Evaluate without the use of a calculator:

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

$\frac{15\pi}{3}+\frac{\pi}{3}$

$\frac{24\pi}{6}-\frac{\pi}{6}$

$\frac{10\pi}{2}+\frac{\pi}{2}$

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

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

$(0,-1)$

$(\cos,\sin)$

$\frac{28\pi}{4}-\frac{\pi}{4}$

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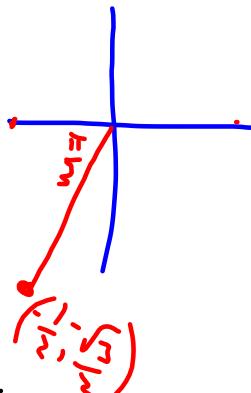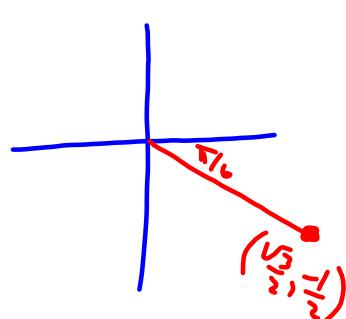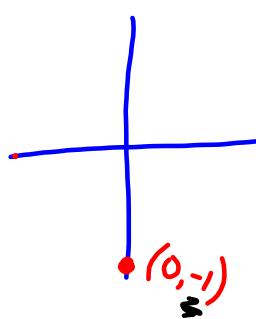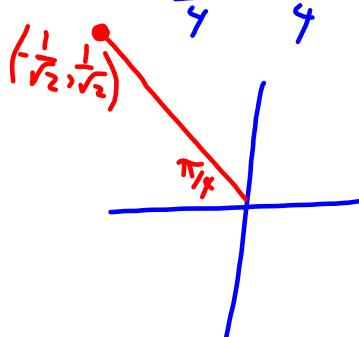
$$=\left(-\frac{1}{2}\right)\left(-\frac{1}{\sqrt{3}}\right)^2+(-1)+\left(\frac{1}{\sqrt{2}}\right)^2$$

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

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

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

$$\boxed{=-\frac{2}{3}}$$

#3) $\dfrac{\cos(-11\pi)}{2 - \cot\left(\dfrac{43\pi}{6}\right)}$

$$= \boxed{\dfrac{-1}{2 - \sqrt{3}}}$$

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

$$= \dfrac{-2 - \sqrt{3}}{4 - 3} = -2 - \sqrt{3}$$

-11π

$(-1, 0)$

$\dfrac{42\pi}{6} + \dfrac{\pi}{6}$

$7\pi + \dfrac{\pi}{6}$

$\dfrac{\left(-\dfrac{\sqrt{3}}{2}\right)}{\left(-\dfrac{1}{2}\right)}$

$\pi/6$

$\left(-\dfrac{\sqrt{3}}{2}, -\dfrac{1}{2}\right)$

#4) $-\dfrac{36\pi}{4} + \dfrac{\pi}{4}$ $-\dfrac{18\pi}{2} + \dfrac{\pi}{2}$ $\dfrac{30\pi}{3} - \dfrac{\pi}{3}$

$\left(-\dfrac{1}{\sqrt{2}}, \dfrac{1}{\sqrt{2}}\right)$

$(0,-1)$

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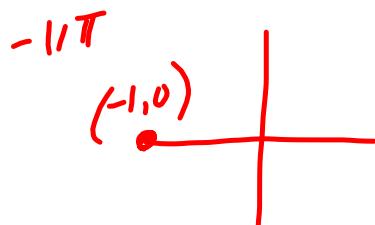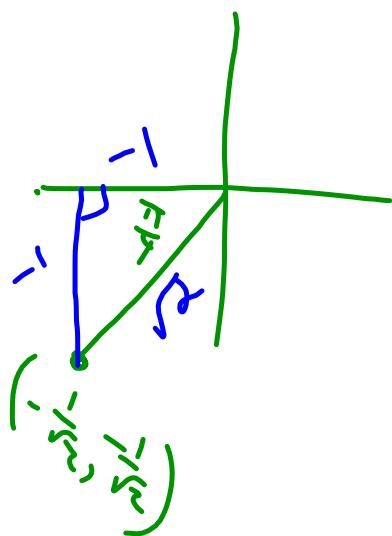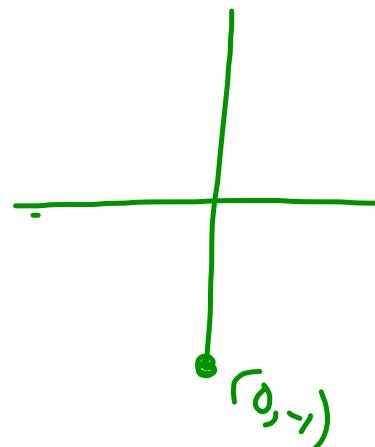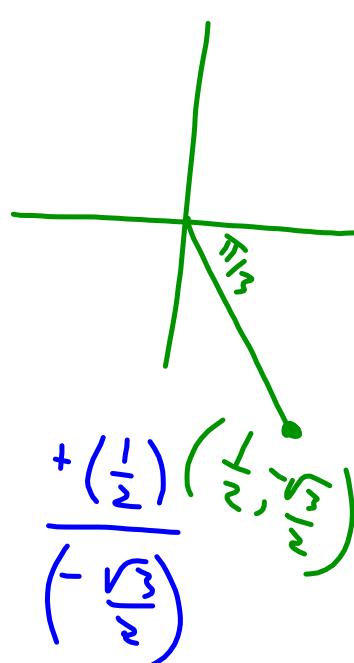
$= \left(-\sqrt{2}\right)^2 (-1) + \left(-\dfrac{1}{\sqrt{3}}\right)^2$

$= 2(-1) + \dfrac{1}{3}$

$= -\dfrac{2}{1} + \dfrac{1}{3}$

$= -\dfrac{6}{3} + \dfrac{1}{3} = \boxed{-\dfrac{5}{3}}$

Homework: Worksheet - Sketching Angles in Radians.doc

Solutions...

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

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

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

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

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

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

7. 0

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

Introduction to Trigonometric Equations

trigonometric equation

- an equation involving trigonometric ratios

Focus on...

- algebraically solving first-degree and second-degree trigonometric equations in radians and in degrees
- verifying that a specific value is a solution to a trigonometric equation
- identifying exact and approximate solutions of a trigonometric equation in a restricted domain
- determining the general solution of a trigonometric equation

Did You Know?

In equations, mathematicians often use the notation $\cos^2 \theta$. This means the same as $(\cos \theta)^2$.

Are you proficient with the trigonometric functions on your calculator???

$$\sin 38° = 0.6157 \qquad \cos 13 = 0.9074$$

$$\sec 148° = \ominus 1.1792 \qquad \boxed{\tfrac{1}{x}} \text{ or } \boxed{x^{-1}}$$

$$\cos 148° =$$

$$\csc(-170°) = -5.7588$$

$$\cos(148°)^{-1}$$

$$\sec \theta = 1.\underline{4398}, \ \theta \ \underline{\text{in degrees}}$$

$$\theta = 46°$$

$$\cos^{-1}(1.4398^{-1})$$

$$\csc \theta = 2.7934, \ \theta \text{ in Radians}$$

$$\theta = \underline{0.37}$$

Let's start with basic LINEAR trigonometric equations...

Solve: $\sin \theta = 0.9659$, $-360° < x < 720°$

$\oplus$

...Pre-Calculus 110
- Reference angle?
- Which quadrants?
- Any co-terminal angles acceptable?

- If the domain is in degrees, give solutions in degrees.
- If the domain is in radians, give solutions in radians.

$180° - \theta$	θ
$180° + \theta$	$360° - \theta$

$180° - \theta$

$180° + \theta$ $360° - \theta$

$(\text{Ref} \angle : 75°, \text{Q } 1,2)$

$\theta = 75°, 105°, 435°, 465°$
          $+360°$ $+360°$

$-360° \rightarrow$

$-285°, -255°$

$\cos \theta = -0.3842$, $0° \leq \theta \leq 1080°$
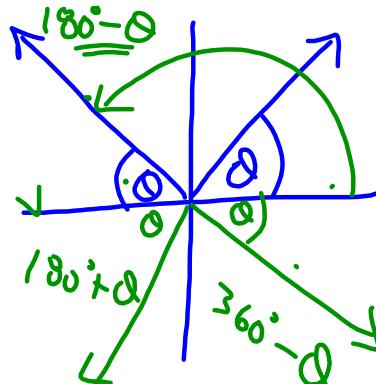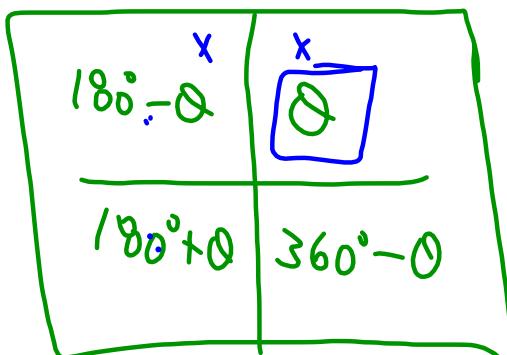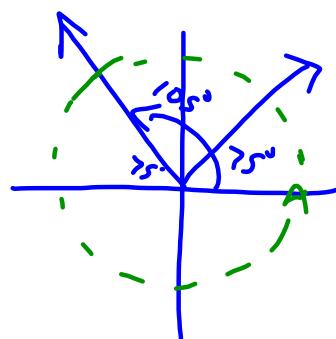
Do NOT put the negative finding in your calculator when finding the reference angle

$(\text{Ref} \angle 67°, \text{Q } 2,3)$

Q2
$\theta = 180° - 67°$
$= 113°$
$= 473°$
$= 833°$

Q3
$\theta = 180° + 67°$
$\theta = 247°$
$= 607°$
$= 967°$

Attachments

Worksheet - Sketching Angles in Radians.doc