

intermediate Algebra

Lesson 9.1- SWBAT label the sides of a right triangle and find right triangle trig ratios.

Kick off-

1) Complete the square: $x^2 - 8x - 32 = 0$

$+32+32$

$$x^2 - 8x = 32$$

$$(x-4)^2 = 32+16$$

$$\sqrt{(x-4)^2} = \sqrt{48}$$

$$x-4 = \pm \sqrt{48}$$

$\sqrt{16 \cdot 3}$

$$x-4 = \pm 4\sqrt{3}$$

$+4 \quad +4$

$$x = 4 \pm 4\sqrt{3}$$

2) Simplify: $\sqrt{20} + \sqrt{45} - \sqrt{12}$

$\wedge \quad \wedge \quad \wedge$
 $\sqrt{4 \cdot 5} \quad \sqrt{9 \cdot 5} \quad \sqrt{4 \cdot 3}$

$$2\sqrt{5} + 3\sqrt{5} - 2\sqrt{3}$$

$$\underline{\underline{5\sqrt{5} - 2\sqrt{3}}}$$

$\frac{1}{2}(-8) = -4$

$2 \times 2 = 4$
 $3 \times 3 = 9$
 $4 \times 4 = 16$
 $5 \times 5 = 25$

Right Triangle Trigonometry

Trigonometry is incredibly useful to determine heights of mountains, measuring across lakes, creating surveys and so much more.

However, in order to use trigonometry, we must first be able to label the sides of a right triangle based on an angle given. *

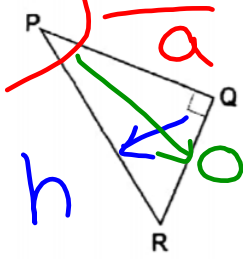
Hypotenuse- Side across from the right angle

Opposite- Side across from the angle given.

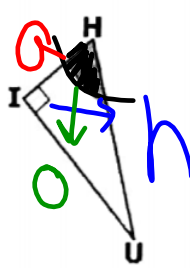
Adjacent- next to the angle given.

Examples: Label the sides of the triangle as adjacent, opposite or hypotenuse when using the angle referenced.

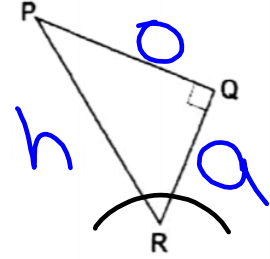
1) Use angle P.



2) Use angle H



3) Use angle R.



Right Triangle Trigonometry

The main 3 trigonometry ratios are:

Sine = $\frac{\text{Opposite}}{\text{hypotenuse}}$ Cosine = $\frac{\text{adjacent}}{\text{hypotenuse}}$ Tangent = $\frac{\text{Opposite}}{\text{Adjacent}}$

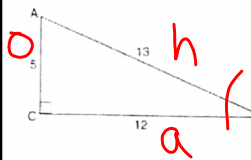
To remember them use:

SOH CAH TOA

$\sin = \frac{O}{H}$ $\cos = \frac{A}{H}$ $\tan = \frac{O}{A}$

Examples: State the ratio as a fraction in lowest terms.

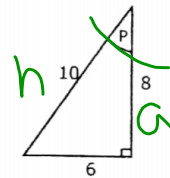
- 4) Find $\sin B$, $\cos B$ and $\tan B$ of the following triangle: *x given*
- 5) Find $\sin P$, $\cos P$ and $\tan P$ of the following triangle:



$\sin B = \frac{O}{H} = \frac{5}{13}$

$\cos B = \frac{A}{H} = \frac{12}{13}$

$\tan B = \frac{O}{A} = \frac{5}{12}$

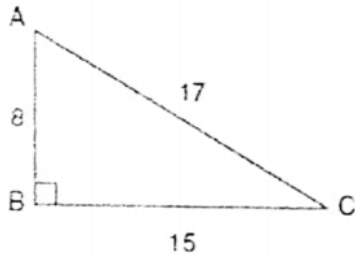


$\sin P = \frac{O}{H} = \frac{8}{10} = \frac{4}{5}$

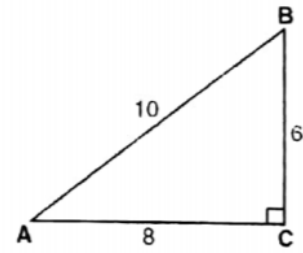
$\cos P = \frac{A}{H} = \frac{6}{10} = \frac{3}{5}$

$\tan P = \frac{O}{A} = \frac{4}{3}$

6) Find $\sin A$, $\cos A$, and $\tan A$ of the following triangle:

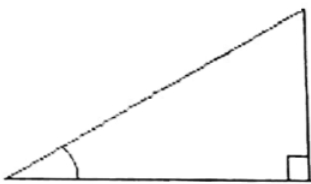


7) Find $\sin B$, $\cos B$, and $\tan B$ of the following triangle:



Directions: Label the sides of the triangles as adjacent, opposite and hypotenuse for each of the following given angles.

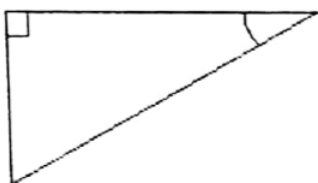
1)



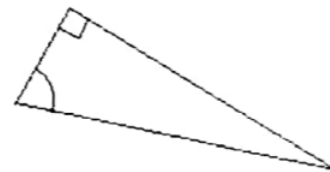
2)



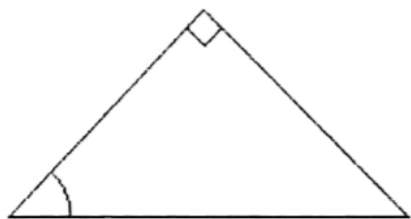
3)



4)



5)

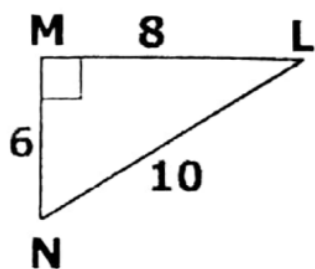


6)

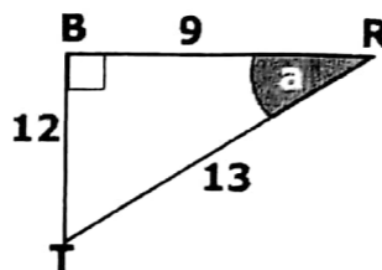


Directions: Solve for the following trigonometric ratios. Be sure to leave your ratios in simplest form.

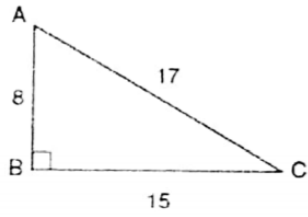
7) Find $\sin N$, $\cos N$, and $\tan N$



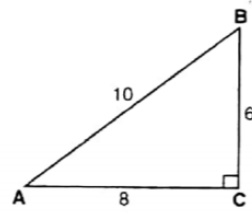
8) Find $\sin R$, $\cos R$, and $\tan R$



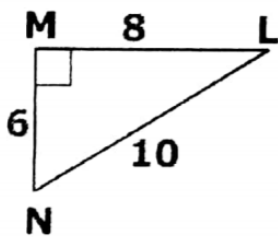
9) Find $\sin C$, $\cos C$, and $\tan C$



10) Find $\sin B$, $\cos B$, and $\tan B$



11) Find $\sin L$, $\cos L$, and $\tan L$



12) In $\triangle XYZ$, $\angle y = 90^\circ$, $XY = 7$, $YZ = 24$, and $XZ = 25$, which ratio represents $\cos x$?