Essential Trig for Calculus

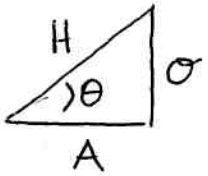
$\sin\theta = \frac{O}{H}$ $\quad \csc\theta = \frac{H}{O}$

$\cos\theta = \frac{A}{H}$ $\quad \sec\theta = \frac{H}{A}$

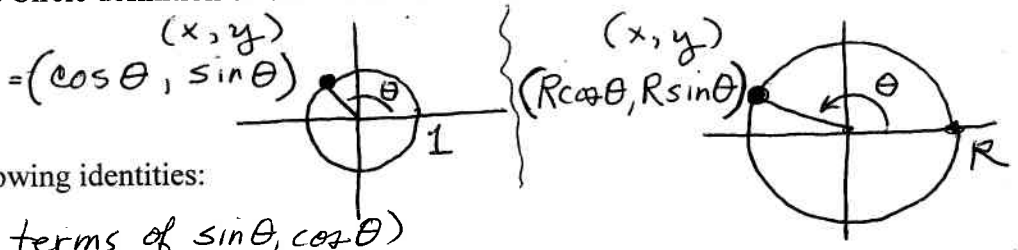
$\tan\theta = \frac{O}{A}$ $\quad \cot\theta = \frac{A}{O}$

1. Know the Right Triangle Definitions for all 6 trig functions.

O = opposite side's length
A = adjacent side's length
H = hypotenuse's length



2. Know the Unit Circle definition of $\sin\theta$ and $\cos\theta$ and extend to circles of radius R.



3. Know the following identities:

* Fundamental (in terms of $\sin\theta, \cos\theta$)

$\tan\theta = \frac{\sin\theta}{\cos\theta}$, $\cot\theta = \frac{\cos\theta}{\sin\theta}$, $\csc\theta = \frac{1}{\sin\theta}$, $\sec\theta = \frac{1}{\cos\theta}$

* Pythagorean

$\cos^2\theta + \sin^2\theta = 1$ (the other identities can be obtained by dividing through by $\cos^2\theta$ OR $\sin^2\theta$)

* Double Angle

$\sin 2\theta = 2\sin\theta\cos\theta$, $\cos 2\theta = \cos^2\theta - \sin^2\theta = 2\cos^2\theta - 1 = 1 - 2\sin^2\theta$

* Half-angle

$\sin\theta = \sqrt{\frac{1-\cos 2\theta}{2}}$, $\cos\theta = \sqrt{\frac{1+\cos 2\theta}{2}}$

4. Evaluate the following WITHOUT using a calculator:

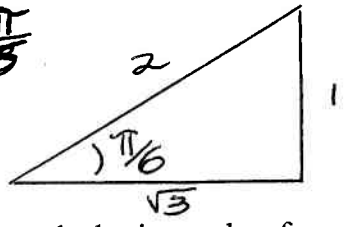
$\sin\theta$, $\cos\theta$ for $\theta = 0, \frac{\pi}{2}, \pi, \frac{3\pi}{2}, 2\pi$ and multiples of these.

$\sin 0 = 0$ | $\sin\pi = 0$ | $\cos 0 = 1$ | $\cos\pi = -1$

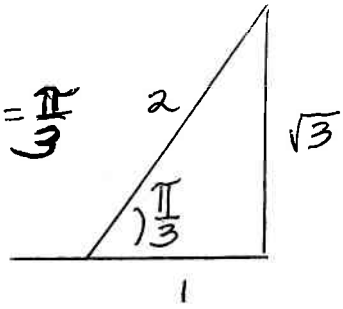
$\sin\frac{\pi}{2} = 1$ | $\sin\frac{3\pi}{2} = -1$ | $\cos\frac{\pi}{2} = 0$ | $\cos\frac{3\pi}{2} = 0$

5. Know the dimensions of 30, 60, 90 triangles.

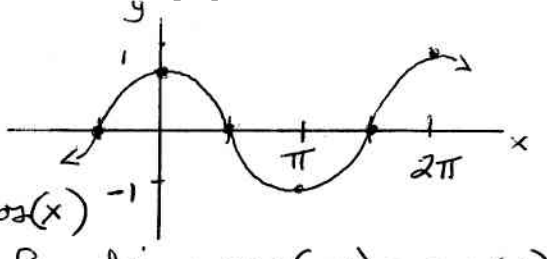
$30° = \frac{\pi}{6}$



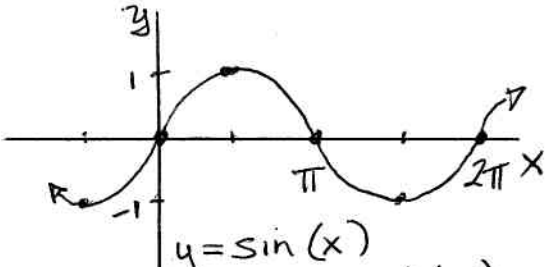
$60° = \frac{\pi}{3}$



6. Know the basic graphs of $y = \cos\theta$, $y = \sin\theta$



EVEN function: $\cos(-x) = \cos(x)$



ODD function: $\sin(-x) = -\sin(x)$