Name: _____

## Math 32, Spring 2010, Section 101
Quiz 8 Solutions

(1) (3 pts) If $\sin t = \sqrt{3}/4$ and $5\pi/2 < t < 3\pi$, compute $\tan t$.

We know that $|\cos t| = \sqrt{1 - \sin^2 t} = \sqrt{13/16} = \sqrt{13}/4$. Since $5\pi/2 < t < 3\pi$, the point $(\cos t, \sin t)$ is in the second quadrant, so $\cos t$ is negative. Hence $\cos t = -\sqrt{13}/4$. This gives $\tan t = \sin t / \cos t = -\sqrt{3/13}$.

(2) (4 pts) A wheel of radius 12cm spins at 6 revolutions per second. (a) Find the angular speed of the wheel in radians/second. (b) Find the linear speed, in units of cm/sec, of a point halfway between the center of the wheel and the circumference.

Each revolution is 2π radians, so the angular speed is 12π radians per second. A point halfway only the wheel is moving along a circle of radius 6cm, and so is moving 12πcm (the circumference of this circle) with each revolution. Hence it is moving $6 \cdot 12\pi = 72\pi$cm/sec.

(3) (3 pts) The following figure shows a sector with central angle α (in radians) in a circle of radius r. Find a formula for the area of the shaded region in terms of α and r.
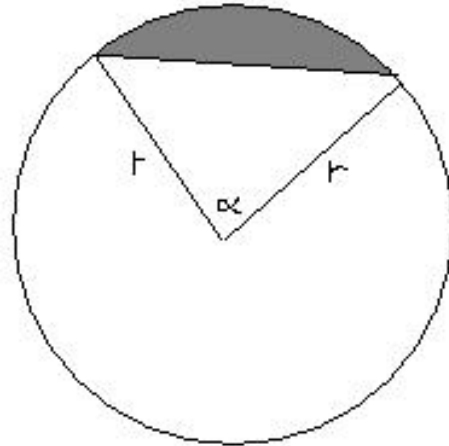
The area of the whole sector is $\frac{1}{2}r^2\alpha$, and the area of the triangle is $\frac{1}{2}r^2\sin\alpha$. Thus the area of the shaded region is $\frac{1}{2}r^2(\alpha - \sin\alpha)$.