Matlab Individual Assignment #1 (Part A & B)

Section #:_____Name: _____UIN: _____

1. Define the variables a and b as $a = -18.2$ and $b = 6.42$, then evaluate the following:

   (a) $1.5a - \dfrac{ab + b^2}{a} + 16a$

   (b) $\ln\left[\left(\dfrac{a}{b} - 1.5a\right)(b - a)\right] + \dfrac{2.5ab + b^2 + a}{-0.5ab - b^2 - a}$

2. The distance d from a point (x_0, y_0) to a line $Ax + By + C = 0$ is given by $d = \dfrac{|Ax_0 + By_0 + C|}{\sqrt{A^2 + B^2}}$. Determine the distance from the point $(3, -4)$ to the line $2x - 7y - 10 = 0$. First define the variables A, B, C, x_0, and y_0, then calculate d.

3. Create the matrix below by using colon notation and/or the **linspace** command to create each row:

$$B = \begin{bmatrix} 0 & 4 & 8 & 12 & 16 & 20 & 24 & 28 \\ 69 & 68 & 67 & 66 & 65 & 64 & 63 & 62 \\ 1.4 & 1.1 & 0.8 & 0.5 & 0.2 & -0.1 & -0.4 & -0.7 \end{bmatrix}$$

4. Show that $\lim\limits_{x \to 0} \dfrac{e^x - 1}{x} = 1$. Do this by creating a vector x that has elements: 1, 0.5, 0.1, 0.01, 0.001, 0.00001, and 0.0000001. Then, create a new vector $y = \dfrac{e^x - 1}{x}$ (remember to use element-by-element operations). Use format long to display the elements of y.

5. Plot the function $f(x) = \dfrac{40}{1 + (x - 4)^2} + 5\sin\left(\dfrac{20x}{\pi}\right)$ in the domain $0 \le x \le 10$.

6. The position (in meters) of a squirrel on a grass field as a function of time (in seconds) is given by $x(t) = -0.28t^2 + 6.5t + 61$, $y(t) = 0.18t^2 - 8.5t + 65$. Plot the position of the squirrel for $0 \le t \le 30$ seconds.