

Economics Homework 1

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Question 1:

Code:

```
% Define vector X
x = [1, 1.5, 3, 4, 5, 7, 9, 10];

% Compute The Values for  $y_1 = -2 + 0.5x$ 
y1 = -2 + 0.5.*x;

% Display y1
disp(y1')
```

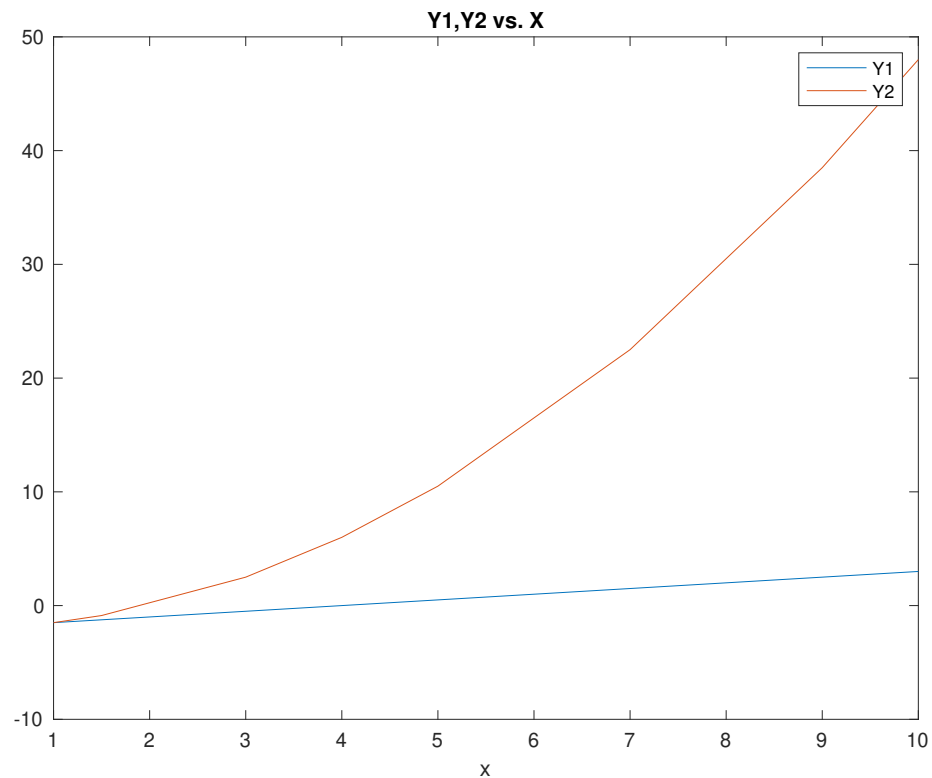
```
-1.5000
-1.2500
-0.5000
 0
 0.5000
 1.5000
 2.5000
 3.0000
```

```
% Compute the values for  $y_2$ 
y2 = -2 + 0.5 .* x.^2;

% Display y2
disp(y2')
```

```
-1.5000
-0.8750
 2.5000
 6.0000
10.5000
22.5000
38.5000
48.0000
```

```
% Plot Y1, Y2 vs X
figure
plot(x, y1, x, y2)
title("Y1,Y2 vs. X")
xlabel("x")
legend("Y1", "Y2")
```



Question 2

Code:

```
% Create x vector
x = linspace(-10, 20);

% Calculate and display sum of the elements of x
sum_x = sum(x)

sum_x = 500.0000
```

Question 3

Code:

```
% Create A matrix
A = [2, 4, 6; 1, 7, 5; 3, 12, 4];

% Create vector b
b = [-2; 3; 10];

% Calculate and display C = A'b
C = A'*b;

% Calculate and display D = ((A'A) ^ (-1))*b
D = inv(A'*A)*b
```

```
D = 3x1
    -3.2505
     0.3961
     0.8037
```

```
% Calculate and Display E = sum_i (sum_j a_ij * b_i)
E = sum(sum(A.*b))
```

```
E = 205
```

```
% F matrix is matrix with the 2nd row and 3rd ...
    column deleted

% Initialize F to A
F = A;

% Delete 2nd row
F(2,:) = [];

% Delete 3rd column and display F
F(:,3) = []
```

```
F = 2x2
     2     4
     3    12
```

```
% Solve the system Ax=b
x=A\b
```

```
x = 3x1
    -0.1622
     1.2432
    -1.1081
```

Question 4

Code:

```
% Create block diagonal matrix

% Initialize B to a 15 x 15 zero matrix
B=blkdiag(A,A,A,A,A)
```

```
B = 25x15
     0     0     1     0     0     0     0     0     0     0     0     0     0     0     0
     1     0     1     0     0     0     0     0     0     0     0     0     0     0     0
     1     1     0     0     0     0     0     0     0     0     0     0     0     0     0
     1     0     0     0     0     0     0     0     0     0     0     0     0     0     0
     0     1     0     0     0     0     0     0     0     0     0     0     0     0     0
     0     0     0     0     0     1     0     0     0     0     0     0     0     0     0
     0     0     0     1     0     1     0     0     0     0     0     0     0     0     0
     0     0     0     1     1     0     0     0     0     0     0     0     0     0     0
     0     0     0     1     0     0     0     0     0     0     0     0     0     0     0
     0     0     0     0     1     0     0     0     0     0     0     0     0     0     0
     ⋮
     ⋮
```

Question 5

Code:

```
% Create 5x3 matrix of randome distributions with ...
mu= 10 and std=5
```

```
A=10+5*randn(5,3)
```

```
A = 5x3
     6.9984    -0.6918    10.6202
    12.4498     5.8021    17.1835
    13.6968    16.7730     0.1955
    18.5594     4.6392     9.0115
     9.0294    14.8048     3.9608
```

```
% Replace the elements of A that are less than 10 ...
    with 0
A(A < 10) = 0;

% Replace the elements of A that are equal or ...
    greater than 10 with 1
A(A >= 10) = 1
```

```
A = 5x3
    0     0     1
    1     0     1
    1     1     0
    1     0     0
    0     1     0
```

Question 6

Code:

```
% Import CSV file
data = csvread('datahw1.csv');

T = readtable('datahw1.csv', 'ReadVariableNames', ...
    false);

% Modify variable names
T.Properties.VariableNames = {'FirmID', 'Year', ...
    'Export', 'RD', 'prod', 'cap'}

fitlm(T, 'prod~Export + RD + cap')
```

Linear regression model:
 $\text{prod} \sim 1 + \text{Export} + \text{RD} + \text{cap}$

Estimated Coefficients:

	Estimate	SE	tStat	pValue
(Intercept)	0.082548	0.016719	4.9374	8.21e-07
Export	0.11985	0.0063193	18.966	3.7356e-77
RD	0.13992	0.0085321	16.399	1.0565e-58
cap	0.029443	0.0017827	16.516	1.7144e-59

Number of observations: 4389, Error degrees of freedom: 4385
 Root Mean Squared Error: 0.178
 R-squared: 0.353, Adjusted R-Squared 0.353
 F-statistic vs. constant model: 798, p-value = 0