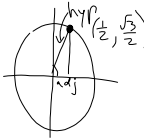
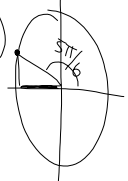


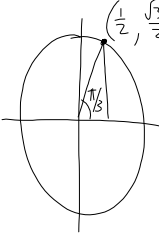
4.3 Trig Ratios

Use your unit circle to evaluate the following:

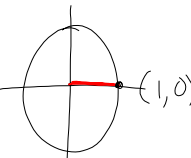
a) $\cos 60^\circ = \frac{1/2}{1}$ $\cos 60^\circ = \frac{1}{2}$  The adjacent side is the x-coord, and the hypotenuse is always 1.

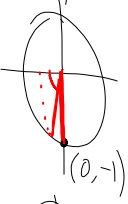
b) $\cos \frac{5\pi}{6} = \frac{-\sqrt{3}/2}{1}$ $\cos \frac{5\pi}{6} = -\sqrt{3}/2$  $\therefore \cos \theta = x$

c) $\cos(-\pi/4) = \sqrt{2}/2$

d) $\sin \pi/3 = \frac{\sqrt{3}/2}{1}$ $\sin \pi/3 = \sqrt{3}/2$  The opposite side is the y-coord & hyp = 1 $\therefore \sin \theta = y$

e) $\sin \frac{7\pi}{6} = -1/2$

f) $\sin 0 = \frac{0}{1} = 0$ 

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

h) $\tan \pi/6 = \frac{y}{x}$ 

$= \frac{1/2}{\sqrt{3}/2}$
 $= \frac{1}{2} \times \frac{2}{\sqrt{3}} = \frac{1 \cdot \sqrt{3}}{\sqrt{3} \cdot \sqrt{3}}$

$\cos \theta = x$

$\sin \theta = y$

$\tan \theta = \frac{y}{x}$

$(x, y) = (\cos \theta, \sin \theta)$

i) $\tan \frac{7\pi}{4} = \frac{-\sqrt{2}}{\sqrt{2}} = -1$

j) $\tan(-\pi/3) = \frac{-\sqrt{3}/2}{1/2}$
 $= -\sqrt{3}$

The Reciprocal Trig Ratios

secant $\sec \theta = \frac{1}{\cos \theta} = \frac{1}{x}$

cosecant $\csc \theta = \frac{1}{\sin \theta} = \frac{1}{y}$

cotangent $\cot \theta = \frac{1}{\tan \theta} = \frac{1}{\frac{y}{x}} = \frac{x}{y}$

Find all 6 trig ratios for $A(\frac{\sqrt{3}}{2}, -\frac{1}{2}) \dots$

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

$$\sec \theta = \frac{1}{\frac{\sqrt{3}}{2}} = 1 \times \frac{2}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{2\sqrt{3}}{3}$$

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

$$\csc \theta = \frac{1}{-\frac{1}{2}} = 1 \times \frac{-2}{1} = -2$$

$$\tan \theta = \frac{-\frac{1}{2}}{\frac{\sqrt{3}}{2}} = \frac{-1}{\sqrt{3}} = -\frac{\sqrt{3}}{3}$$

$$\cot \theta = \frac{\frac{\sqrt{3}}{2}}{-\frac{1}{2}} = -\sqrt{3}$$

OR $\frac{-3}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{-3\sqrt{3}}{3}$

Ex) Find the exact values of:

$$a) \sin(-4\pi/3) = \frac{\sqrt{3}}{2}$$

$$d) \tan \frac{\pi}{2} = \frac{1}{0} \\ = \text{undefined}$$

$$b) \sec 315^\circ = \frac{1}{\sqrt{2}/2} = 1 \times \frac{2}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} \\ = \frac{2\sqrt{2}}{\sqrt{2}} = \sqrt{2}$$

$$e) \csc\left(\frac{17\pi}{6}\right) = 2$$

$$c) \cot 270^\circ = 0$$

$$\frac{17\pi}{6} - \frac{12\pi}{6} = \frac{5\pi}{6}$$

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1, 3, 6, 9, C2, C3