

**Umm Al-Qura University**

**College of Engineering and Islamic Architecture**

**Electrical Engineering Department**

**Engineering Computational Methods**

**HOMEWORK # 1:**

**MATLAB Basics**

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| **INSTRUCTOR: ENGR. YASIR ISMAIL** | **SIGN:** |

Q.1. Evaluate the following MATLAB expressions yourself before checking the

answers in MATLAB:

2 / 2 \* 3 ans = 3

2 / 3 ˆ 2 ans =0.2222

(2 / 3) ˆ 2 ans = 0.4444

2 + 3 \* 4 – 4 ans= 10

2 ˆ 2 \* 3 / 4 + 3 power(2,2 \* 3 / 4 + 3 ) ans = 22.6274

2 ˆ (2 \* 3) / (4 + 3) power(2,(2 \* 3) / (4 + 3) ) ans = 1.8114\

2 \* 3 + 4 = 10

2 ˆ 3 ˆ 2 = power(2,power(3,2) ) ans = 512

Q2. Use MATLAB to evaluate the following expressions.

(a) ans = 1.5000

(b) 22×3 ans = 66

(c) 1*.*5×10−4+2*.*5×10−2 1.5\*power(10,-4)+2.5\*power(10,-2) ans = 0.0252

Q.3.Use MATLAB to evaluate the following expressions.

a.√2

ans =  
 1.4142

b.

3+4/5+6  
ans =  
  
 9.8000

c. Find the sum of 5 and 3 divided by their product

5+3/5\*3  
ans =  
  
 6.8000

d. (23)2

power(power(2,3),2)

ans = 6

e. Find the square of 2*π.*

power(2\*pi,2)

ans =  
  
 39.4784

f. 2*π*2.

2\* pow2(pi)

ans =  
  
 17.6500

Q.4.Use MATLAB array operations to do the following:

1. Add 1 to each element of the vector [2 3 -1].a = [2;3;-1] for i=1:length(a) a(i) = a(i)+1; end

2. Multiply each element of the vector [1 4 8] by 3. a = [1 4 8] for i=1:length(a) a(i) = a(i)\*3; end

3. Find the array product of the two vectors [1 2 3]and [0 -1 1].

Answer is here

a = [1 2 3]; b = [0 -1 1]

a .\* b  
ans =  
 0  
 -2  
 3

4. Square each element of the vector [2 3 1]. a = [2;3;1]

Answer is here

for i=1:length(a) a(i) = a(i)\*a(i); end

Q 5: Draw the graph of Cos(x) by using the values of x between 0 and 6×*π* and the increment is 0.2. ( make it with red color.)

Answer is here

t = 0:0.2:(6\*pi);

x = cos(t);

plot(x,'r');

Q 6: Solve the following equations by using Matrix Method Approach (assume a third equation from your mind):

x + y + z = 1

x – y + z = 0

x+ y - z = 5

answer is here

a = [ 1 1 1; 1 -1 1; 1 1 -1];

b = [1;0;5];

X = linsolve(A,B); disp(X)

2.5000  
 0.5000  
 -2.000

Q 7: solve the following equations by using built in solve function approach:

b – f + g – h = 2

b + f + g + h = 5

b + 2f + 4g + 8h = 1

answer is here

syms b f g h

eqn1 = b - 3\*f + 9\*g - 27\*h == -2;

eqn2 = b + f + g + h == 5;

eqn3 = b + 2\*f + 4\*g + 8\*h ==1;

sol = solve([eqn1, eqn2, eqn3], [b, f,g, h]);

xSol = sol.b

ySol = sol.f

zSol = sol.g

hSol = sol.h  
xSol =67/10  
ySol =-11/20  
zSol = -23/20  
hSol = 0

Q.8. write a for loop that will compute (as its only output) each of the following finite sums. Run it and give the answer (= the output). Use format rat so that all of the digits of these integer sums will be displayed.

a)1+ 2 + 3 + 4 +….+ 9999.

b) 5002 + 5012+ 5022 +….+15002.

c)√5002 -√5012 -√5022 -…..-√15002.

**Answer is here**

**a) sum = 0; for i=1:9999 sum = sum + i; end ans =** 49995000

**b)** **sum = 0; c = 0 ; for i=500:power(1500,2) sum = sum+ power(500+c,2); c = c + 1; end ans =** 3.7969e+18

**c) sum = 0; c = 0 ; for i=5002:sqrt(15002) sum = sum - sqrt(5002+c); c = c + 10; end**

**ans =** 0

Q.9. write a complete program to make a decision of student’s mark with all grades from A to F.

mark=input('enter the degree from 0-100...=')

if (mark>100)

disp('please add marks between 0-100')

elseif (mark<=100&mark>=90)

disp('A')

elseif (mark<=89&mark>=80)

disp('B')

elseif (mark<=79&mark>=70)

disp('C')

elseif (mark<=69&mark>=60)

disp('D')

else

disp('F')

end

Q.10. Write a program to create a 5x5 matrix of (1/2)’s and diagonal are all 0.25.

for i = 1 : 5

for j = 1 : 5

if i==j

kk(i,j) = 1/4;

end

if i~=j

kk(i,j) = 1/2;

end

end

end

disp (kk);