* $\sin 45 = \frac{\sqrt{2}}{2}$ $\text{cosine } 45 = \frac{\sqrt{2}}{2}$ $\tan 45 = 1$

$\frac{\frac{1}{2}}{\sqrt{3}/2}$

$\frac{1}{2} \cdot \frac{2}{\sqrt{3}}$

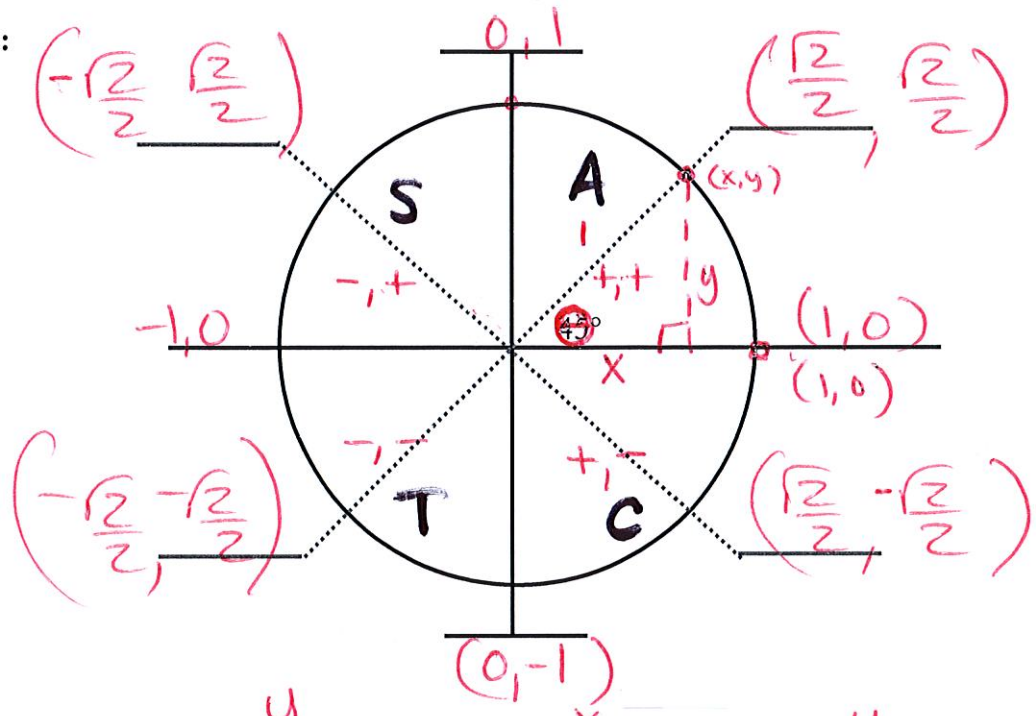
* $\sin 30 = 1/2$ * $\cos 30 = \sqrt{3}/2$ $\tan 30 = \sqrt{3}/3$

$\sin 60 = \sqrt{3}/2$ $\cos 60$ $1/2$ $\tan 60 = \sqrt{3}$

KNOW!

5.3 Circular Functions

Unit Circle:



$\sin\theta = \frac{y}{r}$ $\cos\theta = \frac{x}{r}$ $\tan\theta = \frac{y}{x}$

Notice since $x = \cos\theta$ and $y = \sin\theta$

$x^2 + y^2 = 1$ so $\sin^2\theta + \cos^2\theta = 1$ is an Identity

Notice since $\sin\theta$ = y that sine is positive in quadrant one and two.

Also $\cos\theta$ is = x and that is positive in quadrant one and four.

Since tangent is = $\frac{\sin\theta}{\cos\theta}$ it is positive in one and three.

1. Find each value:

a) $\sin\pi$ b) $\cos\frac{3\pi}{2}$ c) $\cos -90°$ d) $\sin 90°$

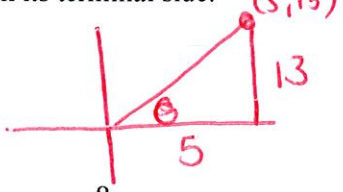
2. Sine and Cosine Functions of an Angle is Standard Position

For any angle in standard position with measure θ, a point P (x, y) on its terminal side, and $r = \sqrt{x^2 + y^2}$, the sine and cosine functions of θ are as follows:

$\cos\theta = \frac{x}{r}$ $\sin\theta = \frac{y}{r}$

Make sure to get radical out of denominator.

3. Find the values of the sine and cosine functions of an angle in standard position with measure θ if the point with coordinates (5, 13) lies on its terminal side.



Draw a triangle. Find the missing side.

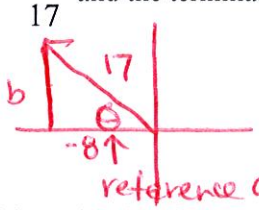
$5^2 + 13^2 = r^2$ $r = \sqrt{194}$

$\sin\theta = 13/\sqrt{194}$ $\cos\theta = 5/\sqrt{194}$

4. Find the $\sin\theta$ when $\cos\theta = -\frac{8}{17}$ and the terminal side of θ is in the second quadrant.

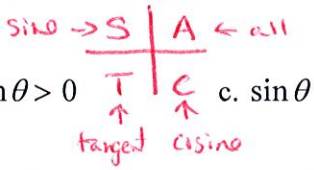
$(-8)^2 + b^2 = 17^2$

$b = 15$



$\sin\theta = 15/17$

5. Suppose θ is in standard position with the given conditions. State the quadrant or quadrants in which the terminal side of θ lie.



a. $\sin\theta > 0$ I, II

b. $\tan\theta > 0$ I, III

c. $\sin\theta < 0, \cos\theta < 0$ III

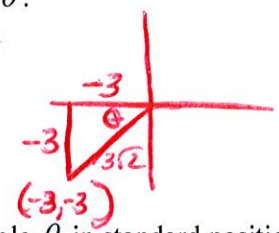
d. $\tan\theta > 0, \cos\theta > 0$ I

6. The terminal side of an angle θ in standard position contains the point with coordinates (-3, -3). Find $\sin\theta$, $\cos\theta$, and $\tan\theta$.

$(-3)^2 + (-3)^2 = r^2$

$18 = r^2$

$3\sqrt{2} = r$



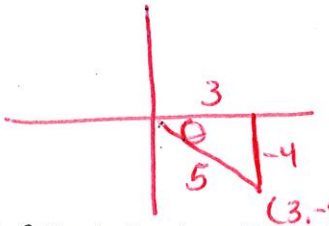
$\sin\theta = -\sqrt{2}/2$

$\cos\theta = -\sqrt{2}/2$

$\tan\theta = 1$

the reference angle is 45°

7. The terminal side of an angle θ in standard position contains the point with coordinates (3, -4). Find $\tan\theta$, $\sin\theta$, $\cos\theta$, ~~and $\tan\theta$~~.



$3^2 + (-4)^2 = r^2$

$5 = r$

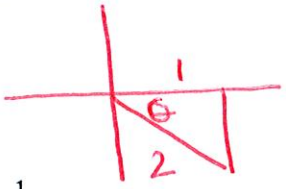
$\sin\theta = -4/5$

$\cos\theta = 3/5$

$\tan\theta = -4/3$

8. If $\cos\theta = \frac{1}{2}$ and θ lies in Quadrant IV, find $\sin\theta$ and $\tan\theta$.

Only cosine is positive in Quad IV

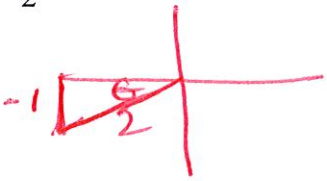


$\theta = 60^\circ$

$\sin\theta = -\sqrt{3}/2$

$\tan\theta = -\sqrt{3}$

9. If $\sin\theta = -\frac{1}{2}$ and θ lies in Quadrant III, find $\cos\theta$ and $\tan\theta$.



$\theta = 30^\circ$

$\cos\theta = -\sqrt{3}/2$

$\tan\theta = +\sqrt{3}/3$

tan is positive in Quad III

HW Page 260 # 23, 25, 27, 29, 30-32, 34-41 all