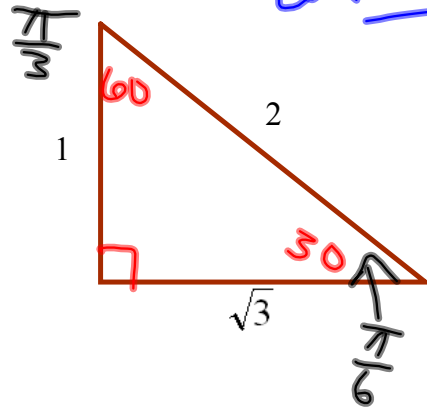
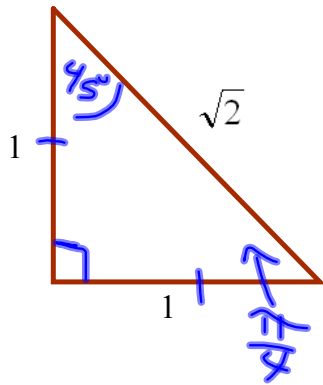
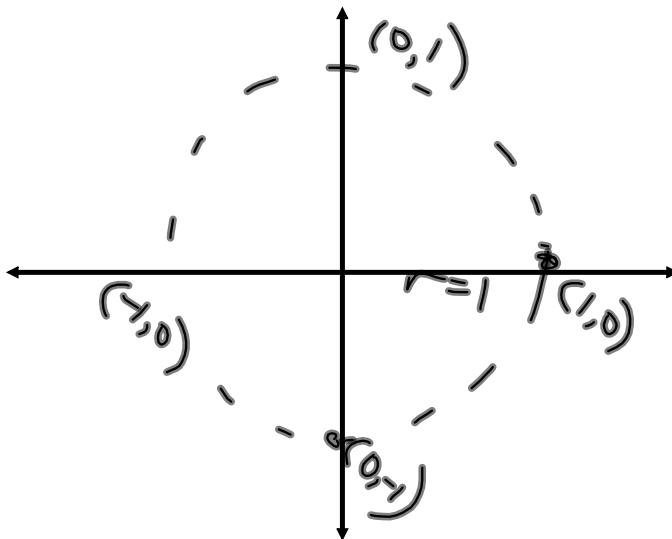


# Special Angles (in radians) $(30^\circ, 60^\circ, 45^\circ)$

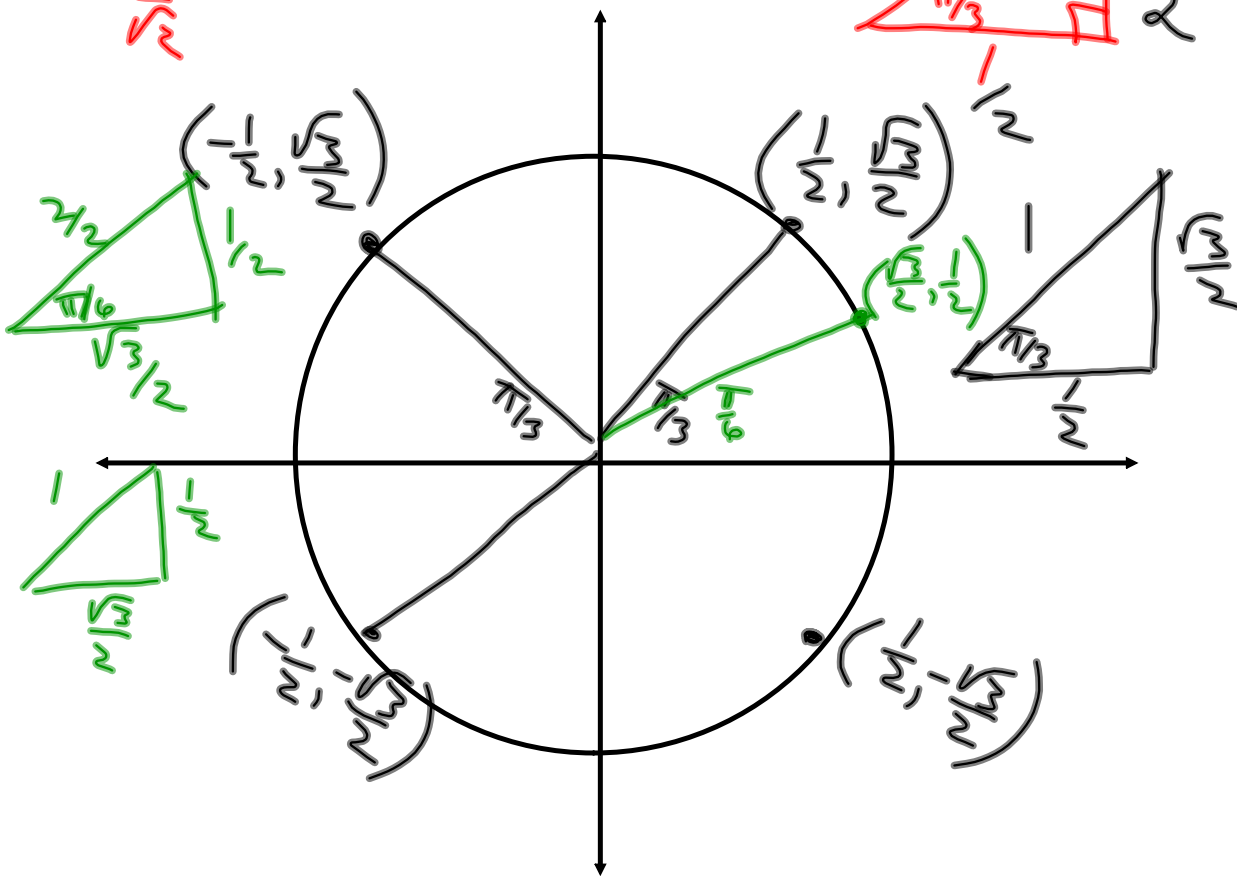
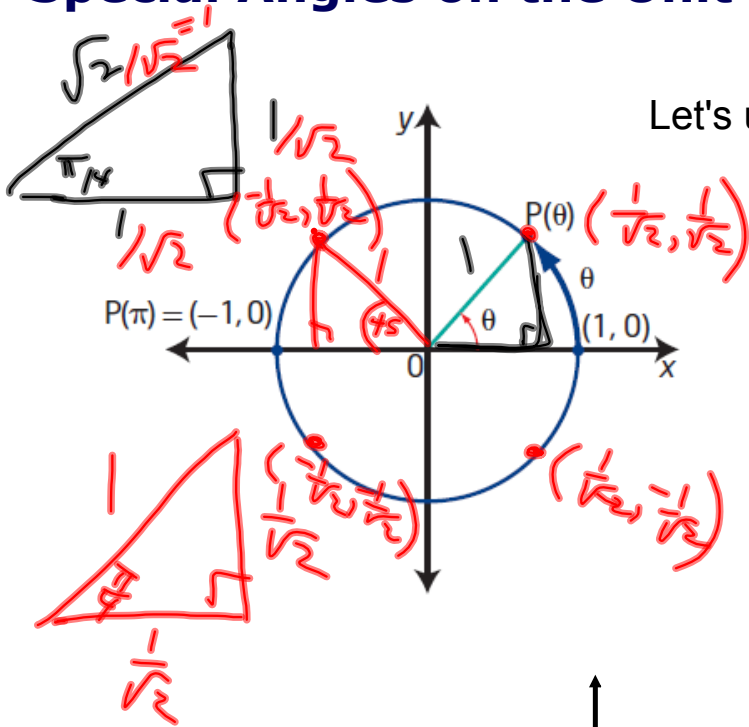
Quadrants



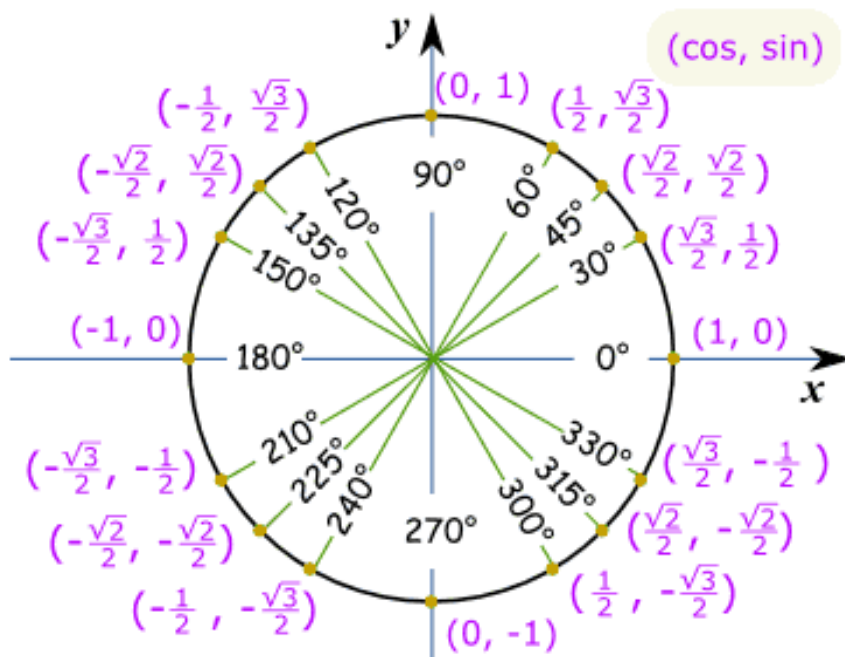
## Quadrantal Angles



## Special Angles on the Unit Circle:



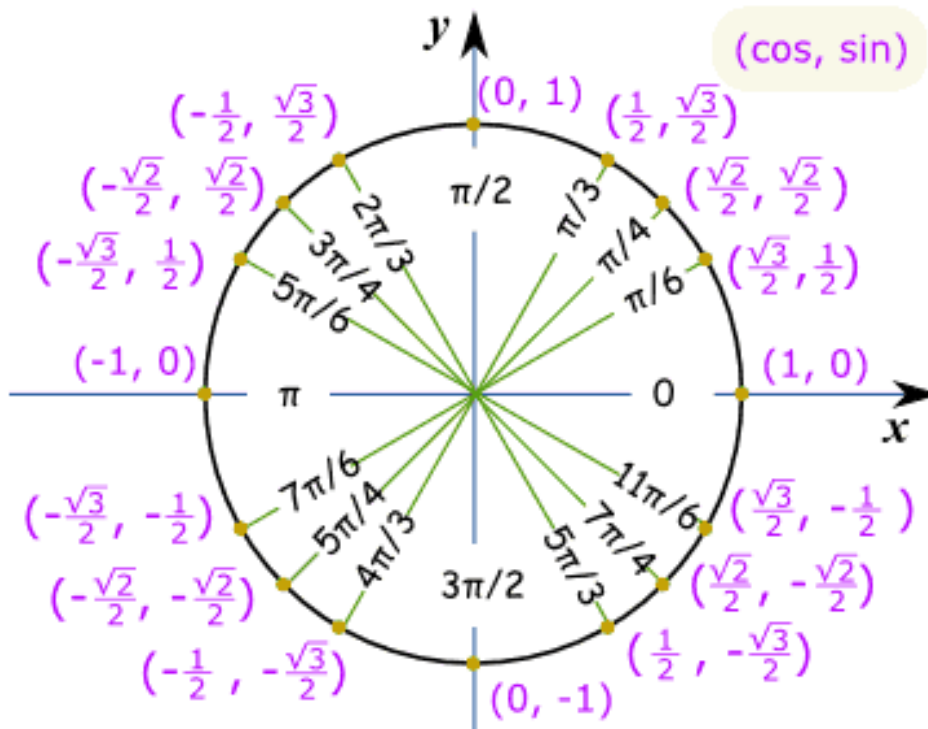
## Unit Circle of Special Angles in Degrees



$$\frac{1}{\sqrt{2}} \left( \frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2} \right) = \frac{\sqrt{2}}{2}$$

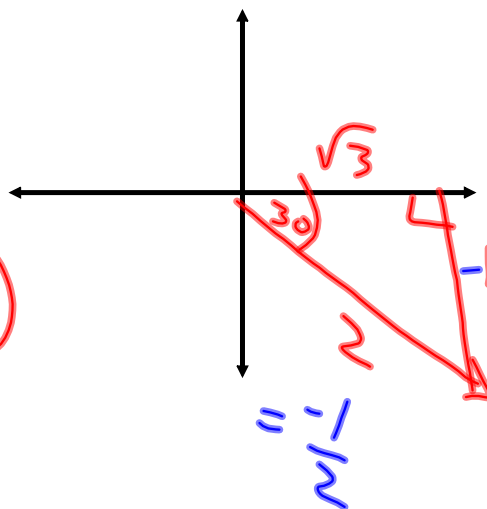
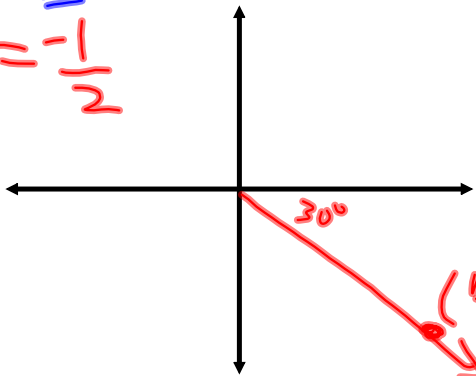
This is lovely...so what is it used for????

## Unit Circle of Special Angles in Radians

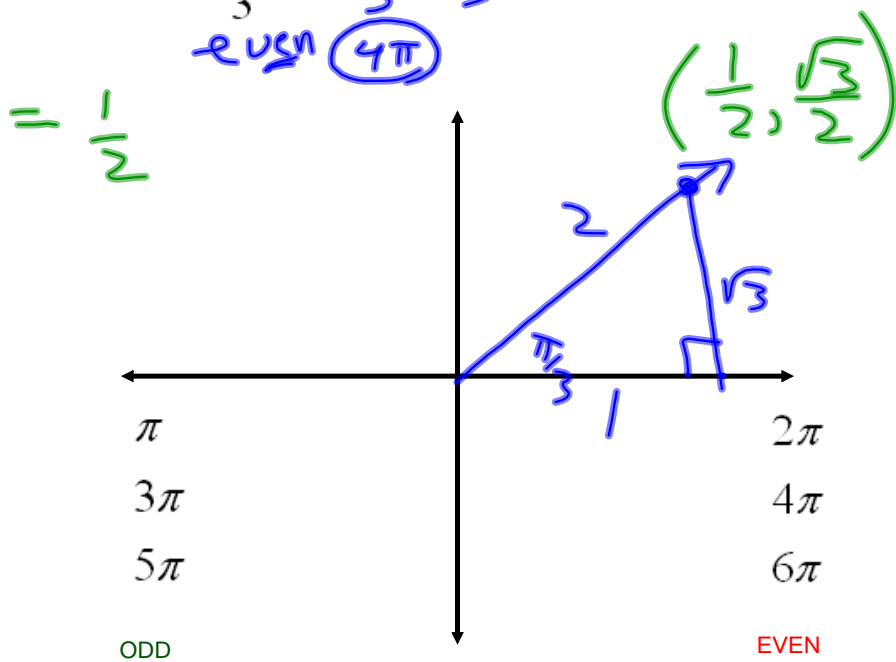


## Sketching Angles in Radians

ex.  $\sin 690^\circ \Rightarrow$  P.A. ( $330^\circ$ )  
 $= -\frac{1}{2}$



Ex.  $\cos \frac{13\pi}{3} = \frac{12\pi + \pi}{3}$   
 $= \cos 4\pi$



$\cos \frac{13\pi}{3}$  ← Break it apart

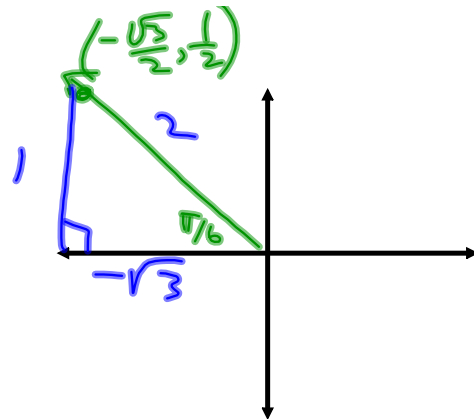
Ex.  $\tan \frac{17\pi}{6}$

$\frac{18\pi}{6} - \frac{\pi}{6}$

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

$\frac{1}{-\sqrt{3}}$

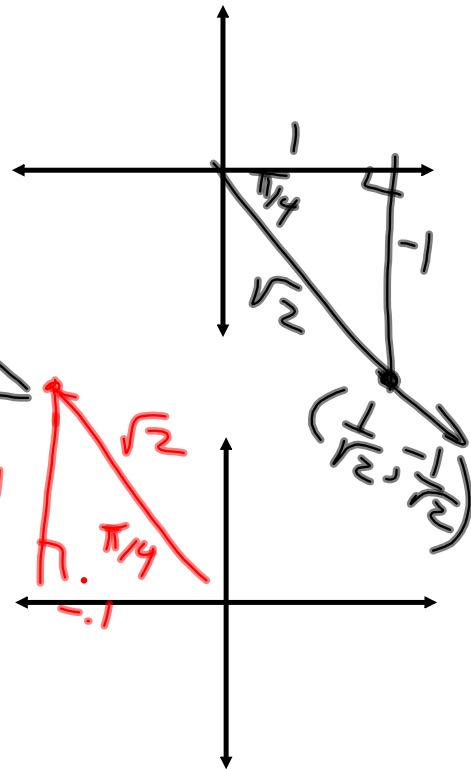
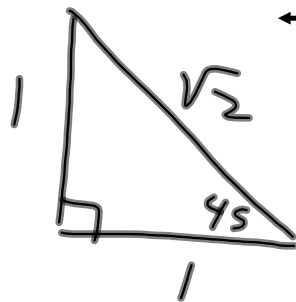
$\frac{1}{\cancel{2}} \cdot \frac{\cancel{2}}{-\sqrt{3}} = -\frac{1}{\sqrt{3}}$



Ex.  $\sin \frac{15\pi}{4} = -\frac{1}{\sqrt{2}}$

$\frac{16\pi}{4} - \frac{\pi}{4}$

$\frac{4\pi}{4} - \frac{\pi}{4}$   
 even  $\uparrow$   $\text{CW}$   $\uparrow$  Ref  $\times$



Ex.  $\cos \left( -\frac{21\pi}{4} \right) = -\frac{1}{\sqrt{2}}$

$-\frac{20\pi}{4} - \frac{\pi}{4}$

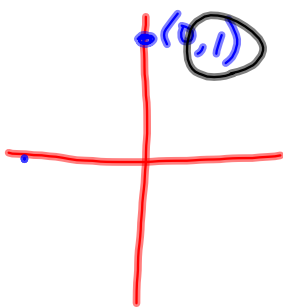
??  
 $-\frac{5\pi}{4} - \frac{\pi}{4}$   
 odd  $\uparrow$   $\text{CW}$   $\uparrow$



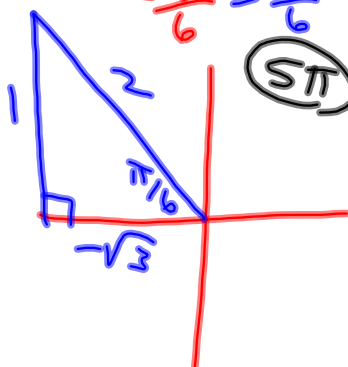
Evaluate without the use of a calculator:

$$\sin \frac{9\pi}{2} - \cos^2 \left( \frac{29\pi}{6} \right) \tan \left( \frac{15\pi}{4} \right)$$

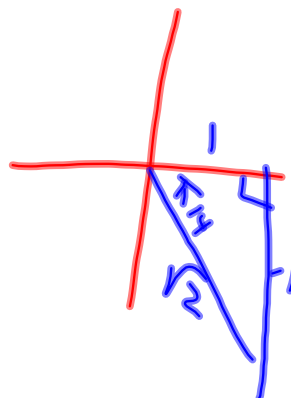
Siii  $\Rightarrow$  y  
 $\frac{9\pi}{2} = \frac{8\pi}{2} + \frac{\pi}{2}$



$$\frac{29\pi}{6} = \frac{30\pi}{6} - \frac{\pi}{6}$$



$$\frac{15\pi}{4} = \frac{16\pi}{4} - \frac{\pi}{4}$$



$$= 1 - \left( \frac{-\sqrt{3}}{2} \right)^2 (-1)$$

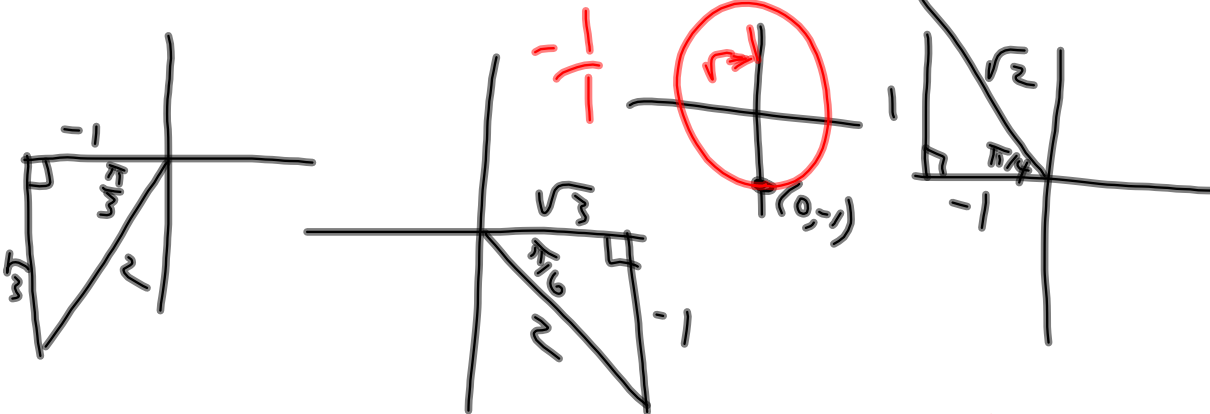
$$= 1 - \left( \frac{3}{4} \right) (-1)$$

$$= 1 + \frac{3}{4}$$

$$= \frac{7}{4}$$

Evaluate without the use of a calculator:

$$\cos\left(\frac{16\pi}{3}\right) \tan^2\left(\frac{23\pi}{6}\right) + \csc\left(\frac{11\pi}{2}\right) + \sin^2\left(\frac{27\pi}{4}\right)$$



$$= \left(-\frac{1}{2}\right) \left(-\frac{1}{\sqrt{3}}\right)^2 + (-1) + \left(\frac{1}{\sqrt{2}}\right)^2$$

$$= -\frac{1}{2} \left(\frac{1}{3}\right) - 1 + \frac{1}{2}$$

$$= -\frac{1}{6} - \frac{6}{6} + \frac{3}{6}$$

$$= -\frac{4}{6} = -\frac{2}{3}$$



# Homework: Worksheet - Sketching Angles in Radians.doc

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## Solutions...

1.  $-\frac{5}{3}$

5.  $\frac{4+3\sqrt{3}}{6}$

2.  $\frac{-\sqrt{6}}{3}$

6.  $\frac{-10}{3}$

3.  $-2-\sqrt{3}$

7. 0

4.  $\frac{-5}{3}$

8.  $\frac{3+3\sqrt{3}}{-2}$

## Attachments

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Worksheet - Sketching Angles in Radians.doc