Homework 3

Problem 1

Plot columns 2 and 3 of the following matrix **A** versus column 1. The data in column 1 are time (seconds). The data in columns 2 and 3 are force (newtons).

$$\mathbf{A} = \begin{bmatrix} 0 & -7 & 6 \\ 5 & -4 & 3 \\ 10 & -1 & 9 \\ 15 & 1 & 0 \\ 20 & 2 & -1 \end{bmatrix}$$

Problem 2

Type this matrix in MATLAB and use MATLAB to carry out the following instructions.

$$\mathbf{A} = \begin{bmatrix} 3 & 7 & -4 & 12 \\ -5 & 9 & 10 & 2 \\ 6 & 13 & 8 & 11 \\ 15 & 5 & 4 & 1 \end{bmatrix}$$

a. Create a 4×3 array **B** consisting of all elements in the second through fourth columns of **A**.
b. Create a 3×4 array **C** consisting of all elements in the second through fourth rows of **A**.
c. Create a 2×3 array **D** consisting of all elements in the rst two rows and the last three columns of **A**.

Problem 3

Given the matrices

$$\mathbf{A} = \begin{bmatrix} 56 & 32 \\ 24 & -16 \end{bmatrix} \qquad \mathbf{B} = \begin{bmatrix} 14 & -4 \\ 6 & -2 \end{bmatrix}$$

Use MATLAB to

a. Find the result of **A** times **B** using the array product.
b. Find the result of **A** divided by **B** using array right division.
c. Find **B** raised to the third power element by element.

Problem 4

Use MATLAB to calculate

a. $6\pi \tan^{-1}(12.5) + 4$ *b.* $5 \tan[3 \sin^{-1}(13/5)]$

Problem 5

Use MATLAB to solve the following problems.

a.
$$\begin{aligned} -2x + y &= -5 \\ -2x + y &= 3 \end{aligned}$$

b.
$$\begin{aligned} -2x + y &= 3 \\ -8x + 4y &= 12 \end{aligned}$$

c.
$$\begin{aligned} -2x + y &= -5 \\ -2x + y &= -5.00001 \end{aligned}$$

d.
$$\begin{aligned} x_1 + 5x_2 - x_3 + 6x_4 &= 19 \\ 2x_1 - x_2 + x_3 - 2x_4 &= 7 \\ -x_1 + 4x_2 - x_3 + 3x_4 &= 30 \\ 3x_1 - 7x_2 - 2x_3 + x_4 &= -75 \end{aligned}$$

Problem 6

Use MATLAB to plot the function $T = 6 \ln t - 7e^{0.2t}$ over the interval $1 \leq t \leq 3$. Put a title on the plot and properly label the axes. The variable T represents temperature in degrees Celsius; the variable t represents time in minutes.

Problem 7

Check if 1 and 2 expressions are equivalent or not. Use matlab to check your answer for specific values of a,b,c, and d.

```
1. (a == b) & ((b == c)|(a == c))
2. (a == b)|((b == c)&(a == c))
```

Problem 8

Write programs that accepts a numerical value x from 0 to 100 as input and computes and displays the corresponding letter grade given by the following table. Solve by both (a) and (b) given below.

A	$x \geq 90$
B	$80 \leq x \leq 89$
C	$70 \leq x \leq 79$
D	$60 \leq x \leq 69$
F	$x < 60$

a. Use nested `if` statements in your program (do not use `elseif`).

b. Use only `elseif` clauses in your program.