Notes – Connecting Triangles & Trig	Name: KEY	

Objective: I understand how and why trig ratios remain constant, no matter the size of the special right triangle.

Review & Warm Up

Simplify the following expressions.

1. $\sqrt{20}$

$\sqrt{4}\sqrt{5}$

$2\sqrt{5}$

2. $\frac{6\sqrt{10}}{2}$

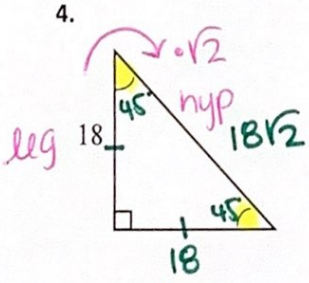
$3\sqrt{10}$

3. $\frac{2}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}}$

$\frac{2\sqrt{3}}{\sqrt{9}} = \frac{2\sqrt{3}}{3}$

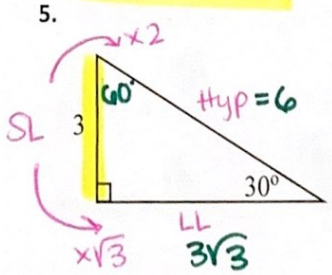
Find the missing side lengths of each of the special right triangles. (45°-45°-90° / 30°-60°-90°)

4.



Hyp = leg · √2

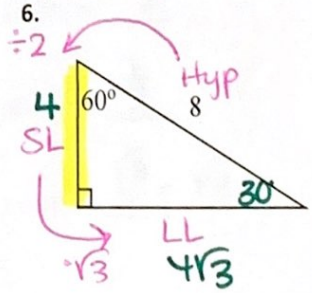
5.



Hyp = 2 · SL

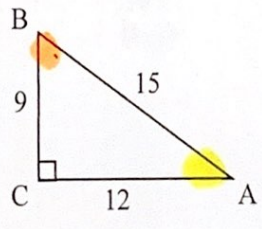
LL = SL · √3

6.



Find the indicated trig ratio(s). ⇒ $S_H^O C_H^A T_A^O$

7.



$sin(A) = \frac{9}{15} = \frac{3}{5}$

$cos(A) = \frac{12}{15} = \frac{4}{5}$

$tan(A) = \frac{9}{12} = \frac{3}{4}$

$sin(B) = \frac{12}{15} = \frac{4}{5}$

$cos(B) = \frac{9}{15} = \frac{3}{5}$

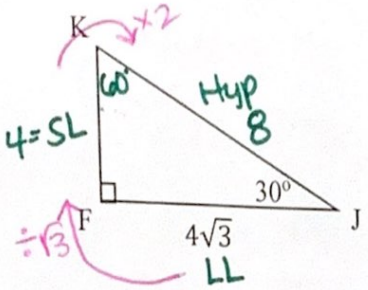
$tan(B) = \frac{12}{9} = \frac{4}{3}$

Explore

All of the following are special right triangles. Find each of the indicated trig ratios. Simplify your answers.

SOHCAHTOA

8.



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

$\cos(J) = \frac{4\sqrt{3}}{8} = \frac{\sqrt{3}}{2}$

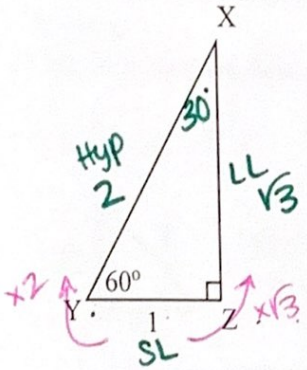
$\tan(J) = \frac{4}{4\sqrt{3}} = \frac{1}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{\sqrt{3}}{3}$

$\sin(K) = \frac{4\sqrt{3}}{8} = \frac{\sqrt{3}}{2}$

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

$\tan(K) = \frac{4\sqrt{3}}{4} = \sqrt{3}$

9.



$\sin(X) = \frac{1}{2}$

$\cos(X) = \frac{\sqrt{3}}{2}$

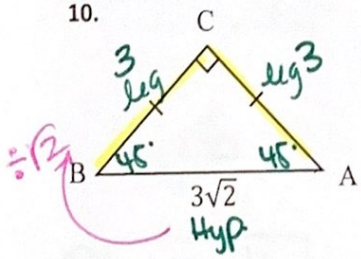
$\tan(X) = \frac{1}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{\sqrt{3}}{3}$

$\sin(Y) = \frac{\sqrt{3}}{2}$

$\cos(Y) = \frac{1}{2}$

$\tan(Y) = \frac{\sqrt{3}}{1} = \sqrt{3}$

10.



$\sin(A) = \frac{3}{3\sqrt{2}} = \frac{1}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{2}}{2}$

$\cos(A) = \frac{3}{3\sqrt{2}} = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$

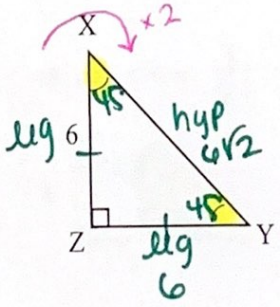
$\tan(A) = \frac{3}{3} = 1$

$\sin(B) = \frac{3}{3\sqrt{2}} = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$

$\cos(B) = \frac{3}{3\sqrt{2}} = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$

$\tan(B) = \frac{3}{3} = 1$

11.



$\sin(X) = \frac{6}{6\sqrt{2}} = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$

$\cos(X) = \frac{6}{6\sqrt{2}} = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$

$\tan(X) = \frac{6}{6} = 1$

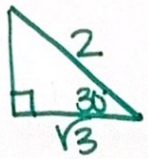
$\sin(Y) = \frac{\sqrt{2}}{2}$

$\cos(Y) = \frac{\sqrt{2}}{2}$

$\tan(Y) = 1$

Summary

$sin(30°) = 1/2$	$sin(60°) = \sqrt{3}/2$	$sin(45°) = \sqrt{2}/2$
$cos(30°) = \sqrt{3}/2$	$cos(60°) = 1/2$	$cos(45°) = \sqrt{2}/2$
$tan(30°) = \sqrt{3}/3$	$tan(60°) = \sqrt{3}$	$tan(45°) = 1$

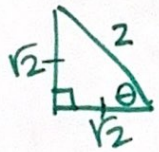
30-60-90 

45-45-90 

Practice

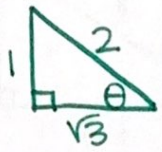
Find each unknown measure *without* using a calculator. It may be helpful to draw a picture if not provided.

12. $sin(\theta) = \frac{\sqrt{2}}{2}$ $\theta = ?$ 45°

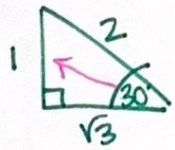


$(\sqrt{2})^2 + x^2 = 2^2$
$2 + x^2 = 4$
$\sqrt{x^2} = \sqrt{2} \Rightarrow x = \sqrt{2}$

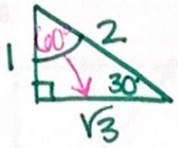
13. $cos(\theta) = \frac{\sqrt{3}}{2}$ $\theta = ?$ 30°



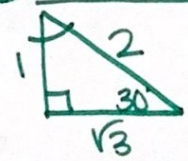
14. $sin(30°) = 1/2$



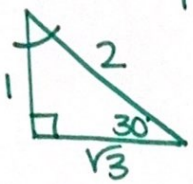
15. $sin(60°) = \sqrt{3}/2$



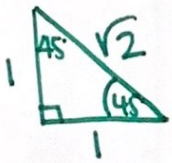
16. $cos(60°) = 1/2$



17. $tan(60°) = \frac{\sqrt{3}}{1} = \sqrt{3}$



18. $cos(45°) = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$



19. $tan(45°) = \frac{1}{1} = 1$