**Exercise 1:**

**Code:**

% Finding determinants of matrices

B = [5, 7, 8;-3, 0, 4; -11, 10, 6];

D = [8, -4; 11, 15; 6, 27];

det(B);

**Explanation:**

I used the det() command to find the determinant. Determinant of D cannot be calculated as it is not a square matrix.

**Result:**

Determinant of B is -622.

**Exercise 2:**

**Code:**

D(3,2)=-7;

**Explanation:**

This changed the entry in 3 row, second column from 27 to -7.

**Result:**

8 -4

11 15

6 -7

**Exercise 3:**

**Code:**

B = [5, 7, 8;-3, 0, 4; -11, 10, 6];

D = [8, -4; 11, 15; 6, 27];

V = [51;52;53];

B\_1=B;

B\_1(:,1)=V;

B\_2=B;

B\_2(:,2)=V;

B\_3=B;

B\_3(:,3)=V;

**Explanation:**

This code changed assigned the column matrix V, to different columns of matrices B\_1, B\_2 and B\_3.

**Result:**

Matrice V

51

52

53

Matrice B

5 7 8

-3 0 4

-11 10 6

Matrice B1

51 7 8

52 0 4

53 10 6

Matrice B2

5 51 8

-3 52 4

-11 53 6

Matrice B3

5 7 51

-3 0 52

-11 10 53

**Exercise 4:**

**Code:**

% Cramers Rule

A = [1, 3, -2, 4; -2, -3, -2, 1; 3, 3, 5, -9; 4, 9, -5, -4];

U = [13;-2;-22;-19];

A\_1=A;

A\_2=A;

A\_3=A;

A\_4=A;

A\_1(:,1)=U;

A\_2(:,2)=U;

A\_3(:,3)=U;

A\_4(:,4)=U;

A\_deter = det(A);

A1\_deter = det(A\_1);

A2\_deter = det(A\_2);

A3\_deter = det(A\_3);

A4\_deter = det(A\_4);

A1\_deter/A\_deter;

A2\_deter/A\_deter;

A3\_deter/A\_deter;

A4\_deter/A\_deter;

**Explanation:**

I followed Cramer’s rule by replacing the respective columns with matrix U, and dividing their determinants by the determinant of A.

**Result:**

Value of x = 5

Value of y = -2

Value of z = 1

Value of w = 4

**Exercise 5:**

**Code:**

A = [3, -1, 4; 2, 5, 0; -4, -2, 6];

B = [2, -4, 3; -5, 6, -1; -2, 0, 4];

A\*B;

B\*A;

**Explanation:**

I simply used the \* operator to multiply the two matrices A and B.

**Result:**

Product of A and B

3 -18 26

-21 22 1

-10 4 14

Product of B and A

-14 -28 26

1 37 -26

-22 -6 16

**Exercise 6:**

**Code:**

A = [5, 2, -4; -3, 1, -2];

B = [1, 5; -4, 2; 3, -1];

A\*B;

B\*A;

**Explanation:**

I simply used the \* operator to multiply the two matrices A and B.

**Result:**

Product of A and B

-15 33

-13 -11

Product of B and A

-10 7 -14

-26 -6 12

18 5 -10

**Exercise 7:**

**Code:**

A = [12 -2; 3, 1];

B = [8, 20; 3, 10];

D = [10, 2, 4; 2, 13, -4];

A+B;

(A+B)\*D;

A\*D;

B\*D;

**Explanation:**

AD + BD is not possible as we are trying to add matrices of different sizes.

**Result:**

A+B is:

20 18

6 11

(A+B)\*D is:

236 274 8

82 155 -20

A\*D is :

116 -2 56

32 19 8

B\*D is :

120 276 -48

50 136 -28

**Exercise 8:**

**Code:**

B = [1, 2, 4; 3, 1, 1,; 2, 0, -1];

D = [-1, 2, -2; 5, -9, 11; -2, 4, -5];

B\*D;

D\*B;

**Explanation:**

Both B\*D and D\*B result in an identity matrix. Hence, they are inverses.

**Result:**

B\*D is:

1 0 0

0 1 0

0 0 1

D\*B is:

1 0 0

0 1 0

0 0 1

**Exercise 9:**

**Code for A:**

A = [2, 7, 3; 2, 8, 1,; 3, 7, 9];

C = [A, eye(3)];

disp("Original: ")

disp(C)

C(1,:) = C(1,:)/2;

C(2,:) = C(2,:) - 2\*C(1,:);

C(3,:) = C(3,:) - 3\*C(1,:);

C(1,:) = C(1,:)- (7/2)\*C(2,:);

C(3,:) = C(3,:)+ (7/2)\*C(2,:);

C(3,:) = C(3,:)/(-5/2);

C(2,:) = C(2,:)+2\*C(3,:);

C(1,:) = C(1,:)-(17/2)\*C(3,:);

Ainverse = C([1,2,3], [4 5 6]);

disp("Reduced: ")

disp(C)

disp("Inverse: ")

disp(Ainverse)

**Explanation for A:**

I used row reduction to obtain identity matrix on the left.

**Result for A:**

Reduced:

1 0 0 -13 42/5 17/5

0 1 0 3 -9/5 -4/5

0 0 1 2 -7/5 -2/5

Inverse:

-13 42/5 17/5

3 -9/5 -4/5

2 -7/5 -2/5

**Code for B:**

B = [1, -3, 0; -1, 2, -1; 0, -2, -2];

C= [B, eye(3)];

C(2,:) = C(1,:) + C(2,:);

C(1,:) = C(1,:) - 3\*C(2,:);

C(3,:) = C(3,:) - 2\*C(2,:);

C(2,:) = (-1)\*C(2,:);

disp(C)

**Explanation for B:**

The left three columns cannot be reduced into identity matrix. Hence inverse for B doesn’t exist.

**Result for B:**

1 0 3 -2 -3 0

0 1 1 -1 -1 0

0 0 0 -2 -2 1