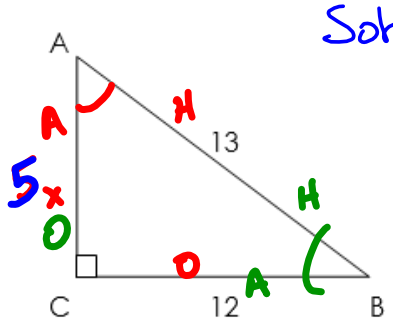
# Day 1: Right Triangles

$\sin(A) = \frac{opp}{hyp}$ $\cos(A) = \frac{adj}{hyp}$ $\tan(A) = \frac{opp}{adj}$ $a^2 + b^2 = c^2$

What mnemonic do you use?

SohCahToa $S\frac{O}{H}\ C\frac{A}{H}\ T\frac{O}{A}$



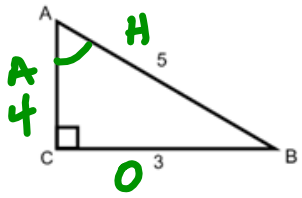

$x^2 + 12^2 = 13^2$
$x^2 + 144 = 169$
$x^2 = 25$
$x = 5$

$\sin(A) = \frac{12}{13}$ $\sin(B) = \frac{5}{13}$

$\cos(A) = \frac{5}{13}$ $\cos(B) = \frac{12}{13}$

$\tan(A) = \frac{12}{5}$ $\tan(B) = \frac{5}{12}$

1. Find sin(A), cos(A), tan(A) and m∠A to nearest degree.

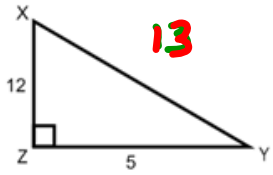



$3^2 + x^2 = 5^2$
$9 + x^2 = 25$
$x^2 = 16$
$x = 4$

{3, 4, 5}
{5, 12, 13}
{8, 15, 17}

$\sin(A) = 3/5$
$\cos(A) = 4/5$
$\tan(A) = 3/4$
$m\angle A = \sin^{-1}(3/5) = 37°$

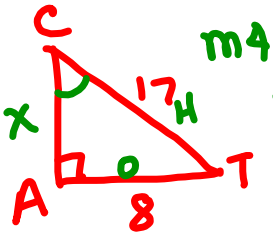
2. Find cos(X), sin(X), tan(Y) and m∠X to nearest degree.




$\cos(X) = 12/13$
$\sin(X) = 5/13$
$\tan(Y) = 12/5$
$m\angle X = \cos^{-1}(12/13) = 23°$ or $\sin^{-1}(5/13)$

3. Given △CAT with hypotenuse CT. The side opposite ∠C is 8 units long and the hypotenuse is 17 units long.

a. Find m∠ C to nearest degree




$m\angle C = \sin^{-1}(8/17)$

$m\angle C = 28°$

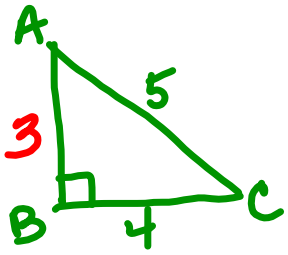
b. Use m∠ C to find side CA

$\frac{\cos(28°)}{1} = \frac{x}{17}$

$x = 17\cos(28)$

$x = 15$

4. Sketch triangle ABC, where angle B is the right angle and $\sin(A) = \frac{4}{5}$ (O/H). Then find cos(A) and tan(A).

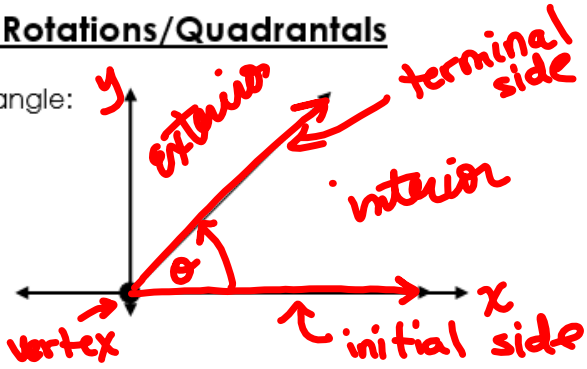



$\cos(A) = 3/5$

$\tan(A) = 4/3$

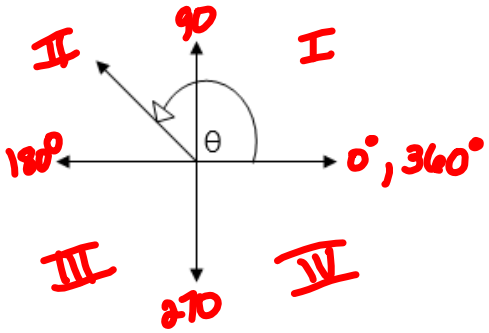
## Angle of Rotations/Quadrantals

Parts of an angle:




Standard Position: The initial side of the angle is on the positive X-axis

θ = Greek letter "theta" (a variable commonly used for angles)




Measures of ∠ θ in:

Quad I $0° < \theta < 90°$

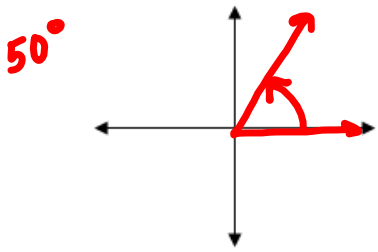
Quad II $90° < \theta < 180°$

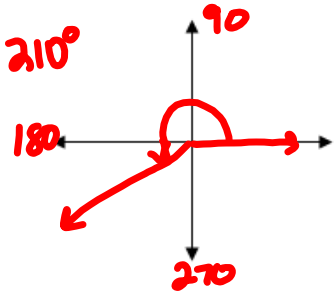
Quad III $180° < \theta < 270°$

Quad IV $270° < \theta < 360°$

**Degree Measure**

Positive angle: counter-clockwise direction




Negative angle: clockwise direction