%Problem 1: Use commands to produce the following:

%a) a 2×4matrix of all zeros

zeros(2, 4)

%b) a 3×2matrix of all ones

ones(3, 2)

%c) the 3×3 identity matrix

eye(3)

%d) a 4×4 diagonal matrix with diagonal entries 1, –2, 4, 3

diag([1; -2; 4; 3])

%Problem 2: Use several commands similar to those in problem #1 to construct matrix M as efficiently as possible:

M = [ones(2) eye(2, 3)

diag([2, 3, 4]) zeros(3, 2)]

%Problem 3

%a) compute LU factorization of A

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

b = [5; -1; 3; 7]

[L, U] = lu(A)

%b)Use the LU-factorization to solve bxA.(Use the command for solving a matrix equation from the first overviewand solvebyLfory and yxUfor x

y = rref([L b])

y = y(:,end:end)

x = rref([U y])

x = x(:, end:end)

%Problem 4: Investigate the truth of the following statements by generating pairs of random matrices and testing the equality, as in the example on the overview. See the example and discussion about what you should do to draw a reasonable conclusion. State your conclusions

A = rand(4)

B = rand(4)

%a)

isequal((A+B)', A' + B')

%b)

isequal((A\*B)', A'\*B')

%Problem 1: Use commands to produce the following:

%a) a 2×4matrix of all zeros

ans =

0 0 0 0

0 0 0 0

%b) a 3×2matrix of all ones

ans =

1 1

1 1

1 1

%c) the 3×3 identity matrix

ans =

1 0 0

0 1 0

0 0 1

%d) a 4×4 diagonal matrix with diagonal entries 1, –2, 4, 3

ans =

1 0 0 0

0 -2 0 0

0 0 4 0

0 0 0 3

%Problem 2: Use several commands similar to those in problem #1 to construct matrix M as efficiently as possible:

M =

1 1 1 0 0

1 1 0 1 0

2 0 0 0 0

0 3 0 0 0

0 0 4 0 0

%Problem 3

A =

-1 0 1 0

2 3 -2 6

0 -1 2 0

0 0 1 5

b =

5

-1

3

7

%a) compute LU factorization of A

L =

-1/2 1 0 0

1 0 0 0

0 -2/3 1 0

0 0 1/2 1

U =

2 3 -2 6

0 3/2 0 3

0 0 2 2

0 0 0 4

%b)Use the LU-factorization to solve bxA.(Use the command for solving a matrix equation from the first overviewand solvebyLfory and yxUfor x

y =

1 0 0 0 -1

0 1 0 0 9/2

0 0 1 0 6

0 0 0 1 4

y =

-1

9/2

6

4

x =

1 0 0 0 -3

0 1 0 0 1

0 0 1 0 2

0 0 0 1 1

x =

-3

1

2

1

%Problem 4: Investigate the truth of the following statements by generating pairs of random matrices and testing the equality, as in the example on the overview. See the example and discussion about what you should do to draw a reasonable conclusion. State your conclusions

A =

18/65 954/1373 573/1306 242/1295

243/5263 293/924 1469/3850 1268/2589

701/7217 1069/1125 111/145 954/2141

681/827 259/7519 497/625 561/868

B =

659/929 302/461 1049/1093 1927/2565

1409/1867 655/4028 547/1607 388/1521

175/634 1078/9059 580/991 637/1259

365/537 457/917 438/1957 1287/1841

%a)

ans =

logical

1

%b)

ans =

logical

0