

## Assignment MathCAD 1

# 1. Unit Conversions: (a)  $2.998 \times 10^8 \text{ m/s} = \text{_____ mph}$       (b)  $62.3 \text{ lb/ft}^3 = \text{_____ kg/m}^3$   
(c)  $0.08206 \text{ L} \times \text{atm}/(\text{mole} \times \text{K}) = \text{_____ joule}/(\text{mole} \times \text{K})$       (d)  $0.01 \text{ poise} = \text{_____ lb}/(\text{ft} \times \text{sec})$

#2. Calculate surface area and volume of a donut with  $R = 3 \text{ cm}$ , and  $r = 1.5 \text{ cm}$ .

$$A = 4\pi^2 Rr \quad \text{and} \quad V = 2\pi^2 Rr^2$$

#3. A glass cylinder fitted with a movable piston contains 5 gm. of Cl gas. When the gas is at room temperature ( $25^\circ\text{C}$ ), the piston is 2 cm from the bottom of the container. The pressure on the gas is 1 atm. What is the volume of gas in the glass cylinder (in liters)?

Use formula:  $PV = NRT$

P, V and T represent pressure, volume ( $\pi r^2 h$ ) and temperature of moles of gas.  $N = (5/35.45) \text{ mole}$   
 $R = 0.08206 \text{ L} \times \text{atm}/(\text{mole} \times \text{K})$ .

#4. The solution of a quadratic equation ( $ax^2 + bx + c = 0$ ) is  $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Find the solutions of the following equations: (a)  $-2x^2 + 3x + 4 = 0$     (b)  $3x^2 + 2x - 1 = 0$

#5. An odd-shaped corner lot is up for sale. The “going rate” for property in the area is \$3.60 per square foot. (a) Determine the corner angle,  $\alpha$  in degrees (1 degree =  $180/\pi$  radian). (b) What is the area of the lot in square feet? In acres? (c) How much should the seller ask for the property?

