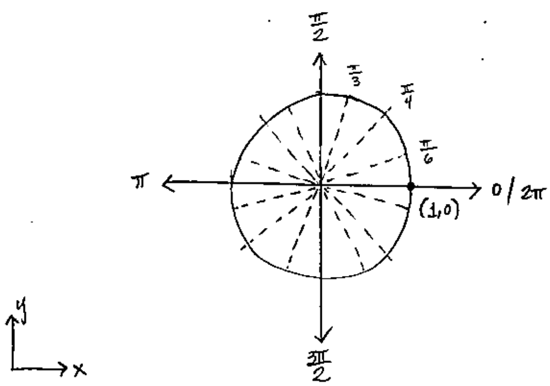
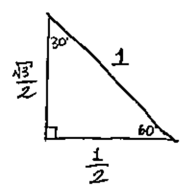
TRIGONOMETRY REVIEW

Unit Circle

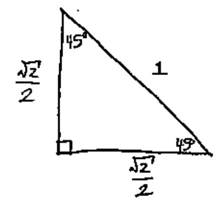


Special Triangles

30°, 60°, 90°



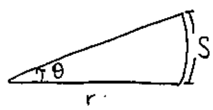
45°, 45°, 90°



Recall:

Arc length (S)

$S = r\theta$



Area of a Segment (A)

$A = \frac{1}{2} r^2 \theta$

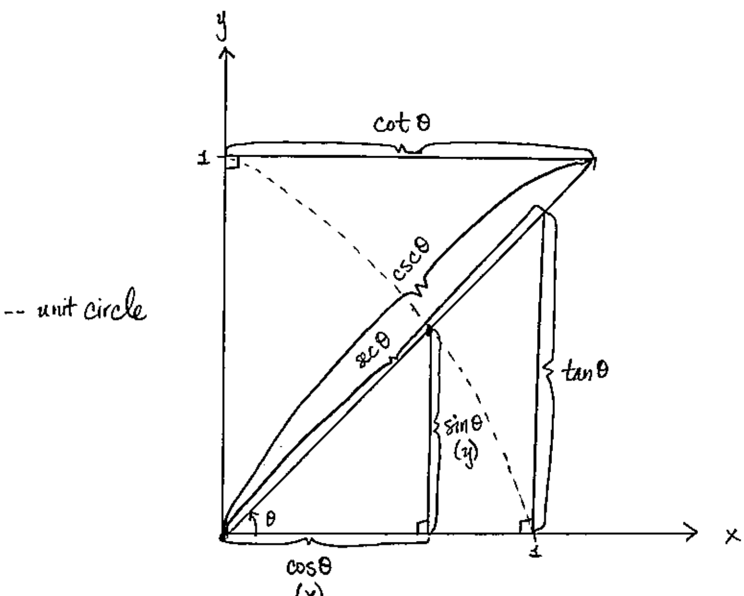
Circumference of a Circle (C

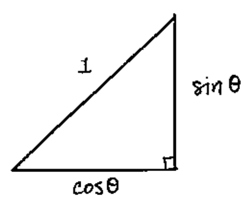
$C = 2\pi r$

Circumference of the Unit Circle

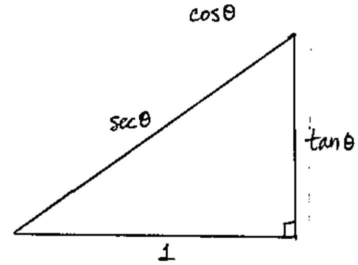
$C_u = 2\pi(1)$

Note: the radius of the Unit Circle is 1. $\therefore$ $C_u = 2\pi$

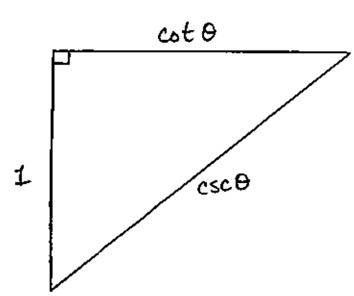




$\cos^2\theta + \sin^2\theta = 1$
[Pythagorean Theorem]



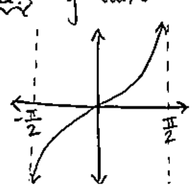
$\sec^2\theta - \tan^2\theta = 1$



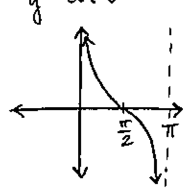
$\csc^2\theta - \cot^2\theta = 1$

Recall:

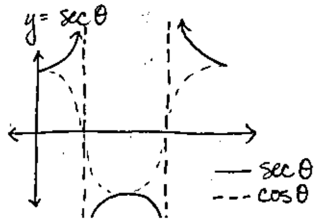
$y = \tan\theta$



$y = \cot\theta$



$y = \sec\theta$



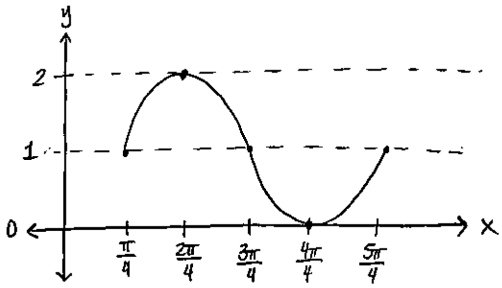
Recall:

- $\frac{\csc\theta}{1} = \frac{1}{\sin\theta} = 1$

- $\frac{0}{0}$ = undefined

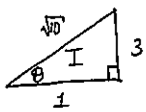
$\boxed{E1}$ Graph $\sin\left(2\theta - \frac{\pi}{2}\right) + 1$

$$0 \le 2\theta - \cancel{\tfrac{\pi}{2}} \le 2\pi$$
$$+\tfrac{\pi}{2} \quad \cancel{+\tfrac{\pi}{2}} \quad +\tfrac{\pi}{2}$$
$$\frac{\frac{\pi}{2}}{2} \le \frac{\cancel{2}\theta}{\cancel{2}} \le \frac{\frac{5\pi}{2}}{2}$$
$$\boxed{\tfrac{\pi}{4} \le \theta \le \tfrac{5\pi}{4}} \text{ period}$$



$\boxed{E2}$ Section Appendix B. #7.

$\tan\theta = 3$ Identify all trig functions of θ.



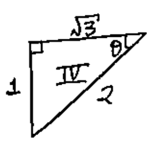
$\sin\theta = \frac{3}{\sqrt{10}} = \frac{3\sqrt{10}}{10}$ $\qquad \csc\theta = \frac{\sqrt{10}}{3}$

$\cos\theta = \frac{1}{\sqrt{10}} = \frac{\sqrt{10}}{10}$ $\qquad \sec\theta = \sqrt{10}$

$\tan\theta = 3$ $\qquad \cot\theta = \frac{1}{3}$

$\boxed{E3}$ Appendix B. #15d.

$\tan\theta = -\frac{1}{\sqrt{3}}$ $\qquad -\frac{\pi}{2} < \theta < 0$



$\sin\theta = -\frac{1}{2}$ $\qquad \csc\theta = -2$

$\cos\theta = \frac{\sqrt{3}}{2}$ $\qquad \sec\theta = \frac{2\sqrt{3}}{3}$

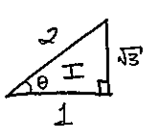
$(1)^2 + (\sqrt{3})^2 = c^2$ $\qquad \tan\theta = -\frac{1}{\sqrt{3}}$ $\qquad \cot\theta = -\sqrt{3}$

$c = \sqrt{4}$

$c = 2$

$\boxed{E4}$ Appendix B. # 27.

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



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

$\theta = \frac{\pi}{3} \pm 2\pi n$

$\theta = \frac{2\pi}{3} \pm 2\pi n$

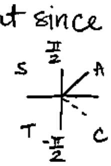
Note: $\tan\theta = 3$

Using SOH - CAH - TOA we are able to draw a triangle and use the pythagorean theorem to find the missing side.

[I] inside triangle signifies first quadrant. Recall the boundaries of $\tan\theta$ is

$$-\frac{\pi}{2} < \theta < \frac{\pi}{2}.$$

$\tan\theta$ must be in the first quadrant since its positive.



However, in $\boxed{E2}$ $\tan\theta = -\frac{1}{\sqrt{3}}$, so it is safe to assume tha tan θ is in the 4th quadran