

**Math 105, Precalculus**  
**Homework 4**

15 pts

Name \_\_\_\_\_  
Due Monday, Dec 21<sup>st</sup>, 3:00 pm

Show all work neatly to receive credit for your answers. You may use your copy of the unit circle.

5

1. Consider the angle  $\theta = -\frac{3\pi}{4}$ .

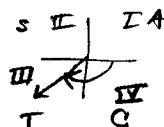
a) Express  $-\frac{3\pi}{4}$  radians as degrees:  $-135^\circ$   $-\frac{3\pi}{4} \cdot \frac{180^\circ}{\pi} = -3(45^\circ) = -135^\circ$

b) In what quadrant does the terminal side of this angle lie? III

c) What is the exact value of  $\cos -\frac{3\pi}{4}$ ?  $-\frac{\sqrt{2}}{2}$  (because  $\cos -\frac{3\pi}{4} < 0$ )

d) What is the exact value of  $\tan -\frac{3\pi}{4}$ ? 1 ( $\tan -\frac{3\pi}{4} > 0$ )

e) Find two angles that are coterminal with the angle  $\theta = -\frac{3\pi}{4}$ .  
 $-11\pi$  (-495°),  $\frac{5\pi}{4}$  (225°),  $\frac{13\pi}{4}$  (585°)  
 $-135 + 360 = 225^\circ$   
 $-135 - 360 = -495^\circ$



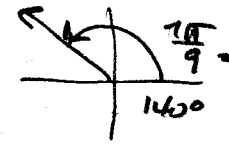
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2. Consider the angle  $140^\circ$ .

a) Express  $140^\circ$  as radians:  $\frac{7\pi}{9}$  rad.  $140 \cdot \frac{\pi}{180} = \frac{140\pi}{180} = \frac{7\pi}{9}$

b) In what quadrant does the terminal side of this angle lie? II

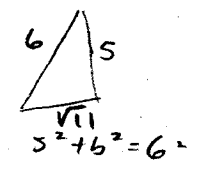
c) Find an angle that is coterminal with the angle  $140^\circ$ .  $500^\circ$ ,  $-220^\circ$  ( $\frac{25\pi}{9}$ ,  $-\frac{11\pi}{9}$ , etc.)



2 1/2

3. Find the exact values of the following functions of the angle  $\theta$  in Quadrant I, when  $\sin \theta = \frac{5}{6}$ . (Do not give decimal approximations for your answers.)

a)  $\cos \theta = \frac{\sqrt{11}}{6}$ ; b)  $\tan \theta = \frac{5}{\sqrt{11}}$   
c)  $\sec \theta = \frac{6}{\sqrt{11}}$ ; d)  $\csc \theta = \frac{6}{5}$ ; e)  $\cot \theta = \frac{\sqrt{11}}{5}$



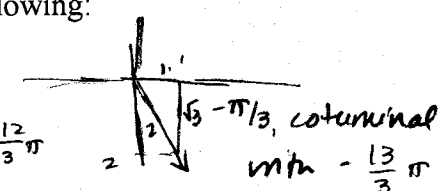
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4. (6 points) Find the exact value for the following:

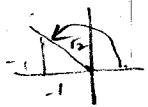
a)  $\sin -\frac{13\pi}{3} = -\frac{\sqrt{3}}{2}$

$-\frac{13\pi}{3}$  coterminal with  $-\frac{1}{3}\pi$  (add  $4\pi = \frac{12\pi}{3}$ )

b)  $\sec(135^\circ) = -\frac{\sqrt{2}}{1} = -\sqrt{2}$



$25 + b^2 = 36$   
 $b^2 = 36 - 25 = 11$   
 $b = \sqrt{11}$



5. Find the radius of the circle if an arc of length 12 m on the circle subtends a central angle of  $60^\circ$ . 36/pi m.

$s = r\theta$ ,  $\theta$  in radians

$60^\circ \cdot \frac{\pi}{180^\circ} = \frac{\pi}{3}$  radians  
 $\frac{3}{\pi} \cdot 12 = r \cdot \frac{\pi}{3} \cdot \frac{3}{\pi} \Rightarrow r = \frac{36}{\pi}$

