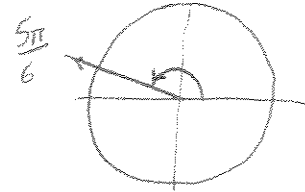# M1060-2 QUIZ 1 (Spencer Stirling) - September 2, 2010

Directions: You may attach more sheets if necessary. SHOW ALL WORK and CLEARLY mark your solutions.

1) (4 points) Find at least two coterminal angles to the angle given, and sketch the angle on the unit circle

(a) $\frac{5\pi}{6}$ coterminal angles (there are many)

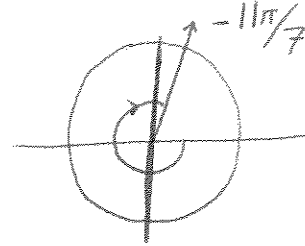$$\frac{5\pi}{6} + 2\pi = \frac{5\pi}{6} + \frac{12\pi}{6} = \frac{17\pi}{6}$$

$$\frac{5\pi}{6} - 2\pi = \frac{5\pi}{6} - \frac{12\pi}{6} = \boxed{-\frac{7\pi}{6}}$$

(b) $-\frac{11\pi}{7}$ coterminal angles

$$-\frac{11\pi}{7} + 2\pi = -\frac{11\pi}{7} + \frac{14\pi}{7} = \boxed{\frac{3\pi}{7}}$$

$$-\frac{11\pi}{7} - 2\pi = -\frac{11\pi}{7} - \frac{14\pi}{7} = \boxed{-\frac{25\pi}{7}}$$

2) (2 points) Convert each angle into radians. Leave your answer in terms of π (i.e. do NOT use a calculator)

(a) $315°$

$$(315°)\left(\frac{\pi}{180°}\right) = \frac{315}{180}\pi = \frac{105}{60}\pi = \boxed{\frac{21}{12}\pi}$$

(b) $-144°$

$$(-144°)\left(\frac{\pi}{180°}\right) = \boxed{-\frac{4}{5}\pi}$$

3) (2 points) Convert each angle into degrees. Leave your answer in terms of a fraction (i.e. do NOT use a calculator)

(a) $\frac{7\pi}{3}$

$$\left(\frac{7\pi}{3}\right)\left(\frac{180°}{\pi}\right) = \boxed{420°}$$

(b) $-\frac{34\pi}{15}$

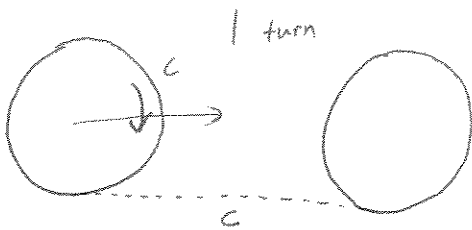$$\left(-\frac{34\pi}{15}\right)\left(\frac{180°}{\pi}\right) = (-34)(12°) = \boxed{-408°}$$

4) (6 points) A car is moving at a speed of 65 miles per hour, and the diameter of its wheels is 2.5 feet. Recall that there are 5280 feet in a mile.
(a) Find the number of revolutions per minute (RPM) that the wheels are rotating
(b) Find the angular speed of the wheels in radians per *second*

a) $\left(65 \frac{miles}{hr}\right)\left(\frac{5280 \, ft}{1 \, mile}\right)\left(\frac{1 \, hr}{60 \, min}\right) = 5720 \, \frac{ft}{min}$ ← 65 mph converted to ft/min

circumference $c = \pi d = (\pi) 2.5 \, ft = 2.5\pi \, ft = c$

In one full turn of wheel car travels c distance

1 turn

$M \sim revolution = 2.5\pi \, ft$

so car travels $\frac{2.5\pi \, ft}{1 \, revolution}$

so $\frac{\# \, revolutions}{min} = \left(\frac{5720 \, ft}{min}\right)\left(\frac{revolution}{2.5\pi \, ft}\right) \approx \boxed{728.3 \, \frac{rev}{min}}$

b) convert to $\frac{rad}{sec}$

$\omega = \left(728.3 \, \frac{revolutions}{min}\right)\left(\frac{2\pi \, rad}{revolution}\right)\left(\frac{1 \, min}{60 \, sec}\right) =$

$\boxed{\omega = 76.3 \, \frac{rad}{sec}}$