

1. (2pts) Convert into the other angle measure (radians or degrees). Show how you computed your number.

$$70^\circ =$$

$$\frac{7\pi}{6} \text{radians} =$$

2. (8pts) Without using the calculator, find the exact values of the following trigonometric expressions. Draw the unit circle and the appropriate angle under the expression.

$$\cos 150^\circ =$$

$$\tan \frac{4\pi}{3} =$$

$$\sec(-270^\circ) =$$

$$\sin \frac{26\pi}{3} =$$

3. (2pts) Use your calculator to evaluate (round to 4 decimals):

$$\sec 115^\circ =$$

$$\tan \frac{4\pi}{9} =$$

4. (5pts) In a right triangle, the leg opposite angle  $\theta$  has length 3 and the hypotenuse has length 8. Compute  $\cos \theta$ ,  $\csc \theta$  and  $\tan \theta$ .

5. (5pts) Use fundamental identities and complementary angles to simplify:

$$\frac{\sin 40^\circ}{\sin 50^\circ} - \tan 40^\circ =$$

$$\sin 65^\circ \csc 65^\circ + \cos 41^\circ \csc 49^\circ =$$

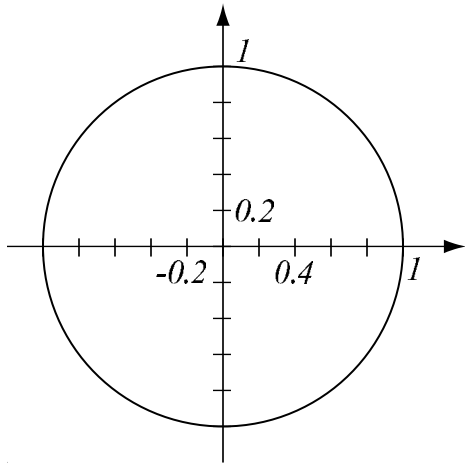
6. (4pts) Use the odd-even and periodicity properties to figure out:

a) If  $\sin \theta = 0.7$ , what is  $\sin(-\theta)$ ?

b) If  $\cos \theta = -0.35$ , what is  $\cos(-\theta)$ ?

c) If  $\sin \theta = 0.15$ , what is  $\sin \theta + 2 \sin(\theta + 4\pi) - 3 \sin(\theta - 6\pi)$ ?

7. (4pts) Use the picture below to estimate  $\sin \frac{5\pi}{8}$  and  $\cos \frac{5\pi}{8}$ . Compare your answer with results you get with a calculator.



	estimate	calculator
$\cos \left( \frac{5\pi}{8} \right) =$		
$\sin \left( \frac{5\pi}{8} \right) =$		

8. (5pts) If  $\cos \theta = \frac{1}{3}$  and  $\theta$  is in the fourth quadrant, find  $\sin \theta$ ,  $\cot \theta$ ,  $\sec \theta$ . Draw a picture.

9. (5pts) A Ferris wheel of diameter 70ft has rotated  $35^\circ$  between two stops. What is the distance (length of arc) that a point on the rim of the Ferris wheel has traveled?

**10.** (5pts) The Moon revolves around Earth on an approximately circular orbit with radius 384,400km. What is the Moon's linear speed (in km/hr) if it completes one full revolution in 27.32 days?

**11.** (5pts) A ship is just offshore of New York City. A sighting is taken of the Statue of Liberty, which about 305 feet tall. If the angle of elevation to the top of the statue is  $20^\circ$ , how far is the ship from the base of the statue?

**Bonus.** (5pts) Find the area of a right triangle, if its hypotenuse is 6cm and one of its angles is  $37^\circ$ .