

1. (4pts) Roughly sketch angles whose measures are:

70°

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

-405°

$\frac{5\pi}{3}$

2. (3pts) Convert into the other angle measure (radians or degrees). Show how you computed your number.

$50^\circ =$

$\frac{2\pi}{5}$ radians =

3. (2pts) Use your calculator to compute (pay attention to the mode you are in):

$\tan 17^\circ =$

$\sec \frac{\pi}{7} =$

4. (4pts) Compute the exact values (do not use the calculator):

$\sin 30^\circ + \cos 45^\circ =$

$\tan \frac{\pi}{3} - \cos^2 \frac{\pi}{4} =$

5. (5pts) In a right triangle, the leg adjacent to angle θ has length 2 and the hypotenuse has length 3. Compute $\sin \theta$, $\csc \theta$ and $\tan \theta$.

6. (5pts) If θ is an acute angle and $\sin \theta = \frac{3}{7}$, find $\cot \theta$, $\sec \theta$ and $\cos \theta$.

7. (5pts) The point $(-4, 3)$ is on the terminal side of the angle θ that is in standard position. Compute $\sin \theta$, $\cot \theta$ and $\sec \theta$.

8. (6pts) Use trigonometric identities in order to simplify the following expressions. Show all your steps. Do not use the calculator.

$$\cos 70^\circ \cdot \csc 20^\circ =$$

$$\tan^2 \frac{\pi}{5} - \sec^2 \frac{\pi}{5} =$$

$$\tan 25^\circ - \frac{\sin 25^\circ}{\sin 65^\circ} =$$

9. (5pts) Use the reference angle to compute the exact values of the following angles. Sketch the picture and do not use the calculator.

$$\sin 135^\circ$$

$$\tan \frac{7\pi}{6}$$

10. (3pts) A wheel rotates 40 rounds per minute. Find the angular velocity of the wheel and express it in radians per second.

11. (4pts) A Ferris wheel of diameter 100ft has rotated 40° between two stops. What is the distance (length of arc) that a point on the rim of the Ferris wheel has traveled?

12. (4pts) A water sprinkler sprays water over a distance of 20ft while rotating through an angle of 100° . What area of lawn receives water?

Bonus (5pts) Consider a right triangle whose hypotenuse has length 1 and let θ be one of the acute angles in that triangle. The area of the triangle will depend on the size of θ .

a) Find the formula for the area of the triangle in terms of θ . (Hint: find the lengths of the legs first.)

b) Graph the function on your calculator and determine for which θ the area of the triangle is the greatest. What is the greatest possible area of the triangle?