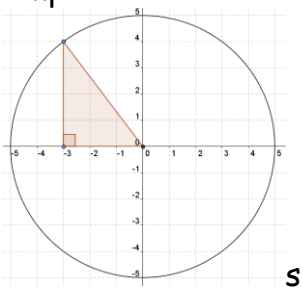
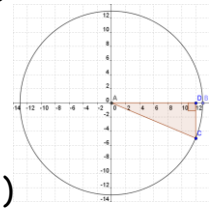
5.2 THE SINE AND COSINE FUNCTIONS AND THE UNIT CIRCLE (PART I)

Example:

1)  sin(θ)=4/5 cos(θ) =-3/5

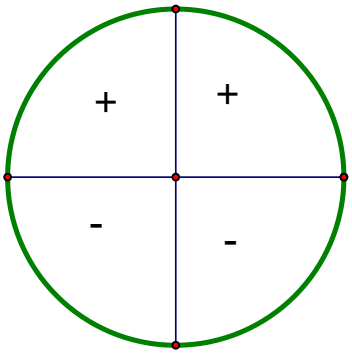
2)  cos(θ) =12/13

3)

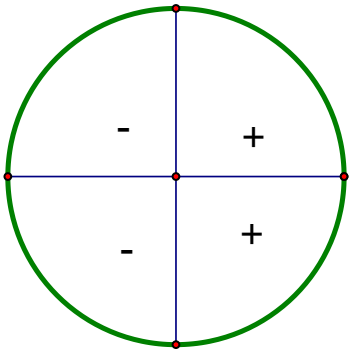
θ (degrees)	θ (radians)	$\sin\theta$	$\cos\theta$
0°	**0**	**0**	**1**
90°	$\frac{\pi}{2}$	**1**	**0**
180°	**π**	**0**	**-1**
270°	$\frac{3\pi}{2}$	**-1**	**0**
360°	**2π**	**0**	**1**

4)

a)



sin θ = *y*



cos θ = *x*

b) ___Sinθ increases from 0 to 1_____

c) Same as above for cos θ. __ Cosθ decreases from 1 to 0_____

5) a) $\sin\theta > 0$ *and* $\cos\theta < 0$ ___II____

b) $\sin\theta < 0$ *and* $\cos\theta < 0$ _III_

c) $\sin\theta < 0$ *and* $\cos\theta > 0$ ___IV____

6) $(\cos\theta)^2 + (\sin\theta)^2 = 1$ The Pythagorean theorem applies. Coordinates create right triangles, in those right triangles $x^2+y^2=1$. As cos(θ)=x sin(θ)=y, then $(\cos\theta)^2 + (\sin\theta)^2 = 1$

7) 90° + 360*n or $\frac{\pi}{2} + 2\pi * n$, where n is an integer.

8) **218°** θ'=_38°___ 9) **160°** θ'=20°____

10) **315°** θ'=_45°___ 11) **695°** θ'=_25°___

12) __No, 95° is greater than 90°. All reference angles are acute

13) _$\frac{4\pi}{3}$_____

14) a) _.2079_____ b) .2079__

15) a) .8191____ b) _-35°_____. .8191___

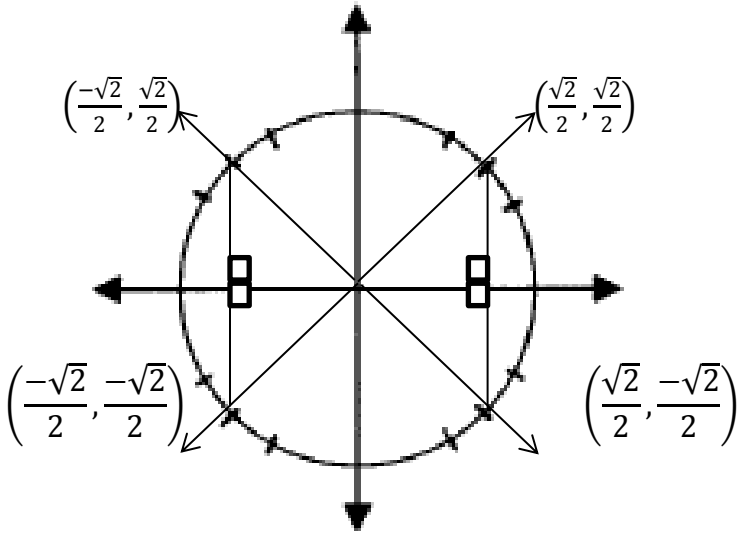
C)_____-.8191, it is negative because in quadrant 3 cosines are negative.

16) a) **sin 150°** _.5__ b) **sin 210°** -.5_ c) **sin 330°** -.5_

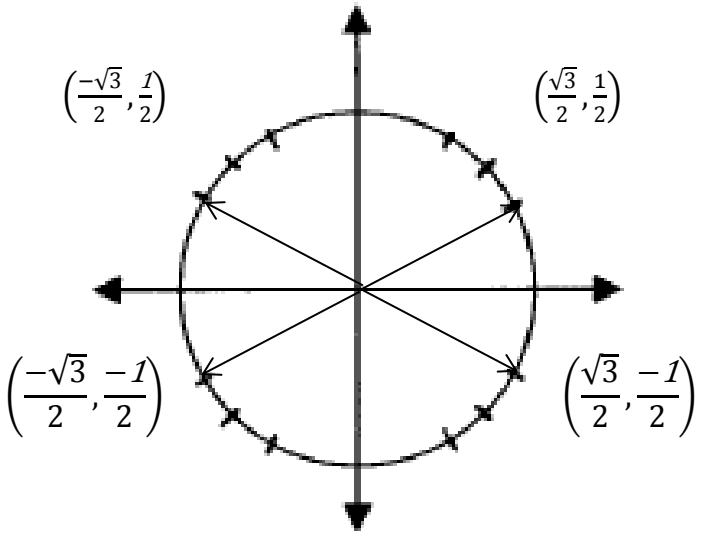
17) **Angles with reference angle 45° or $\frac{\pi}{4}$:**

$c)$ $\sqrt{2}/2$ $\sqrt{2}/2$

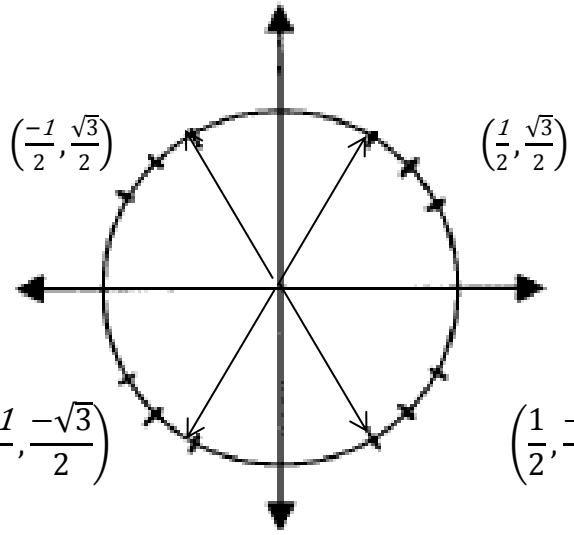
d)



18)



19)



1) $\sin 150^\circ$ __+__ 2) $\cos 235^\circ$ _-__ 3) $\sin(-325^\circ)$ __+__

4) $\sin\frac{5\pi}{6}$ _+__ 5) $\cos\frac{2\pi}{3}$ _-__ 6) $\sin 4$ __-__

7) a) θ increases from 0° to 90° __inc___

b) θ increases from 90° to 180°? _dec____

c) θ increases from 180° to 270°? _dec____

d) θ increases from 270° to 360°? _inc____

8) $\cos\theta = -1$ π+2πn 9) $\sin\theta = -1$ $\frac{3\pi}{2}$+2πn

10) __3/5____ 11) _-7/25__ 12) _12/13____

13) $\sin 50^\circ$ _____ $\sin 30^\circ$ > 14) $\cos 45^\circ$ _____ $\cos 30^\circ$ <

15) $\sin 188^\circ$ _____ $\sin 8^\circ$ < 16) $\cos 50^\circ$ _____ $\cos(-50^\circ)$ =

17)a) $\sin 138^\circ = \sin 42^\circ$ reason: reference angle for θ=138° is θ'=42° and θ is in Quad II, hence positive.

b) $\cos 138^\circ$ = -cos 42°__ c) $\sin(-37^\circ)$= -sin 37_____

d) $\cos 834^\circ$ = -cos(66°)___ e) $\cos(-132^\circ)$ = _____-cos(48)

18) sin 225°=-√2 / 2 19) cos 300° = 1/2

20) $\sin\left(-\frac{\pi}{3}\right)$=-√3 / 2 21) $\cos\left(\frac{7\pi}{6}\right)$=-√3 / 2

22) $\cos\frac{3\pi}{2}$ =0 23) $\sin\left(-\frac{3\pi}{2}\right)$=1

24) a) _2____ b) _45°,225°__