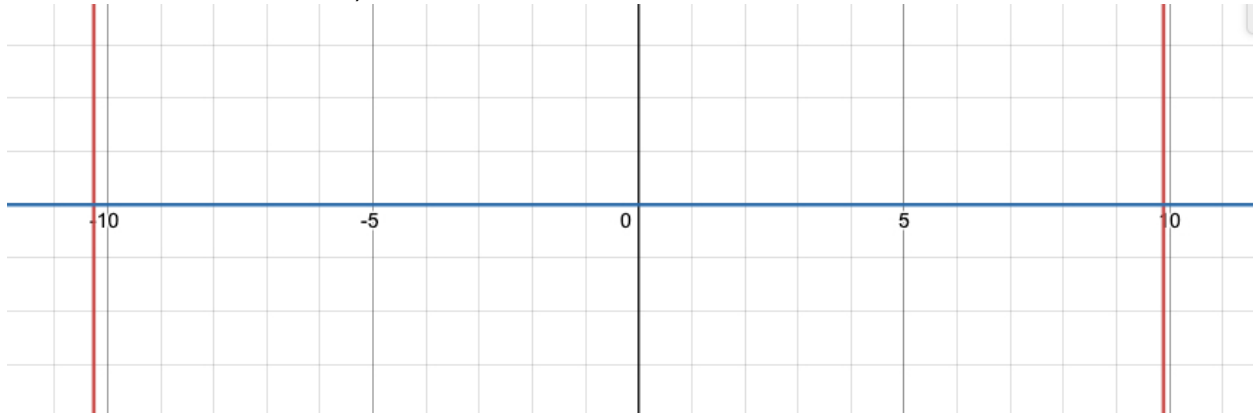Assignment: Module 3   Name: Hoyoung kim

Disclaimer: This is my work, not that of others

Total Score: 110

1. 10
2. 10
3. 10

1.Find the two real roots of the equation $x^4 - 3x^2 + 75x - 10000 = 0$. Both roots are in the range [-20, 20]. (You may want to use incremental search method or graph method to narrow down the intervals for both roots.)

Roots are some where between -11 , -10 and 9 , 10

When using bisectional with python program, the root comes down to
-10.260964393615723 [-10.260965347290039, -10.260963439941406]
9.886002540588379 [9.886001586914062, 9.886003494262695]

2.Find all roots of the equation $e^x - 3x = 0$. Explain how you set up your procedure to find the solutions. (Graph the function first to find out the where the initial intervals should be.)
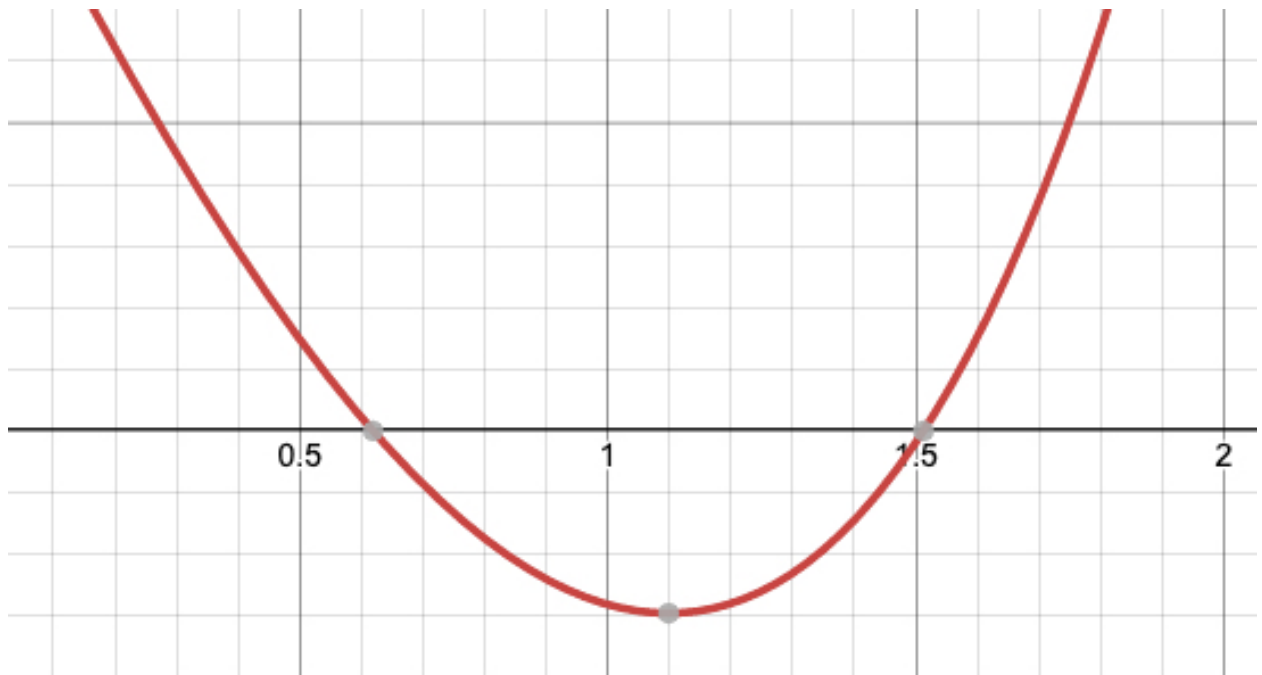
The beginning root bracket is 0,1 and 1, 2 and the root and the bracket when using bisectional through python program given in the book is below with the brackets

0.619061291217804, [0.6190612316131592, 0.6190613508224487]

1.5121344327926636, [1.512134313583374, 1.5121345520019531]

3.You plan for buy a Tesla Model S vehicle for $79,990 by paying 10% down and financing the balance over a 7-year term. You have budgeted a monthly payment of $1,000. So, now you need to shop for a loan at the required interest rate (or lower). The formula governs the loan calculation is

$$A = P \left(i(1+ i)^n / (1+ i)^n - 1 \right)$$

where A = the monthly payment, P = the loan amount, i = the monthly interest rate in a fraction, not a percentage (you need to divide the APR by 12), and n = the length of the loan in month. Use APR of 3% and 9% as the initial guesses.

 79,990 – 7,999 = 71,991 total after down
7*12 = 84 months
APR 3% /12 = 0.0025
APR 9%/12 = 0.0075
$0 = 71{,}991(i(1+i)^{84}/(1+i)^{84}-1)-1000$
Using 0.0025 and 0.0075 as a initial bracket in the equation above, when doing a bisectional below is the outcome
0.04479492545127868, [0.04479492187499999, 0.04479492902755736]