STANDARDS: HS.P.C.57 _____ HS.P.C.58_____

Name: Answer Key Period: _____ Date: _____

HS.P.C.57, HS.P.C.58 Assessment

HS.P.C.57	I can calculate the magnitude and direction of the acceleration for a particle experiencing uniform circular motion.	

1. A ceiling fan spins at a rate of 30 rotations in 60 seconds. If a sock is stuck on the end of the 0.45 meter blade...

   a. What is the circumference of the circular path the sock travels?

   $cir = 2\pi r$

   $= 2\pi(.45)$

   $\boxed{cir = 2.83\ m}$

   b. What is the tangential speed that the sock travels as it is spun around?

   T = period = time to go around once = $\frac{60}{30} = 2\ sec$

   $V = \frac{2\pi r}{T}$

   $V = \frac{2\pi(.45)}{2}$

   $\boxed{V = 1.42\ m/s}$

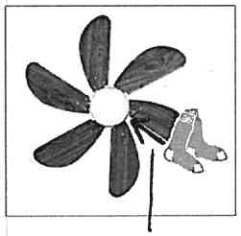
   c. What is the centripetal acceleration of the sock as it is spun around?

   $a_c = \frac{V^2}{r}$

   $a_c = \frac{(1.42)^2}{.45}$

   $\boxed{a_c = 4.48\ m/s^2}$

   d. Draw the direction of the **acceleration** the sock experiences on the picture below:



acceleration is pointed inward.

HS.P.C.58	I can use Newton's 2nd Law to solve problems for a particle experiencing uniform circular motion	

2. A 2000 kg car is traveling on a circular track with a radius of 150 meters at a constant speed of 25 m/s.

   e. What is the centripetal acceleration of the car?

   $a_c = \frac{V^2}{r}$

   $a_c = \frac{25^2}{150}$

   $\boxed{a_c = 4.17\ m/s^2}$

   f. What is the centripetal force acting on the car?

   $F_c = ma_c$

   $F_c = (2000)(4.17)$

   $\boxed{F_c = 8,340\ N}$