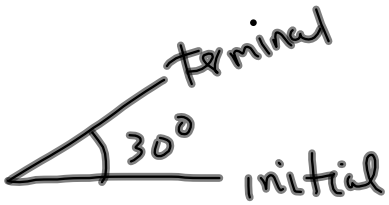
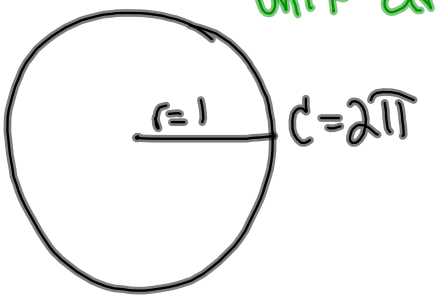
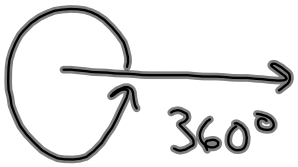
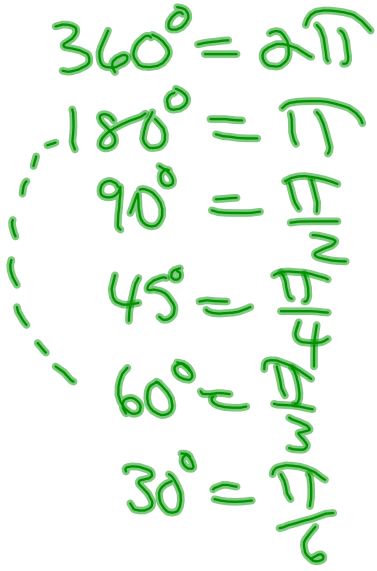
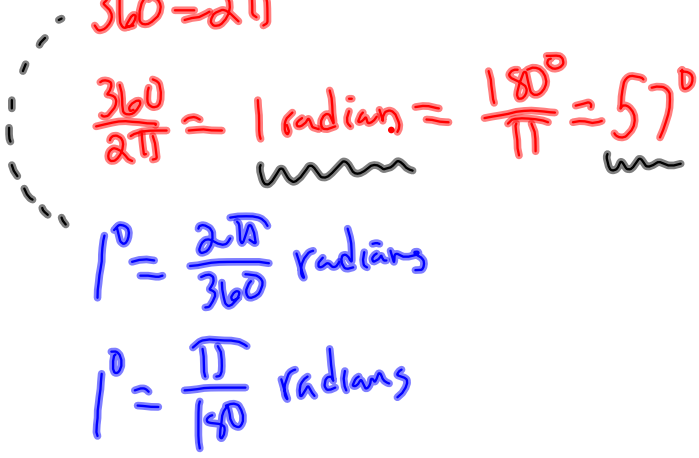




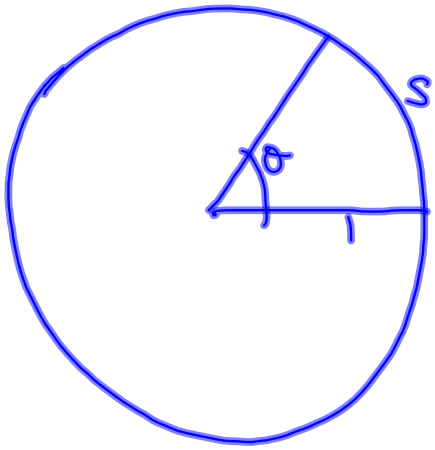


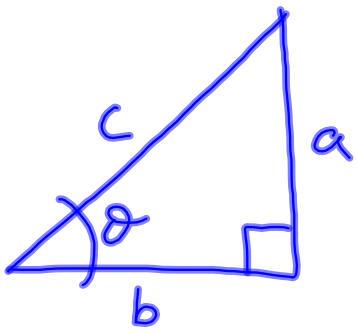
"once around" = $360^\circ = 2\pi$ radians


360° = 2π
180° = π
90° = π/2
45° = π/4
60° = π/3
30° = π/6

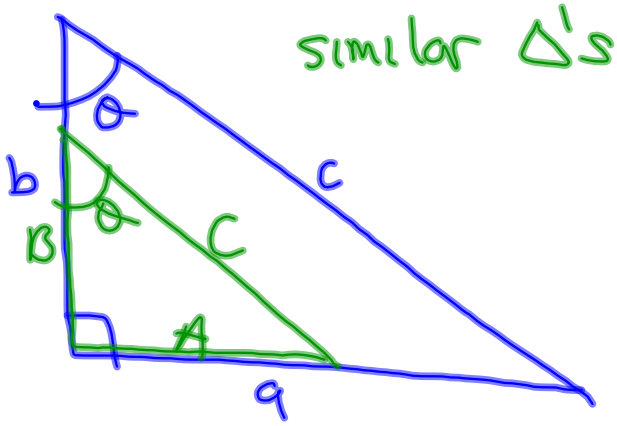

360° = 2π
360/2π = 1 radian = 180°/π = 57°
1° = 2π/360 radians
1° = π/180 radians

$s = r\theta$ (θ in radians)





a is "opposite" θ
b is "adjacent to" θ
c is hypotenuse
a, b are "legs"



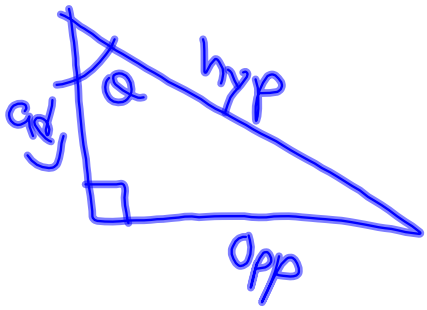
similar Δ's

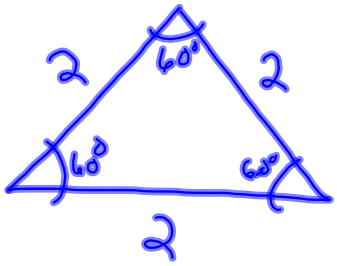
$$\frac{B}{C} = \frac{b}{c}$$

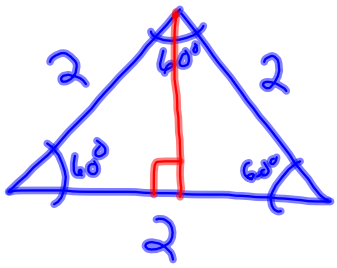
$$\sin\theta = \frac{\text{opposite leg}}{\text{hyp}}$$

$$\cos\theta = \frac{\text{adjacent leg}}{\text{hyp}}$$

$$\tan\theta = \frac{\text{opposite leg}}{\text{adjacent leg}} = \frac{\sin\theta}{\cos\theta}$$





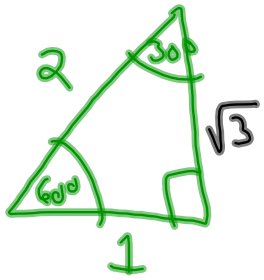


$\sin 30^\circ = \frac{1}{2}$

$\sin \frac{\pi}{6} = \frac{1}{2}$

$\cos 30^\circ = \frac{\sqrt{3}}{2}$

$\sin 60^\circ = \frac{\sqrt{3}}{2}$ } !

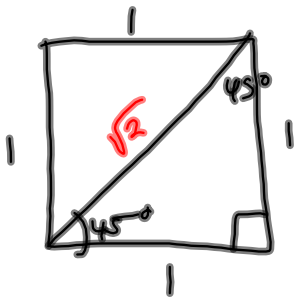


$2^2 = x^2 + 1^2$

$x^2 = 3$

$x = \sqrt{3}$

$\tan 60^\circ = \tan \frac{\pi}{3} = \sqrt{3} = \frac{\sin 60^\circ}{\cos 60^\circ}$ $\quad \frac{\frac{\sqrt{3}}{2}}{\frac{1}{2}} = \sqrt{3}$



$\sin 45 = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$

$\cos 45 = \frac{1}{\sqrt{2}}$

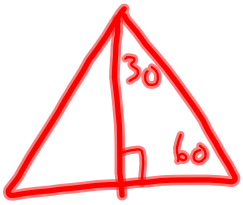
$\tan 45 = 1$

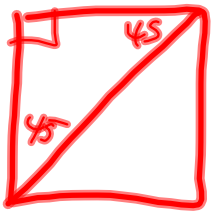
$$\sec\theta = \frac{\text{hyp}}{\text{adj leg}} = \frac{1}{\cos\theta}$$

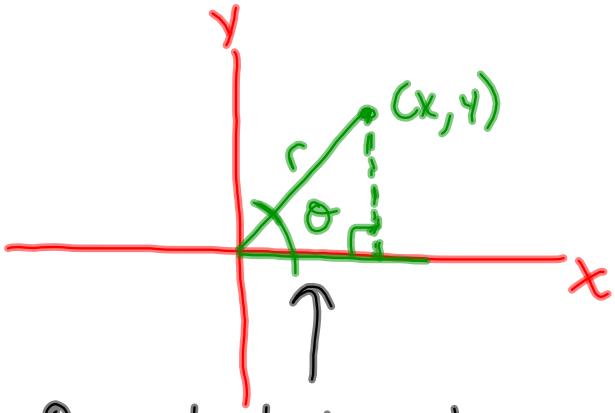
$$\csc\theta = \frac{\text{hyp}}{\text{opp leg}} = \frac{1}{\sin\theta}$$

$$\cot\theta = \frac{\text{adj leg}}{\text{opp leg}} = \frac{1}{\tan\theta}$$

sin, cos, tan, cot, sec, csc of 30, 60, 45



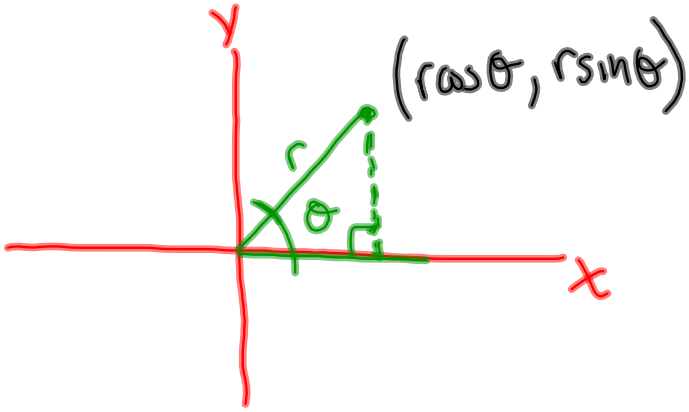


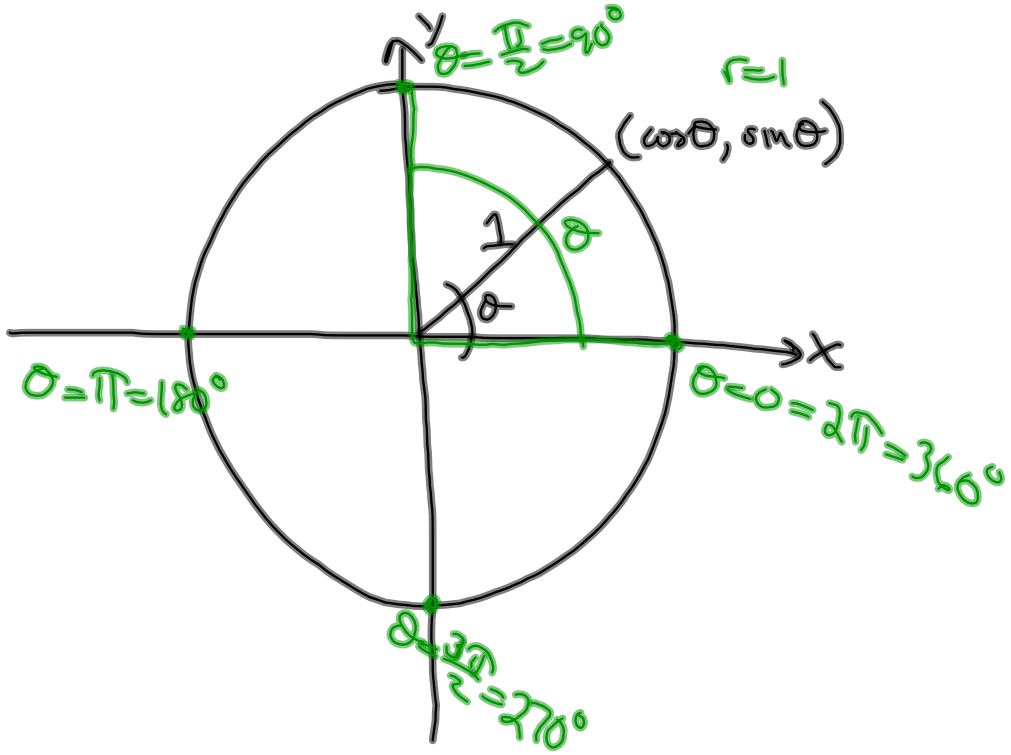


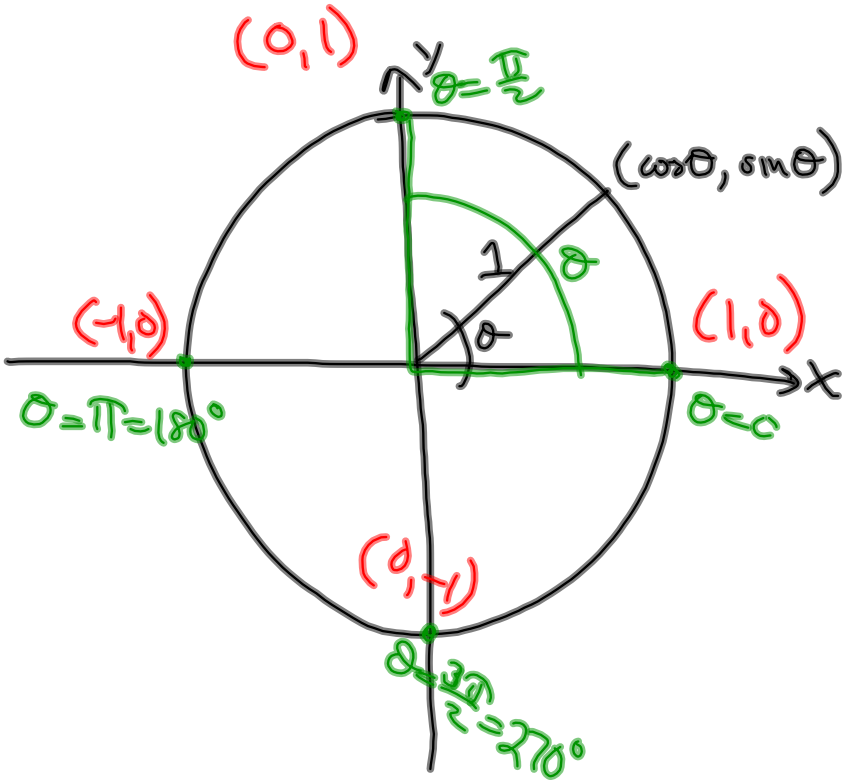
θ in standard position

$\sin\theta = \frac{y}{r} \Rightarrow r\sin\theta = y$

$\cos\theta = \frac{x}{r} \Rightarrow r\cos\theta = x$




y
θ = π/2 = 90°
r = 1
(cos θ, sin θ)
1
θ
θ
x
θ = π = 180°
θ = 0 = 2π = 360°
θ = 3π/2 = 270°



$\sin 0° = 0$

$\sin \frac{\pi}{2} = 1$

$\sin \pi = 0$

$\sin \frac{3\pi}{2} = -1$

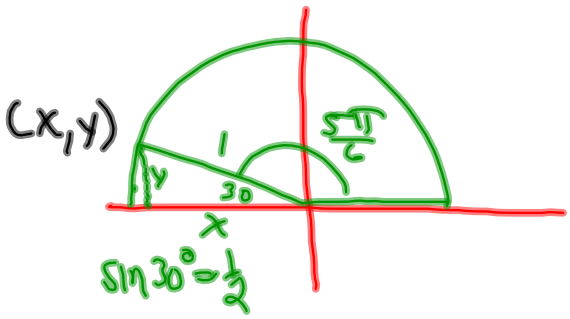
$\cos 180° = -1$

$\tan 90° = \frac{1}{0} = \text{undef}$

$\sec 0° = \frac{1}{1} = 1$

$\sec 90° = \frac{1}{0} = \text{undef}$

$\theta = 150^\circ = \frac{5\pi}{6}$



$\sin 30^\circ = \frac{1}{2}$

$\therefore y = \frac{1}{2}$

$\cos 30^\circ = \frac{\sqrt{3}}{2}$

$x = -\frac{\sqrt{3}}{2}$

$(x, y) = \left(-\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$

$\sin \frac{5\pi}{6} = \frac{1}{2}$

$\cos \frac{5\pi}{6} = -\frac{\sqrt{3}}{2}$

$\tan \frac{5\pi}{6} = -\frac{1}{\sqrt{3}}$

$\cot \frac{5\pi}{6} = -\sqrt{3}$

$\sec \frac{5\pi}{6} = -\frac{2}{\sqrt{3}}$

$\csc \frac{5\pi}{6} = 2$

$\sin\frac{5\pi}{6} = \frac{1}{2}$

$\cos\frac{5\pi}{6} = -\frac{\sqrt{3}}{2}$

$\tan\frac{5\pi}{6} = -\frac{1}{\sqrt{3}}$

$\cot\frac{5\pi}{6} = -\sqrt{3}$

$\sec\frac{5\pi}{6} = -\frac{2}{\sqrt{3}}$

$\csc\frac{5\pi}{6} = 2$

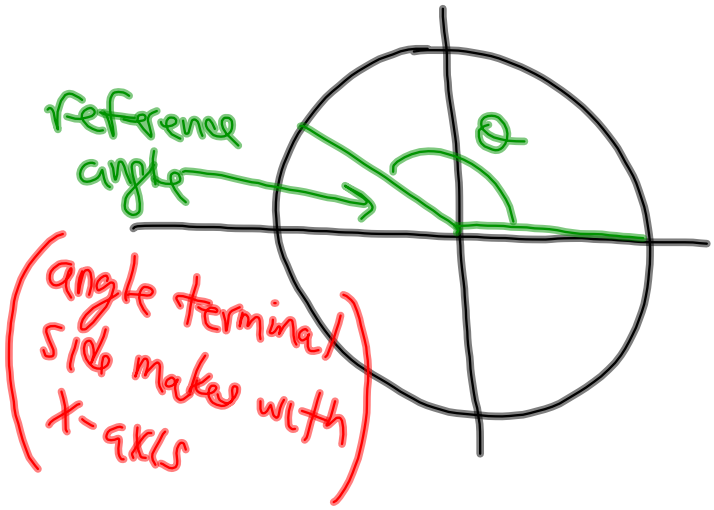
$\sin\frac{\pi}{6} = \frac{1}{2}$

$\cos\frac{\pi}{6} = \frac{\sqrt{3}}{2}$

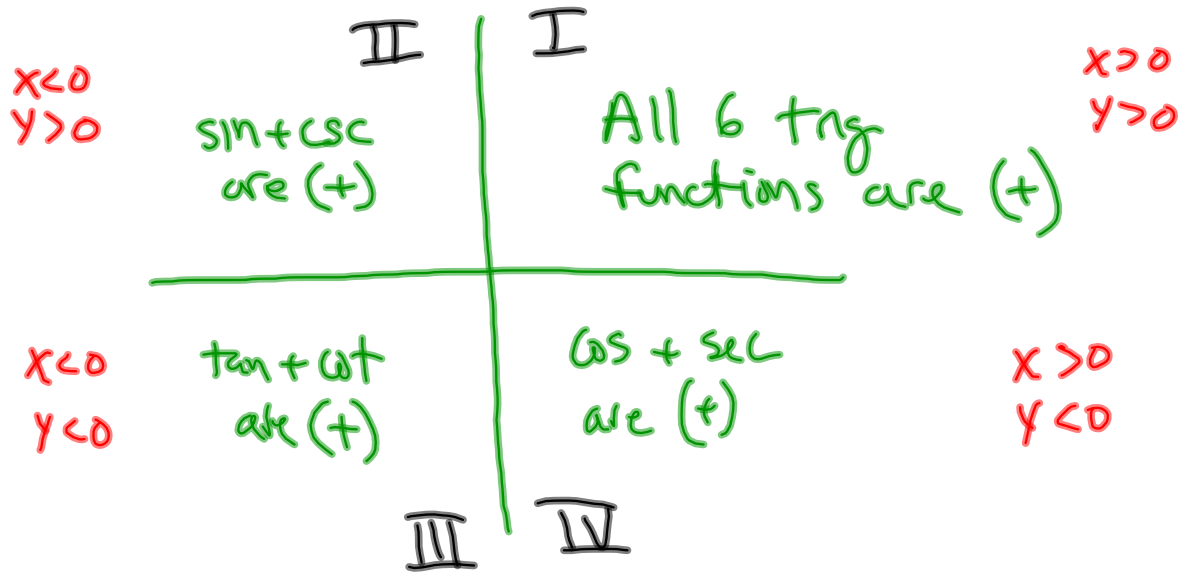
$\tan\frac{\pi}{6} = \frac{1}{\sqrt{3}}$

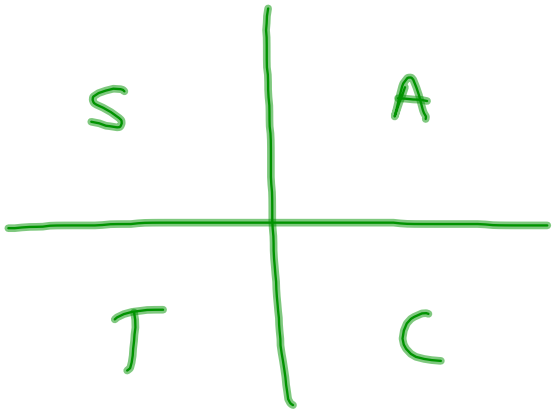
$|\sin\theta| = \sin(\text{ref}\angle)$

same for other 5



(angle terminal side makes with x-axis)

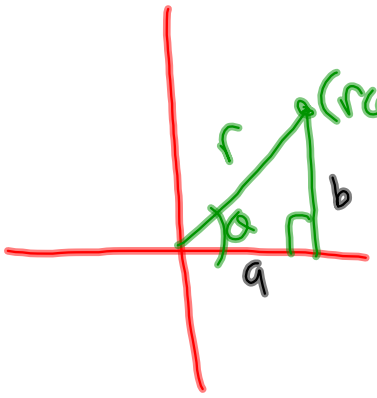

II
I
x<0
y>0
sin + csc
are (+)
All 6 trig
functions are (+)
x>0
y>0
x<0
y<0
tan + cot
are (+)
cos + sec
are (+)
x>0
y<0
III
IV



"All students take calculus"

Pythagorean Identity

$a^2+b^2=c^2$ (r^2)

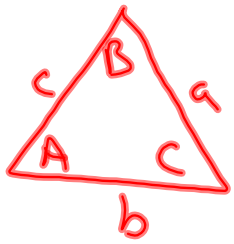


$$(r\cos\theta)^2+(r\sin\theta)^2=r^2$$

$$(\cos\theta)^2+(\sin\theta)^2=1$$

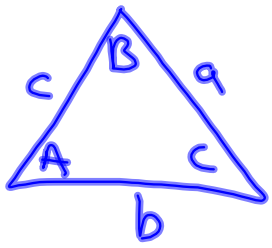
$$\cos^2\theta+\sin^2\theta=1$$

law of sines (any triangle)



$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$

law of cosines (Any triangle)



$$a^2 = b^2 + c^2 - 2bc\cos A$$
$$b^2 = a^2 + c^2 - 2ac\cos B$$
$$c^2 = a^2 + b^2 - 2ab\cos C$$

p A49
#6c)

$\sin\theta =$

$\cos\theta =$

$\tan\theta =$

$\cot\theta =$

$\sec\theta =$

$\csc\theta =$

p A49
#6c)

$1^2 + x^2 = 4^2$

$x^2 = 15$

$x = \sqrt{15}$

$\sin\theta = \frac{1}{4}$

$\cos\theta = \frac{\sqrt{15}}{4}$

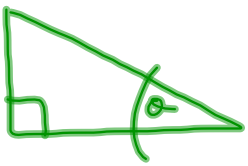
$\tan\theta = \frac{1}{\sqrt{15}}$

$\cot\theta = \sqrt{15}$

$\sec\theta = \frac{4}{\sqrt{15}}$

$\csc\theta = 4$

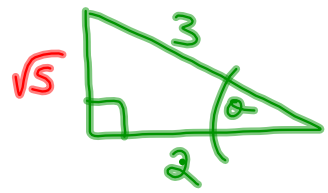
#8) $\cos\theta = \frac{2}{3}$



$\sin\theta =$

$\tan\theta =$

#8) $\cos\theta = \frac{2}{3}$



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

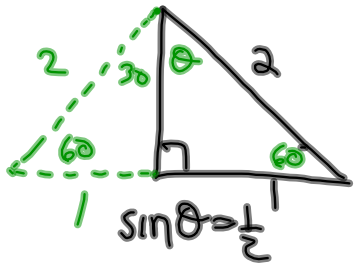
$x^2 = 5$

$x = \sqrt{5}$

$\sin\theta = \frac{\sqrt{5}}{3}$

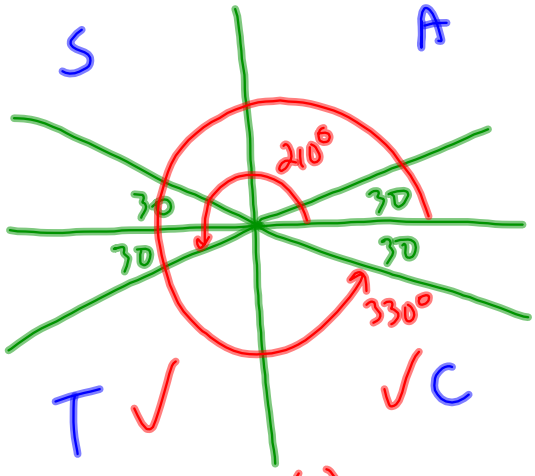
$\tan\theta = \frac{\sqrt{5}}{2}$

#22a) $\sin\theta = -\frac{1}{2}$



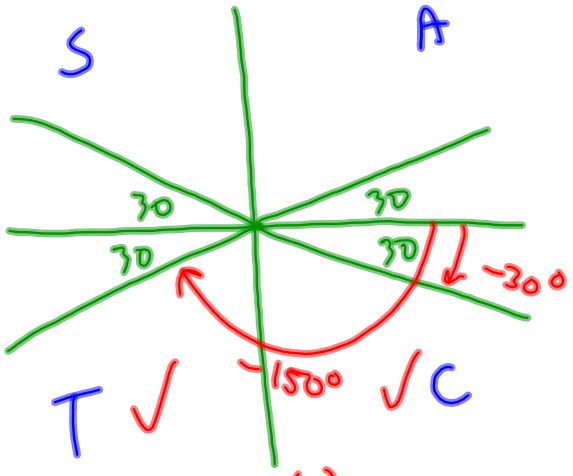
$\Rightarrow \theta = 30^\circ = \frac{\pi}{6}$

ref ang ∠



$\theta = 210^\circ = \frac{7\pi}{6}$

$\theta = 330^\circ = \frac{11\pi}{6}$



$\theta = -30^\circ = -\frac{\pi}{6}$

$\theta = -150^\circ = -\frac{5\pi}{6}$

sin (-)

$\theta = 210^\circ = \frac{7\pi}{6}$

$\theta = 330^\circ = \frac{11\pi}{6}$

Trig Homework: Appendix E

page A49

5,9,11,15c,23,29,35,37,43