

**UNIVERSITY OF JORDAN**  
**COMPUTER ENGINEERING DEPARTMENT**  
**CPE0907311 COMPUTER APPLICATIONS LAB**  
**LAB3 – ARITHMETIC OPERATIONS ON ARRAYS**

NAME:

ID NUMBER:

SECTION:

**OBJECTIVES**

This lab familiarizes the student with the Matlab capabilities for performing:

1. Element-by-element array operations.
2. Matrix mathematical operations.
3. Polynomial operations using arrays.

**PROBLEMS**

After launching Matlab, use the command prompt to solve the following problems. Submit your report to the lab engineer before quitting the lab.

1. Given the following matrices

$$A = \begin{bmatrix} 13 & -1 \\ 18 & -3 \end{bmatrix}$$

$$B = \begin{bmatrix} 15 & 3 \\ 2 & 12 \end{bmatrix}$$

$$C = \begin{bmatrix} 4 & 3 \\ 7 & 0 \end{bmatrix}$$

- a. Find  $A + B + C$ .
- b. Find  $A - B - C$ .
- c. Find the result of element-by-element multiplication of B and C.
- d. Find the result of A times C using matrix product.
- e. Find the result of A divided by B using element-by-element division.
- f. Find B raised to the fourth power using matrix product.
- g. Find the transpose of C.
- h. Find the inverse of B.

Part	Answer	Part	Answer
a		e	
b		f	
c		g	
d		h	

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2. A geometric series is defined as the sequence  $1, x, x^2, x^3 \dots$  in which the powers of  $x$  range from 0 to  $\infty$ . The sum of the terms in a geometric series converges to a limiting value of  $1/(1-x)$  if  $|x| < 1$ ; otherwise the sum diverges.
- For  $x = 0.75$ , compute the sum of the first 5 terms in the series and compare the result with the limiting value. Repeat for 10 and 50 terms. (Hint: generate a vector of integers to use as the exponent of  $x$ , and then use the sum function.)
  - Repeat with  $x = -0.75$ .

Part	Number of terms		
	5	10	50
a x = 0.75			
b x = -0.75			

3. Write a Matlab assignment statement for each of the following functions. Assume that  $w, x, y,$  and  $z$  are vector quantities of equal length, and  $c$  and  $d$  are scalars.

a. 
$$D = \frac{d}{\sqrt{\frac{2\pi c}{x}}}$$

b. 
$$G = \frac{x + w}{\frac{y}{2w} - \frac{z}{w + x}}$$

c. 
$$M = \frac{\sqrt{zx} e^{-\%_5y}}{(\ln y)}$$

d. 
$$T = \frac{(2.15x + 0.24y)^x}{z \log(1 - x)^y}$$

Part	Answer
a	
b	
c	
d	

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4. Use Matlab to find the result of the polynomial operations. Express your answer as polynomials.

Expression	Answer
$(8x^5 - 34x^3 + 2x^2 + 31x + 16)(x^2 - 5x + 6)$	
$\frac{34x^4 - 12x^3 + 123x^2 + 8x + 72}{x^6 - 4x^3 - 32}$	

5. SOLVE AT HOME AS EXERCISE !

Solve problems 5, 10, 15, 16, 19, and 41 from chapter 2 in the book.