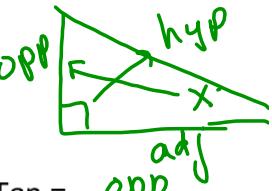
Sine (sin) / Cosine (cos) / Tangent (tan)

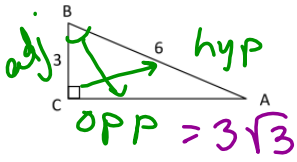
To remember the trigonometric ratio we can use the following saying:

SOH-CAH-TOA



Sin = $\frac{opp}{hyp}$ Cos = $\frac{adj}{hyp}$ Tan = $\frac{opp}{adj}$

1. Using the triangle below express sine-cosine-tangent.



sin A = $\frac{3}{6} = \frac{1}{2}$ sin B = $\frac{3\sqrt{3}}{6} = \frac{\sqrt{3}}{2}$

cos A = $3\sqrt{3}/6$ cos B = $3/6 = \frac{1}{2}$

tan A = $3/3\sqrt{3} = \frac{\sqrt{3}}{3}$ tan B = $\frac{3\sqrt{3}}{3} = \sqrt{3}$

$3^2 + x^2 = 6^2$

$9 + x^2 = 36$

$\sqrt{x^2} = \sqrt{27}$

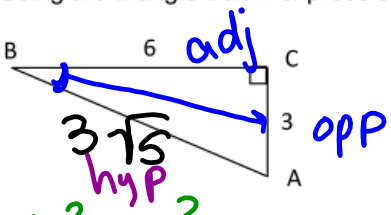
$x = 3\sqrt{3}$

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

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

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

2. Using the triangle below express sine-cosine-tangent. NO DECIMALS!



sin A = $\frac{6}{3\sqrt{5}} = \frac{2}{\sqrt{5}} = \frac{2\sqrt{5}}{5}$ sin B = $\frac{3}{3\sqrt{5}} = \frac{\sqrt{5}}{5}$

cos A = $3/3\sqrt{5} = \frac{\sqrt{5}}{5}$ cos B = $\frac{6}{3\sqrt{5}} = \frac{2\sqrt{5}}{5}$

tan A = $\frac{6}{3} = 2$ $\frac{3}{6} = \frac{1}{2}$

$a^2 + b^2 = c^2$

$3^2 + 6^2 = c^2$

$9 + 36 = c^2$

3. The cos 60° is 1/2 . What does this mean? Your explanation should include something about the sides of a right triangle.

$\cos 60^\circ = \frac{1}{2}$

4. In ΔMOP, $\angle O$ is the right angle. Suppose $\sin P = \frac{7}{25}$. Find $\sin M$ and $\cos P$.

$7^2 + b^2 = 25^2$

$49 + b^2 = 625$

$\sqrt{b^2} = \sqrt{574}$

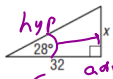
$b = 24$

$\sin M = \frac{24}{25}$

$\cos P = \frac{24}{25}$

Examples: Find the missing side lengths.

10.



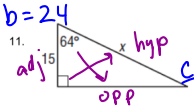
SOHCAHTOA

$\tan 28° = \frac{x}{32}$

$32 \tan 28 = 1x$

$17.01 = x$

11.



$\cos 64 = \frac{15}{x}$

$x \cos 64 = 15$

$\frac{x \cos 64}{\cos 64} = \frac{15}{\cos 64}$

$x = \frac{15}{\cos 64}$

$= 34.22$

12.

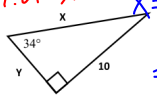
$\sin 43 = \frac{x}{55}$

$37.5 = x$

$\cos 43 = \frac{y}{55}$

$40.22 = y$

13.



15. A 15-foot ladder leans against a wall. The **angle of elevation** (the angle between the ladder and ground) is 70°. How far up the wall does the ladder reach?

$\sin 70 = \frac{x}{15}$

$15 \sin 70 = x$

$14.1 = x$