposite}}{\text{adjacent}} = 2.7467$
Triangle DEF	$\frac{\text{opposite}}{\text{hypotenuse}} = .9396$	$\frac{\text{adjacent}}{\text{hypotenuse}} = .3421$	$\frac{\text{opposite}}{\text{adjacent}} = 2.7467$
Triangle GHI	$\frac{\text{opposite}}{\text{hypotenuse}} = .9393$	$\frac{\text{adjacent}}{\text{hypotenuse}} = .3421$	$\frac{\text{opposite}}{\text{adjacent}} = 2.7475$

4. What do you notice about each column?

approximately the same value.

5. Make sure your yellow calculator is in **degree mode (MODE -> Degree)**. Find the following values. Round to the nearest ten-thousandth. **** ** ***

$\sin 70^\circ = .9397$ $\cos 70^\circ = .3420$ $\tan 70^\circ = 2.7475$

6. Did your findings from the table match up to the calculator values? Explain. **yes, ... decimals**

**7. Using the side lengths in triangle ABC, find the following values based off of the 20° angle. Confirm using the calculator.

$\sin 20^\circ = .3420$ $\cos 20^\circ = .9397$ $\tan 20^\circ = .3639$

Sin => Sine
Cos => Cosine
Tan => Tangent.

Trigonometry Notes

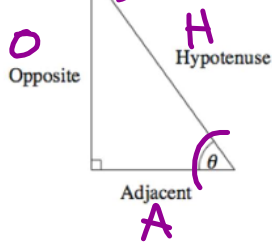
Name: _____ Date: _____

Trig Ratio Recap

For a right triangle, the sine, cosine, and tangent of the angle θ is defined as:

$$\sin \theta = \frac{\text{opp}}{\text{hyp}} \quad \cos \theta = \frac{\text{adj}}{\text{hyp}} \quad \tan \theta = \frac{\text{opp}}{\text{adj}}$$

Remember:



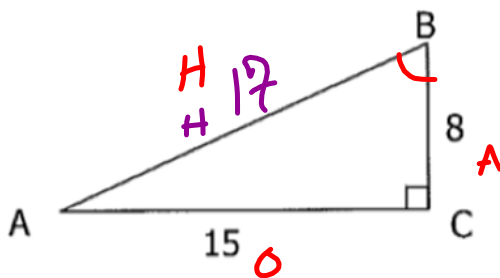
Sine of A = $\frac{\text{opposite}}{\text{hypotenuse}}$ also written "sin A "

Cosine of A = $\frac{\text{adjacent}}{\text{hypotenuse}}$ also written "cos A "

Tangent of A = $\frac{\text{opposite}}{\text{adjacent}}$ also written "tan A "

Helpful abbreviation: **SOH CAH TOA**

Example 1



$$15^2 + 8^2 = c^2$$

$$\sqrt{289} = \sqrt{c^2}$$

$$17 = c$$

$$\sin A = \frac{8}{17}$$

$$\cos A = \frac{15}{17}$$

$$\tan A = \frac{8}{15}$$

Simplified fraction form

$$\sin B = \frac{15}{17}$$

$$\cos B = \frac{8}{17}$$

$$\tan B = \frac{15}{8}$$

$$\sin \theta = \frac{H}{H}$$

$$\cos \theta = \frac{A}{H}$$

$$\tan \theta = \frac{O}{A}$$

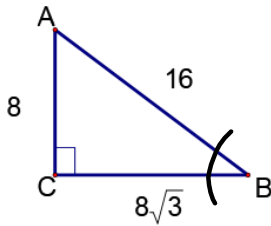
* Rationalize Denominators!!!!

Trigonometry Notes

Name: _____

Date: _____

EXAMPLE 2.



$$\sin A = \frac{8\sqrt{3}}{16} = \frac{\sqrt{3}}{2}$$

$$\cos B = \frac{8\sqrt{3}}{16} = \frac{\sqrt{3}}{2}$$

$$\cos A = \frac{8}{16} = \frac{1}{2}$$

$$\sin B = \frac{8}{16} = \frac{1}{2}$$

$$\tan A = \frac{8\sqrt{3}}{8} = \sqrt{3}$$

$$\tan B = \frac{8}{8\sqrt{3}} = \frac{1}{\sqrt{3}} = \frac{\sqrt{3}}{3}$$

If you know the measure of an acute angle of a right triangle, the calculator can find the sin, cos, and tan ratios (in decimal form)

- 1.) Make sure the calculator is in Degree mode
- 2.) Find the sin, cos, and tan buttons on your calculator.
- 3.) After you press which ratio you want, enter in the angle measure (be sure to end the parentheses)
- 4.) Press enter to find the value.

EXAMPLE 4.

Find the following ratios (round to 4 decimal places):

$$\sin 57^\circ = .8389 \quad \cos 23^\circ = .9205 \quad \sin 30^\circ = .5$$

$$\sin 39^\circ = .6293$$

$$\cos 33^\circ = .8389 \quad \sin 67^\circ = .9205 \quad \cos 60^\circ = .5$$

$$\cos 41^\circ = .7547$$

$$\sin 7^\circ = .1218 \quad \cos 55^\circ = .5736 \quad \sin 40^\circ = .6428$$

$$\sin 28^\circ = .4694$$

$$\cos 83^\circ = .1218 \quad \sin 35^\circ = .5736 \quad \cos 50^\circ = .6428$$

$$\cos 62^\circ = .4694$$

If $\angle A + \angle B = 90^\circ$ (ie. complimentary angles)

Then, $\cos A = \sin B$

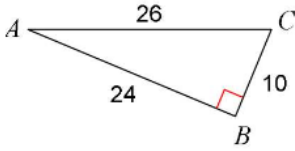
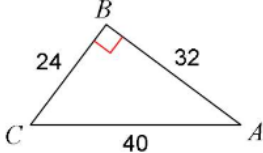
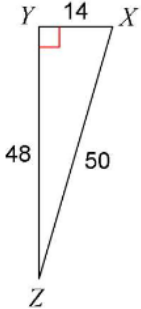
and
 $\sin A = \cos B$

Sin and Cos

hyp ← longest side

Intro to Trig Practice Name: _____ Date: _____

Complete the following. Answers should be in simplest fraction form.

	$\sin A =$ $\cos A =$ $\tan A =$	$\sin C =$ $\cos C =$ $\tan C =$
	$\sin A =$ $\cos A =$ $\tan A =$	$\sin C =$ $\cos C =$ $\tan C =$
	$\sin X =$ $\cos X =$ $\tan X =$	$\sin Z =$ $\cos Z =$ $\tan Z =$

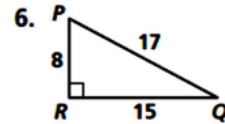
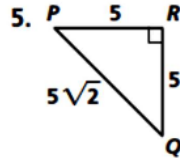
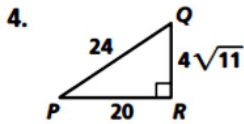
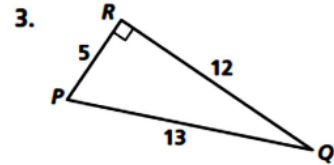
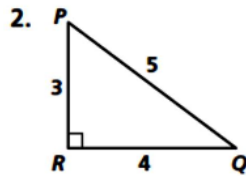
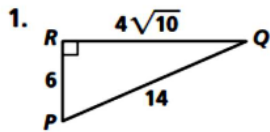
Intro to Trig Practice

Name: _____ Date: _____

Practice 9-2

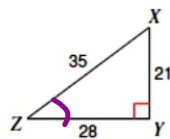
Sine and Cosine Ratio:

Write the ratios for $\sin P$ and $\cos P$.



Find the Trigonometric Ratio. Answer should be in simplest fraction form.

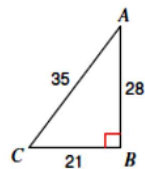
1) $\tan Z$



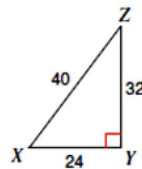
2) $\cos C$



3) $\sin C$



4) $\tan X$



Intro to Trig Practice

Name: _____ Date: _____

Find the value of each. Round your answers to the nearest ten-thousandth.

1) $\sin 32^\circ$

2) $\sin 60^\circ$

3) $\cos 16^\circ$

4) $\cos 35^\circ$

5) $\tan 15^\circ$

6) $\sin 66^\circ$

7) $\sin 40^\circ$

8) $\tan 40^\circ$

9) $\cos 10^\circ$

10) $\sin 34^\circ$

