**Homework 4**

## Problem 1

Consider the array **A**.

$$\mathbf{A} = \begin{bmatrix} 3 & 5 & -4 \\ -8 & -1 & 33 \\ -17 & 6 & -9 \end{bmatrix}$$

Compute Matrix **B** by taking the natural log of all elements that are greater than or equal to 1, then add 20 to all values that are less than or equal to -1. do this 2 ways

*calculate B by using a for loop with conditional statements.

*Calculate B without a loop

## Problem 2

Consider the following script. Fill in the lines of the following table with the values that would be displayed immediately after the while statement if you ran the script. Write in the values the variables have each time the while statement is executed. You might need more or fewer lines in the table. Then type in the script file and run it to check your answers.

Investigate this link
https://www.mathworks.com/matlabcentral/answers/53832-how-to-display-obj-or-png-files-on-a-figure-window

To add a screenshot of the table you have filled out below to the code. You must also upload the original image file when you submit the assignment.

```
k = 1; b = -2; x = -1; y = -2;
while k <= 3 k,
        b, x, y
        y = x^2 - 3;
        if y < b
                b = y;
        end
        x = x + 1;
        k = k + 1;
end
```

| Pass | k | b | x | y |
|---|---|---|---|---|
| First | | | | |
| Second | | | | |
| Third | | | | |
| Fourth | | | | |
| Fifth | | | | |

## Problem 3

The following table gives the approximate values of the static coef cient of friction μ for various materials.

| **Materials** | **μ** |
|---|---|
| Metal on metal | 0.20 |
| Wood on wood | 0.35 |
| Metal on wood | 0.40 |
| Rubber on concrete | 0.70 |

To start a weight $W$ moving on a horizontal surface, you must push with a force $F$, where $F = \mu W$. Write a MATLAB program that uses the `switch` structure to compute the force $F$. The program should accept as input the value of $W$ and the type of materials.

## Problem 4

Suppose it is known that the graph of the function $y = ax^3 + bx^2 + cx + d$ passes through four given points $(x_i,y_i)$, i = 1,2,3,4. Ask the user to input four points and computes the coefficient a,b,c, and d. The function should solve four linear euqations in terms of the four unknown a,b,c and d. Test your function for the case where $(x_i,y_i)$ = (-2, -20), (0, 4), (2, 68), and (4, 508), whose answer is a = 7, b = 5, c = -6 and d = 4.

## Problem 5

The $(x, y)$ coordinates of a certain object as a function of time $t$ are given by

$$x(t) = 5t - 10 \qquad y(t) = 25t^2 - 120t + 144$$

for $0 \leq t \leq 4$. Write a program to determine the time at which the object is the closest to the origin at (0, 0). Determine also the minimum distance.

* use a for loop.
* the distance between two points (x1,y1) and (x2,y2) is given by

$$distance = \sqrt{(x2 - x1)^2 + (y2 - y1)^2}$$