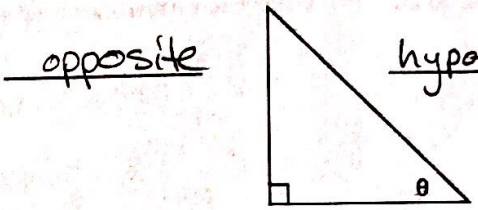
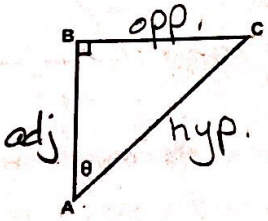
Geometry
Trigonometric Ratios

Name / Date_____

Triangle Sides (based on θ)

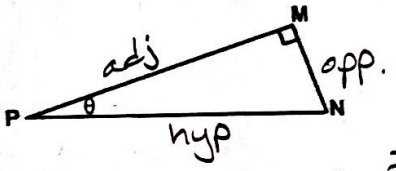




Which side is the hypotenuse? $\overline{AC}$

Which leg is opposite θ? $\overline{BC}$

Which leg is adjacent to θ? $\overline{AB}$

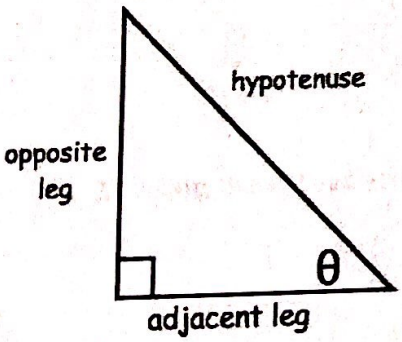


Which side is the hypotenuse? $\overline{PN}$

Which leg is opposite θ? $\overline{MN}$

Which leg is adjacent to θ? $\overline{PM}$

What are the Trigonometric Ratios?



sine (sin)	$\frac{\text{opposite}}{\text{hypotenuse}}$
Cosine (cos)	$\frac{\text{adjacent}}{\text{hypotenuse}}$
Tangent (tan)	$\frac{\text{opposite}}{\text{adjacent}}$
	$\frac{\sin}{\cos}$

$\frac{opp}{hyp} \cdot \frac{hyp}{adj} = \frac{opp}{adj}$

SohCahToa

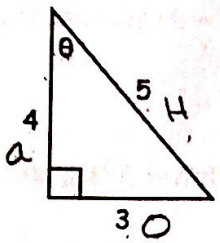
SOH ___sin___ equals ___opp.___ over ___hyp.___

CAH ___cos___ equals ___adj.___ over ___hyp___

TOA ___tan___ equals ___opp.___ over ___adj___

SOHCAHTOA

How do we use these ratios?



$\sin\theta = \frac{o}{h} = \frac{3}{5}$

$\cos\theta = \frac{a}{h} = \frac{4}{5}$

$\tan\theta = \frac{o}{a} = \frac{3}{4}$

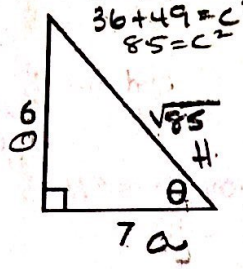
$\frac{12}{4\sqrt{13}} = \frac{3}{\sqrt{13}} \cdot \frac{\sqrt{13}}{\sqrt{13}} = \frac{3\sqrt{13}}{13}$

Find the missing side and evaluate each for sin θ, cos θ, and tan θ.

$6^2+7^2=c^2$

$36+49=c^2$

$85=c^2$



$\sin\theta = \frac{o}{h} = \frac{6}{\sqrt{85}} \cdot \frac{\sqrt{85}}{\sqrt{85}} = \frac{6\sqrt{85}}{85}$

$\cos\theta = \frac{a}{h} = \frac{7}{\sqrt{85}} \cdot \frac{\sqrt{85}}{\sqrt{85}} = \frac{7\sqrt{85}}{85}$

$\tan\theta = \frac{o}{a} = \frac{6}{7}$

$8^2+12^2=c^2$

$64+144=c^2$

$208=c^2$

$c=\sqrt{208}=\sqrt{16\cdot 13}$

$=4\sqrt{13}$

$\sin\theta = \frac{o}{h} = \frac{12}{4\sqrt{13}} = \frac{3\sqrt{13}}{13}$

$\cos\theta = \frac{a}{h} = \frac{8}{4\sqrt{13}} = \frac{2\sqrt{13}}{13}$

$\tan\theta = \frac{o}{a} = \frac{12}{8} = \frac{3}{2}$

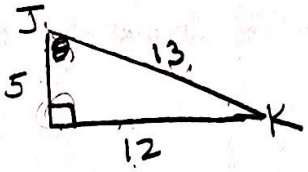
$\frac{2\cancel{8}}{1\cancel{4}\sqrt{13}} = \frac{2}{\sqrt{13}} \cdot \frac{\sqrt{13}}{\sqrt{13}} = \frac{2\sqrt{13}}{13}$

How would you solve the following problem?

Suppose ∠J and ∠K are ~~complementary~~ angles in a right triangle. The value of $\tan J = \frac{12}{5}$ → total 90° $\frac{o}{a}$

What is the value of sin J?

1. Draw and label a triangle for the problem.



2. Use the given trig ratio to label the lengths of two sides. Then use the Pythagorean Theorem to find the third side.

$5^2+12^2=c^2$

$25+144=c^2$

$169=c^2$

$c=13$

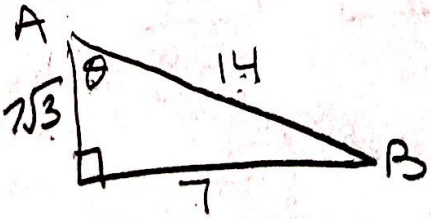
3. Using the measures of the sides of the triangle, find sin J.

$\sin J = \frac{12}{13}$

Try this one...

Suppose ∠A and ∠B are complementary angles in a right triangle. The value of $\sin A = \frac{7}{14}$ $\frac{o}{h}$

What is the value of cos A?



$c = \frac{a}{h}$

$\cos A = \frac{7\sqrt{3}}{14} = \frac{\sqrt{3}}{2}$

$7^2+b^2=14^2$

$49+b^2=196$

$b^2=147$

$b=\sqrt{147}$

$b=\sqrt{49\cdot 3}$

$b=7\sqrt{3}$