CPSC 442 – Assignment #1

Problem 1: Write a function that computes the roots of a quadratic equation. The input to the function are the coefficients a, b, c of the quadratic equation e.g., with general form:

$$a\,x^2 + b\,x + c = 0$$

For example, if

$$x^2 + 5\,x + 6 = 0$$

Then compute_quadratic_roots function will be called as: compute_quadratic_roots(1,5,6)

Problem #2: Write a function that will return the total amount due for a loan after borrowing amount amt for n months with an interest rate of r%.

The formula for compound interest rate calculation is:

$$Total\ Amount\ =\ \mathrm{P}\,(1\ +\ \mathrm{r})^{n/12}$$

Where P is the starting principle amount. For example, if you borrowed $10,000 for 36 months at an interest rate of 5%, the amount after 36 months will be: $10000 * (1 + 0.05)^{36/12} = 11576.25$

The input to the compute_total_mount_with_compound_interest function will be p, r, and n.

Problem #3: Write a function that will return the monthly payment for a loan amount amt, interest rate r, and loan duration in months n. The formula for calculating the monthly payment is:

$$\mathrm{monthly\ \ payment} = \mathrm{amt} * \frac{r}{1200}\,\frac{(1+\frac{r}{1200})^n}{(1+\frac{r}{1200})^n - 1}$$

The inputs to the compute_monthly_payment function will be amt, r, and n.

Problem #4: Write a function that will compute the average of the highest and lowest number in a list.

Problem #5: Write a function that will convert a given temperature in Fahrenheit to Centigrade. The formula relating the Fahrenheit and Centigrade is: C 5 = $(F\ -\ 32)$ 9

$$\frac{C}{5} = \frac{(\mathrm{F}\ -\ 32)}{9}$$

Problem #6: Write a function to convert temperature given in Centigrade to Fahrenheit.

Problem #7: Write a function to compute the area of a circle, given its radius.

Problem #8: Write a function to compute the volume of a cylinder given its length and diameter.

***** Use 'Doctest' to test your functions as appropriate**