NOTES

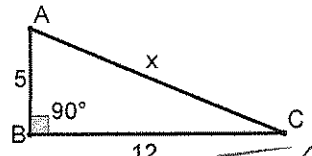
~~Packet~~ Unit 5 Right Triangles Honors Common Core Math 2 1

Day 1: Trigonometric Functions

Warm-Up:

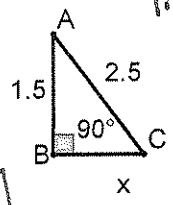
Given the following triangles, find x.

1.



$5^2+12^2=x^2$ $\sqrt{169}=\sqrt{x^2}$ $x=13$

2.

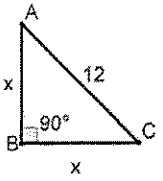


$1.5^2+x^2=2.5^2$

$x^2=4$

$x=2$

3.



$x^2+x^2=12^2$

$\frac{2x^2}{2}=\frac{144}{2}$

$\sqrt{x^2}=\sqrt{72}$

$x=\sqrt{36}\sqrt{2}$

$x=6\sqrt{2}$

Solve for the missing variables

4. $x^2-12x=45$

$x^2-12x-45=0$

$(x-15)(x+3)=0$

$x=15,-3$

5. $\left(y=\frac{1}{2}x-5\right)2$

$2y=x-10$

$-x \quad -x$

$3x+8y=2$

$(-x+2y=10)\cdot 3$

$3x=18$

$x=6$

$3x+8y=2$

$-3x+6y=30$

$14y=-28$

$\frac{14y}{14}=\frac{-28}{14}$

$y=-2$

$3x+8(-2)=2$

6. Simplify $(-5\sqrt{3})^2$

do outside · outside, inside · inside

$(-5\sqrt{3})(-5\sqrt{3})$

$25\sqrt{9}$

$25\cdot 3$

75

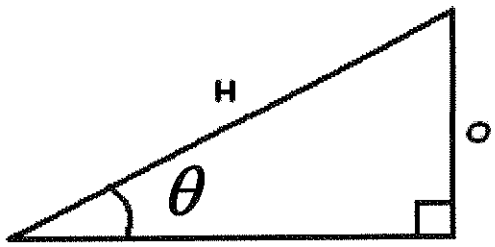
Notes 9.1 and 9.2 - Trigonometric Functions

The trigonometric (trig) functions are Sin, Cosine, and tangent.

These functions can be used to find angle measures, knowing the ratio of the sides

OR length of a side, knowing one side and an angle measure.

They are used only for right triangles!



"theta"

Sin θ = $\frac{\text{opposite}}{\text{hypotenuse}}=\frac{O}{H}$

Cos θ = $\frac{\text{adjacent}}{\text{hypotenuse}}=\frac{A}{H}$

Tan θ = $\frac{\text{opposite}}{\text{adjacent}}=\frac{O}{A}$

O = opposite = side ALL the way across from labeled acute ∠

H = hypotenuse = across from right ∠

A = adjacent = side by acute ∠ but not the hypotenuse

θ = angle measure

SOH CAH TOA ← look at 1st letter of trig function to help pick ratio from acronym

if switch angles, must switch labels

BOLD labels on pic

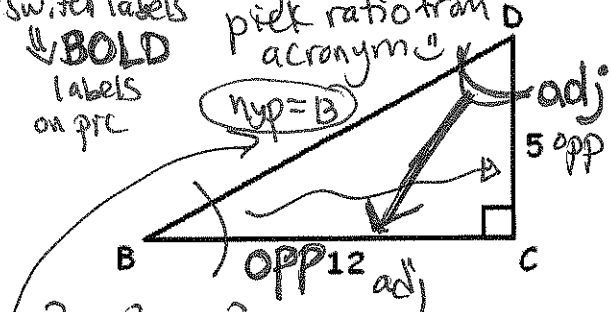
Example 1: tan(∠B) = $\frac{\text{opp}}{\text{adj}}=\frac{5}{12}$ TOA

Example 2: tan(D) = $\frac{12}{5}$ TOA

Example 3: sin D = $\frac{12}{13}$ SOH

Example 4: cos D = $\frac{5}{13}$ CAH

Example 5: cos(B) = $\frac{12}{13}$ CAH



$5^2+12^2=BD^2$ pyth. thm. $BD=13$

NOTES

Puzzle - Practice Ratios

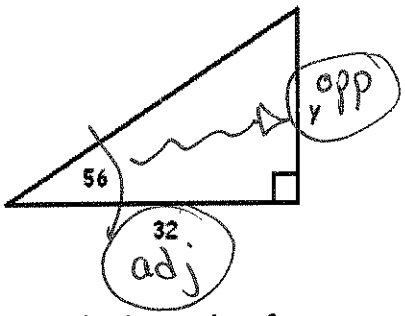
Finding missing side lengths using Trigonometric Ratios

To solve for missing side lengths, set up the trig ratio, and put the trig function over one, then cross-multiply to solve.

this is what we just learned how to do ☺

Use the trig ratios to find the length of the side labeled with a variable. All angle measures for these examples are in degrees. (Remember SOH CAH TOA)

Example 1: Solve for y.



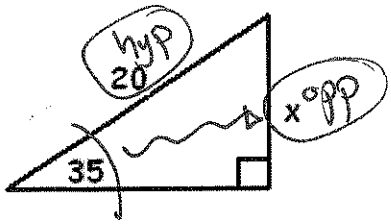
TOA

$\tan(56) = \frac{y}{32}$

$y = 32\tan 56$

$y = 47.4$

Example 2: Solve for x.



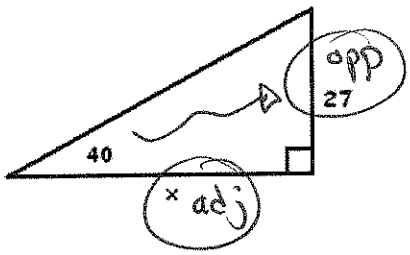
SOH

$\sin(35) = \frac{x}{20}$

$x = 20\sin(35)$

$x = 11.5$

Example 3: Solve for x.



TOA

$\tan(40) = \frac{27}{x}$

$x\tan(40) = 27$

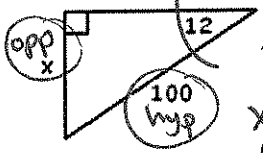
$\frac{x\tan(40)}{\tan(40)} = \frac{27}{\tan(40)}$

$x = 32.2$

* Be careful ... always use the acronym SOH CAH TOA... the variable is sometimes in the bottom!

You try!!

1)



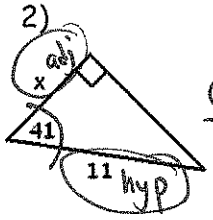
SOH

$\sin(12) = \frac{x}{100}$

$x = 100\sin(12)$

$x = 20.8$

2)



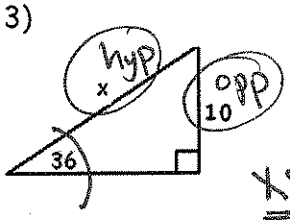
CAH

$\cos(41) = \frac{x}{11}$

$x = 11\cos(41)$

$x = 8.3$

3)



SOH

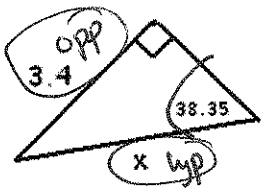
$\sin(36) = \frac{10}{x}$

$x\sin(36) = 10$

$\frac{x\sin(36)}{\sin(36)} = \frac{10}{\sin(36)}$

$x = 17.0$

4)



SOH

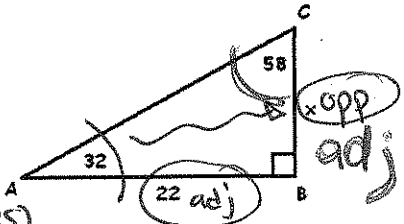
$\sin(38.35) = \frac{3.4}{x}$

$x\sin(38.35) = 3.4$

$\frac{x\sin(38.35)}{\sin(38.35)} = \frac{3.4}{\sin(38.35)}$

$x \approx 5.5$

5)



adj

opp

TOA

$\tan(32) = \frac{x}{22}$

$x = 22\tan(32)$

$x = 13.7$

OLD

OR $\tan(58) = \frac{22}{x}$

$x\tan(58) = 22$

$\frac{x\tan(58)}{\tan(58)} = \frac{22}{\tan(58)}$

$x = \frac{22}{\tan(58)}$