Geometry Note-Taking Guide **Name:**_____

Period:____

Section 7.4 – Trigonometric Ratios

A _____ is a ratio of the lengths of two sides of a <u>right</u> triangle.

The three basic trigonometric ratios are _____, _____, _____, which are abbreviated as _____, _____, _____, respectively.

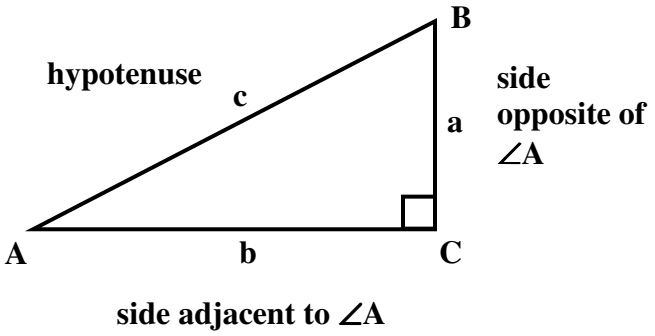
Trigonometric Ratios

Let ΔABC be a <u>right triangle</u>. The sine, the cosine, and the tangent of the acute angle $\angle A$ are defined as follows.

$$\sin A = \frac{\text{side opposite of } \angle A}{\text{hypotenuse}} = \frac{a}{c}$$

$$\cos A = \frac{\text{side adjacent to } \angle A}{\text{hypotenuse}} = \frac{b}{c}$$

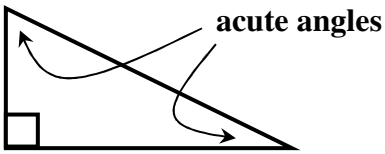
$$\tan A = \frac{\text{side opposite of } \angle A}{\text{side adjacent to } \angle A} = \frac{a}{b}$$



Acronym to help remember trig ratios:_____

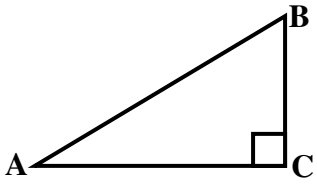
<u>Big Question</u>: What is the purpose of trigonometric ratios?

Trig ratios are only applied to the acute angles of a right triangle. If you know the measure of <u>one acute angle</u> of a right triangle and you know <u>one side length</u>, then <u>you can solve for the other two side lengths</u>.

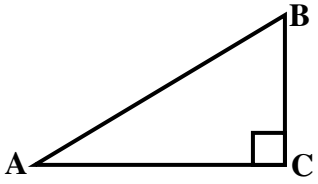


Ex 1:

a) Label the sides that in relation to $\angle A$ are opposite, adjacent, and the hypotenuse.

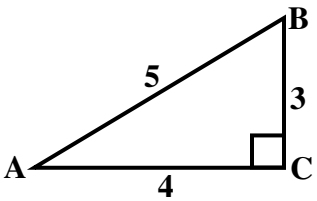


b) Label the sides that in relation to $\angle B$ are opposite, adjacent, and the hypotenuse.



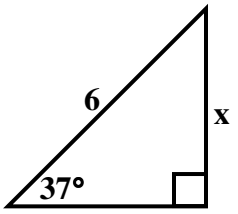
Ex 2:

Find the sine, cosine, and tangent of angle A and angle B.

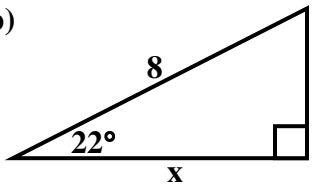


Ex 3:
Find the value of each variable.

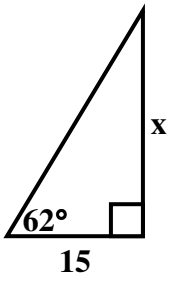
a)



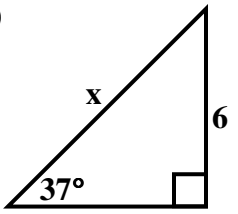
b)



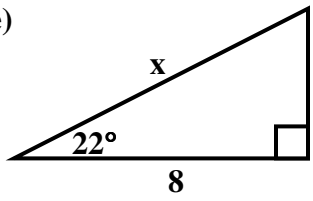
c)



d)



e)



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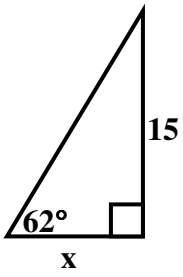
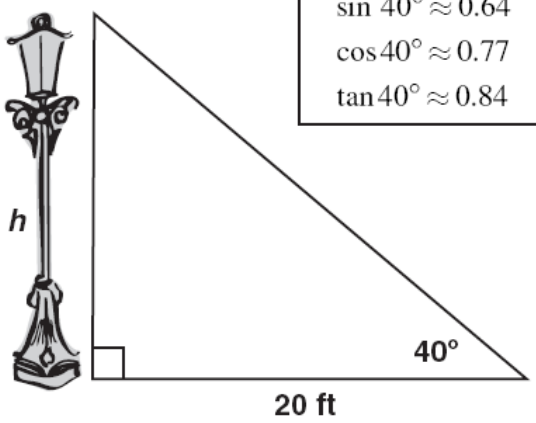


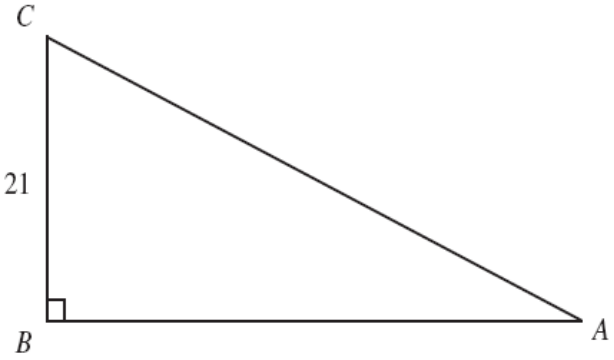
Ex 4:

a) **Approximately how many feet tall is the streetlight?**

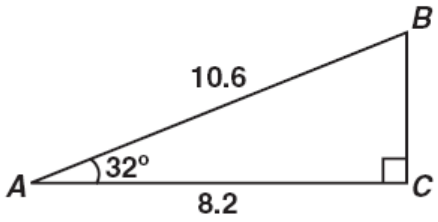
$\sin 40° \approx 0.64$
$\cos 40° \approx 0.77$
$\tan 40° \approx 0.84$



b) **In the figure below, $\sin A = 0.7$. What is the length of $\overline{AC}$?**



c) **Right triangle ABC is pictured below.**



Which equation gives the correct value for BC?

A $\sin 32° = \frac{BC}{8.2}$

B $\cos 32° = \frac{BC}{10.6}$

C $\tan 58° = \frac{8.2}{BC}$

D $\sin 58° = \frac{BC}{10.6}$

d) **In the figure below, if $\sin x = \frac{5}{13}$, what are $\cos x$ and $\tan x$?**