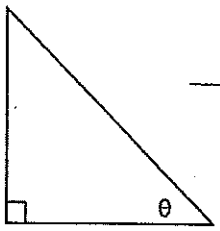
Geometry
Guided Notes – Trigonometric Ratios

Name: Key
Date: _____

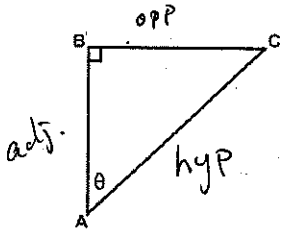
Triangle Sides (based on θ)



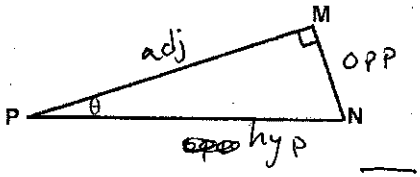
Opposite leg _____

____hypotenuse_

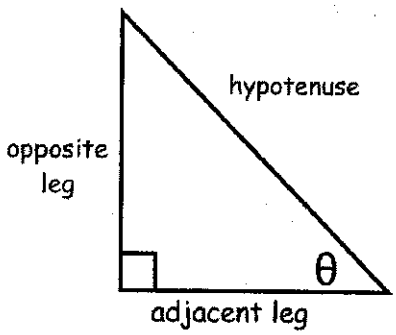
adjacent leg



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? $\overline{NP}$
Which leg is opposite θ? $\overline{MN}$
Which leg is adjacent to θ? $\overline{MP}$



What are the Trigonometric Ratios?

Sine	$\frac{\text{opposite}}{\text{hypotenuse}}$
Cosine	$\frac{\text{adjacent}}{\text{hypotenuse}}$
Tangent	$\frac{\text{opposite}}{\text{adjacent}}$
	$\frac{\sin}{\cos}$

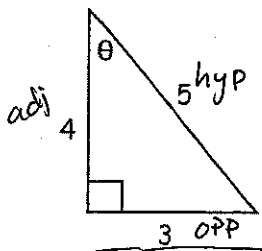
SohCahToa

SOH **Sine** equals opposite over hypotenuse

CAH **Cosine** equals adjacent over hypotenuse

TOA **Tangent** equals opposite over adjacent

How do we use these ratios?

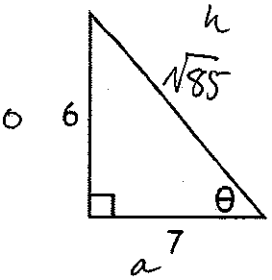


$\sin\theta = \frac{OPP}{hyp} = \frac{3}{5}$

$\cos\theta = \frac{adj}{hyp} = \frac{4}{5}$

$\tan\theta = \frac{OPP}{adj} = \frac{3}{4}$

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



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

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

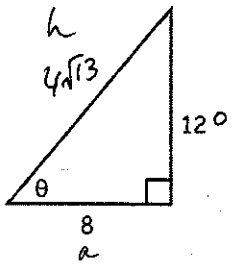
$\tan\theta = \frac{o}{a} = \frac{6}{7}$

1) $6^2 + 7^2 = c^2$

$36 + 49 = c^2$

$\sqrt{85} = \sqrt{c^2}$

$c = \frac{3\sqrt{13}}{13}$



$\sin\theta = \frac{o}{h} = \frac{12}{4\sqrt{13}} \cdot \frac{\sqrt{13}}{\sqrt{13}} = \frac{12\sqrt{13}}{52}$

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

$\tan\theta = \frac{o}{a} = \frac{12}{8} = \frac{6}{4} = \frac{3}{2}$

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

$64 + 144 = c^2$

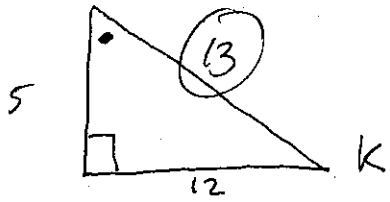
$\sqrt{208} = \sqrt{c^2}$

$4\sqrt{13} = c$

How would you solve the following problem?

Suppose ∠J and ∠K are complementary angles in a right triangle. The value of $\tan J = \frac{12}{5}$. What is the value of sin J? add to 90°

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.

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

$25 + 144 = c^2$

$169 = c^2$

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

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