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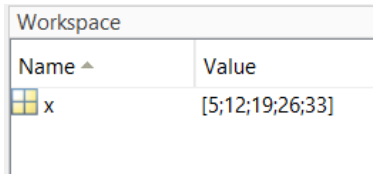
Section: 17460
Assignment: Lab 4

Problem 4.1 Create a column vector using ":" that goes from 5 to 35 in steps of 7. Show the command you used.

```
>> x = [5:7:35]'

x =

     5
    12
    19
    26
    33
```



Problem 4.2 Consider matrix M: $\begin{bmatrix} 0 & 2 & 3 & 5 \\ 7 & 3 & 8 & 4 \end{bmatrix}$ and matrix N: $\begin{bmatrix} 1 & 1 & 3 \\ 4 & 5 & 6 \\ 9 & 4 & 8 \end{bmatrix}$. Enter the MATLAB commands to produce M and N. Check the output and make sure it matches the requirement as we will use these matrices in some calculations below.

```
>> M = [0 2 3 5; 7 3 8 4]

M =

     0     2     3     5
     7     3     8     4

>> N = [1 1 3
4 5 6
9 4 8]

N =

     1     1     3
     4     5     6
     9     4     8
```

Problem 4.3 Define a vector D as [-5.0 1.0 -3.0 3.0] and write the results of these operations: A+D, A-D, (2*D)-B', D-57, A/4, 3*D

```
>> A + D

ans =

    -4     3     0     7

>> A - D

ans =

     6     1     6     1

>> (2*D)-B'

ans =

   -16    -5   -14    -3

>> D-57

ans =

   -62   -56   -60   -54

>> A/4

ans =

    0.2500    0.5000    0.7500    1.0000

>> 3*D

ans =

   -15     3    -9     9
```

Problem 4.4 Type the command to return the fourth element (index 4) in vector D.

```
>> D(4)

ans =

     3
```

Problem 4.5 Write the command you would use to retrieve the number 6 from the matrix N (look back in this exercise to see where in N the number 6 is.)

```
>> N(2,3)

ans =

     6
```

Problem 4.6 Write a single command to store the all the rows of columns 1, 2, and 3 of matrix M into a matrix named partOfM

```
>> partOfM = M(:, 1:3)

partOfM =

     0     2     3
     7     3     8
```

Problem 4.7 Find the sizes of A and M using MATLAB. Copy/paste the commands you used and their results.

```
>> size(A)

ans =

     1     4

>> size(M)

ans =

     2     4
```

Problem 4.8 What is the output from the following commands if entered in the Command Window?

```
>> inputvector = [0 3 3.3];
>> f(inputvector)

ans =

   -0.1086   -0.0529   -0.0725
```

Problem 4.9 Once you have saved your function, e.g. "fscalar.m", execute the following commands in the Command Window. What are the results of these commands? Why does MATLAB give these results?

```
>> fscalar(0.67)

ans =

   -0.0319

>> vectorinput = [1 -2 2];
>> fscalar(vectorinput)
Error using  ^  (line 51)
Incorrect dimensions for raising a matrix to
a power. Check that the matrix is square and
the power is a scalar. To perform
elementwise matrix powers, use '.^'.

Error in fscalar (line 2)
value = (3/500)*(x^3 - 10.535*x^2 + 25.697*x
- 18.099);
```

The first command works because the function can take in a scalar x-value and return a value. The "fscalar(vectorinput)" command returns an error because the "vectorinput" variable is a row vector while the function attempts to raise the vector variable to a power, so the dimensions of the operands don't match in this case.

Problem 4.10 Create function files **g** and **h** for the other two equations (Eq.4.2 and Eq.4.3). Make sure that the function **g** can accept either a scalar or a vector, or a matrix. Function **h** will require the use of an **if** statement to set value. Function **h** should accept a scalar variable (not a vector or matrix). Print out the functions to turn in.

Function h accepts a vector matrix if and only if all the x-values are less than 12.

```
function value = g(x)
value = -1.23.*x.*exp(sin(x)).*exp(-3.*x) - 71.4;


function value = h(x)
if x < 12
    value = 0;
else
    value = 12*x^2 - 12;
end
```