

## Assignment #8

Due on Wednesday, October 2, 2013

**Read** Section 1.3 on *Real World Measurements: Dealing with Units*, on pages 41–57 in the text.

**Do** the following problems

1. If a circle of radius 10 meters has its radius decreased by 2 meters, by what percent is its area decreased?
2. A fire starts in a dry, open field and spreads in a circular shape. Suppose the radius of this circle increases at a rate of 6 ft/min. If the fire is spotted when the diameter of the burning area is  $1/2$  mile, what is the area of the fire 30 minutes later? (Recall that 1 mile = 5280 feet.)
3. A \$200,000 Ferrari goes from 0 to 60 mph in 4 seconds. How long will it take to reach its maximum speed of 195 mph? Explain your reasoning and state all your assumptions.
4. A patient must be given a medication every 5 hours starting at 10:00 am on Thursday. What is the first day on which the patient will receive the medication at noon?
5. The pressure  $P$  of enclosed gas varies directly as the absolute temperature  $T$  (measured in Kelvins), and inversely as the volume  $V$ . If  $500 \text{ ft}^3$  of gas yields a pressure of 10 pounds per square foot at a temperature of 300 Kelvins, what will be the pressure of the gas if the volume is decreased to  $300 \text{ ft}^3$  and the temperature increased to 360 Kelvins?

*Note:* If  $T_C$  denotes the temperature in degrees Celsius, and  $T$  the absolute temperature measured in Kelvins, then  $T = 273 + T_C$ ; thus, 1 degree Celsius is equivalent to 1 Kelvin, and an absolute temperature of 0 Kelvin corresponds to  $-273$  degrees Celsius.