

## ▼ HW7: Conditionals and Functions

### ▼ Problem 1

(a) x is given below. Write an if statement that will print whether x is positive, negative, or zero.

x=-10

(b) x and y are given below. Write an if statement that will print whether x and y are both positive, or both negative, or if one or both are zero.

x=-4 y=3.2

(c) Write a single line (condensed) if statement that will evaluate  $y = 1/x$  if x is not zero. If x is 0, then y=0. Print y.

(d) The ideal gas law is an approximation, but it is only a good approximation under certain circumstances. The general rule of thumb is: when the specific volume is greater than 5 L/mol for diatomic gases and 20 L/mol for all other gases. (Specific volume:  $\hat{V} = \frac{V}{n}$  )

$$\hat{V} = \frac{RT}{P} > 5L/mol$$
$$\dots\dots > 20L/mol$$

Write an if statement that will print the specific volume of O2, and state whether or not the ideal gas law is a good approximation.

T = 600 K

P = 15 atm

R = .08206 L\*Atm/(mol K)

## ▼ Problem 2

(a) Write a function called "sum" that takes two numbers and returns the sum of them.

(b) Write a function called "quad" that takes three numbers  $a$ ,  $b$ , and  $c$  as function arguments that are the coefficients of the quadratic formula  $ax^2 + bx + c = 0$ , and returns the two roots. Test your function on  $a = 1$ ,  $b = -1$ ,  $c = -2$ . You should get roots of 2 and -1.

(c) Functions are a convenient way to convert units. Write a function that converts

1. Celsius for Farhenheit
2. Farheneit to Celsius
3. Liters to Gallons
4. kg/h to lbm/s
5. Joules per hour to hp

## ▼ Problem 3

You are trying to decide which car to buy between a hybrid and non-hybrid. Hybrid cars often have a higher initial cost, but have lower fuel costs.

Hybrid Car - \$25,000 and gets 33 MPG

Non-Hybrid Car - \$15,000 and gets 19 MPG

You plan on keeping the car for five years, and after 5 years cars depreciate by 75%. You drive about 200 miles per week. Create a program that will print which car is the smarter economical decision, and the total cost (fuel cost + depreciation of car value). Also print how much money you would be saving for this car compared to the other car. Assume the cost of gas is \$2.20/gallon.

