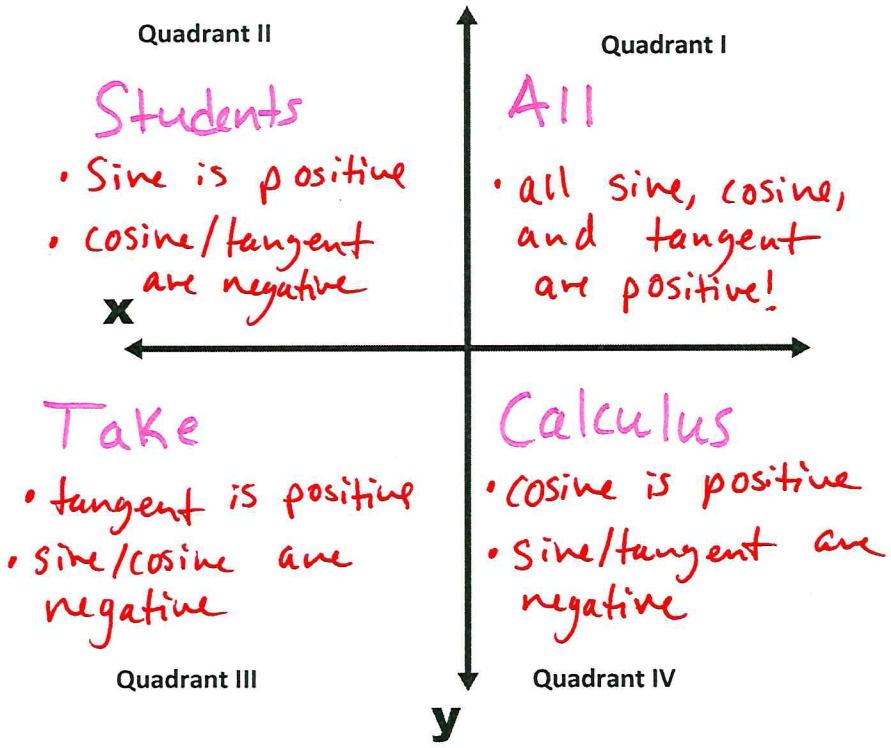
Name: Key Hour: ____ Date: _____

Using Pythagorean Identities Notes



Steps for Finding Trig Identities Using Pythagorean Identities:

- Determine Quadrant
- Sketch/label triangle
- Find missing side using pythagorean theorem
- Write two missing ratios.

Quick Pythagorean Theorem Review:

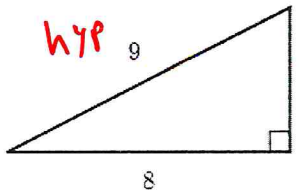
What does it do?

Pythagorean Theorem allows us to find the missing side length of a right triangle

Formula:

$(\text{leg})^2 + (\text{leg})^2 = (\text{hypotenuse})^2$

Ex:



leg

$8^2 + x^2 = 9^2$

$64 + x^2 = 81$

$-64 \quad -64$

$x^2 = 17$

$x = \sqrt{17}$

Finding Trig Ratios Using Pythagorean Identities Examples:

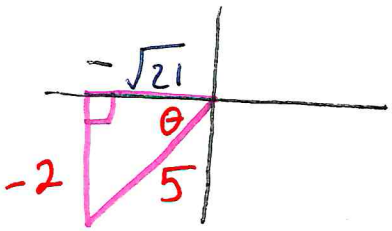
DIRECTIONS: Given one trig ratio and limited information about a second, find the remaining trig ratio for the angle ϑ.

1) Given that $sin\theta = -\frac{2}{5}$ and cosine is negative.

Sine is negative
Cosine is negative

QIII

$\sin\theta = \frac{-2}{5}$ ← opp, ← hyp



$(-2)^2 + x^2 = (5)^2$

$4 + x^2 = 25$

$x^2 = 21$

$x = \sqrt{21}$

$\cos\theta = \frac{-\sqrt{21}}{5}$

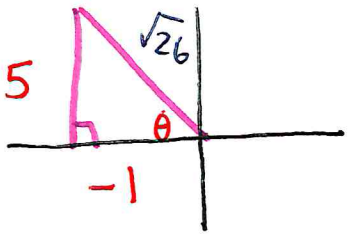
$\tan\theta = \frac{-2}{-\sqrt{21}} \cdot \frac{\sqrt{21}}{\sqrt{21}} = \frac{2\sqrt{21}}{21}$

2) Given that $tan\theta = -5$ and sine is positive.

tangent is negative
sine is positive

QII

$\tan\theta = \frac{-5}{1}$ ← opp, ↖ adj



$(5)^2 + (-1)^2 = c^2$

$25 + 1 = c^2$

$26 = c^2$

$\sqrt{26} = c$

$\sin\theta = \frac{5}{\sqrt{26}} \cdot \frac{\sqrt{26}}{\sqrt{26}} = \frac{5\sqrt{26}}{26}$

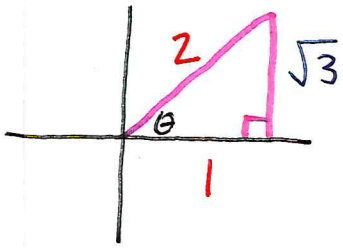
$\cos\theta = \frac{-1}{\sqrt{26}} \cdot \frac{\sqrt{26}}{\sqrt{26}} = -\frac{\sqrt{26}}{26}$

3) Given that $cos\theta = \frac{1}{2}$ and tangent is positive.

Cosine is positive
tangent is positive

QI

$\cos\theta = \frac{1}{2}$ ← adj, ↖ hyp



$(1)^2 + x^2 = 2^2$

$1 + x^2 = 4$

$x^2 = 3$

$x = \sqrt{3}$

$\sin\theta = \frac{\sqrt{3}}{2}$

$\tan\theta = \frac{\sqrt{3}}{1} = \sqrt{3}$