Define the values (A=1, b=3, C=-3, d=300, E=0.2, f=0.8) in MATLAB command, then use MATLAB as calculator to find the value of the following:

1. Type the following as a comment in MATLAB.

   Teachers open the door, but you must enter by yourself. Learning is not attained by chance; it must be sought for with ardor and attended to with diligence.

2. $\sqrt{A\,b\,|C|\,D} - e^d$

3. $\log_b(d) - \tan(4\pi A) + \ln(b)$

4. $\dfrac{\sqrt{A\,b\,|C|\,D} - 4DbCe^d}{\log_b(d) - \tan(4\pi A)}$

5. $\dfrac{e\sqrt{A\,b\,|C|\,D}}{\log_b(d) - \tan(4\pi A)}$

6. Round E and f to the nearest integer

7. Round E and f to the nearest integer toward 0

8. Round E and f to the nearest integer toward ∞

9. Round E and f to the nearest integer toward $-\infty$

10. Which command function return a value -1 if the value less than 0, a value of 0 if the value is equal to 0, and a value of 1 if the value greater than 0. And test it on the values 200, -21, -34, 0, 45.

11. Using MATLAB command to Compute the remainder of $\dfrac{b}{2}, \dfrac{d}{109}, \dfrac{C}{3}$.

12. Define $z = d + Ci$ as a complex number

13. Return the real part and imaginary part of z.

14. compute the sum of real part with imaginary part of z.

15. Compute conjugate of z.

16. Compute magnitude of z.

17. Compute the angle of z.

Define the following in MATLAB $B = 3\ 4\ 5\ 7$, $A = \begin{matrix} 2 & 5 & 2 & 7 \\ -23 & 0 & 3 & 5 \\ 13 & 0 & 4 & 0 \\ 1 & 2 & 6 & 2 \\ 0 & 0 & 1 & 1 \end{matrix}$, $C = \begin{matrix} 2 \\ 3 \\ 4 \\ 0 \\ 0 \end{matrix}$

1. Find length of the arrays A, B, C

2. Find size of the arrays A, B, C

3. Using index form return the number 4 in each arrays A, B, C

4. Using sub-index form extract the number 4 in each arrays A, B, C

5. Using index form extract the numbers has odd index in arrays A, B, C

6. Using index form extract the numbers has even index in arrays A, B, C

7. Using one command line. In matrix A extract the odd columns

8. Using one command line. In matrix A extract the even rows

9. Using one command line. In matrix A extract the first and last rows

10. Using one command line. In matrix A extract the second and third columns

11. Using one command line. In matrix A extract $\begin{matrix} 0 & 3 \\ 0 & 4 \\ 2 & 6 \end{matrix}$

12. Using one command line. In matrix A extract $\begin{matrix} 5 & 2 \\ 0 & 4 \\ 0 & 1 \end{matrix}$

13. Using one command line. In matrix A delete the odd rows

14. Using one command line. In matrix A delete the even columns

15. Using one command line. In matrix A delete the last two columns

16. Using one command line. In matrix A delete the first two rows

17. Using one command line. In B delete the last element.

18. Using one command line. In C delete the non zero elements.

19. Using one command line. In matrix A change the first two rows to -1

20. Using one command line. In matrix A change the last two columns to C

21. Using one command line. In matrix A change the third row to B

22. Using one command line. Add B

    a. Above the first row in matrix A

    b. below the last row in matrix A

    c. between the second and third rows in matrix A

    d. between the first two rows ,and between the last two rows in matrix A

23. Using one command line. Add C

    a. Before the first column in matrix A

    b. After the last column in matrix A

    c. between the second and third columns in matrix A

    d. between the first two columns, and at the end column in matrix A

24. Using one command line. Add zero row below the matrix A

25. Using one command line. Add zero column before the matrix A

[**Please write your answer in details such as written in MATLAB command**]

Let A, B C be any matrix of the same size, and v, u be any vector of the same length using element by element operators to calculate the following in MATLAB, Just werite the MATLAB form:

26. $\frac{A}{B} + BC$

27. u^v

28. $u + \sqrt{v}$

29. $A^2 + B^5 + ACB$

30. $uv - \frac{v}{u}$

Using ones, zeros and identities to create the following:

$$\begin{matrix} 4 & 0 & 0 & 1 \\ 0 & 4 & 0 & 1 \\ 0 & 0 & 4 & 1 \\ 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 1 \end{matrix} \qquad \begin{matrix} -1 & -1 & -1 & -1 \\ 0 & 0 & 0 & 10 \\ 9 & 9 & 9 & 10 \\ 9 & 9 & 9 & 10 \\ 9 & 9 & 9 & 10 \end{matrix}$$

$$\begin{matrix} 2 & 2 & 2 & 2 \\ 2 & 2 & 2 & 2 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{matrix} \qquad \begin{matrix} 7 & 7 & 7 & 7 \\ 0 & 3 & 0 & 0 \\ 0 & 0 & 3 & 0 \\ 0 & 0 & 0 & 3 \end{matrix}$$

Define the following in MATLAB $B = 3\ 4\ 5\ 7$, $A = \begin{matrix} 2 & 5 & 2 & 7 \\ -23 & 0 & 3 & 5 \\ 13 & 0 & 4 & 0 \\ 1 & 2 & 6 & 2 \end{matrix}$

Then using the diag, triu and tril with[operations or new matrix], to create the following:

$$
\begin{bmatrix}
3 & 0 & 0 & 0 \\
0 & 4 & 0 & 0 \\
0 & 0 & 5 & 0 \\
0 & 0 & 0 & 7
\end{bmatrix}
\quad
\begin{bmatrix}
3 & 0 & 2 & 17 \\
0 & 4 & 0 & 5 \\
0 & 0 & 5 & 0 \\
0 & 0 & 0 & 7
\end{bmatrix}
\quad
\begin{bmatrix}
2 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 \\
0 & 0 & 4 & 0 \\
0 & 0 & 0 & 2
\end{bmatrix}
\quad
\begin{bmatrix}
9 & 0 & 0 & 0 \\
0 & 12 & 0 & 0 \\
0 & 0 & 15 & 0 \\
0 & 0 & 0 & 21
\end{bmatrix}
$$

$$
\begin{bmatrix}
8 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 \\
13 & 0 & 16 & 0 \\
1 & 2 & 0 & 8
\end{bmatrix}
\quad
\begin{bmatrix}
6 & 5 & 2 & 7 \\
-23 & 8 & 3 & 5 \\
13 & 0 & 10 & 0 \\
1 & 2 & 6 & 14
\end{bmatrix}
\quad
\begin{bmatrix}
6 & 5 & 2 & 7 \\
0 & 8 & 3 & 5 \\
0 & 0 & 10 & 0 \\
0 & 0 & 0 & 14 \\
3 & 0 & 0 & 0 \\
-23 & 4 & 0 & 0 \\
13 & 0 & 5 & 0 \\
1 & 2 & 6 & 7
\end{bmatrix}
$$

$$
\begin{bmatrix}
2 & -23 & 13 & 1 & 6 & 5 & 2 & 7 \\
0 & 0 & 0 & 2 & 0 & 8 & 3 & 5 \\
0 & 0 & 4 & 6 & 0 & 0 & 10 & 0 \\
0 & 0 & 0 & 2 & 0 & 0 & 0 & 14
\end{bmatrix}
$$

Let A be any matrix and v be any vector find the following:

1. Maximum of each row in A.

2. Maximum of each column in A.

3. Maximum of each even column in A.

4. Minimum of each row in A.

5. Minimum of each odd row in A.

6. Minimum of each column in A.

7. Minimum of the matrix A.

8. Maximum of the matrix A.

9. Find the sum of all elements in the matrix A.

10. Find the sum of each even row in the matrix A.

11. Find the sum of each odd column in the matrix A.

12. Inverse of matrix A.

13. Determinant of matrix A.

14. Find the location (index) of maximum element in v.

15. Find the location (index) of minimum element in v.

16. Find transpose of matrix A.

[**Please write your answer in details such as written in MATLAB command. For any question about even, do the same for odd, as well as for positive and negative, maximum and minimum, upper triangle and lower triangle**]

Let A be any matrix. Mixing MATLAB functions to do the following by one line statement in command window:

From 1 to 27, just bring 12 of them:

1. Find positive elements in A.

2. Find the number of negative elements in A.

3. Find negative odd elements in A.

4. Find the number of positive even elements in A.

5. Find prime elements in A.

6. Find the number of elements divisible by 5 in A.

7. Find minimum positive element in A.

8. Find maximum element in diagonal of A.

9. Find minimum element in upper triangle of A.

10. Find number of negative even elements in upper triangle of A.

11. Find number of negative prime elements in A.

12. Find the number of odd elements in each column in A.

13. Find the minimum element of upper triangle A.

14. Find the sum of integer elements in A.

15. Find maximum integer element in A.

16. Find the number of even integer elements in A.

17. Find the sum of elements in lower triangular A.

18. Find the maximum prime element in A.

19. Find the number of positive prime elements in A.

20. Find the location (sub) of maximum element in A.

21. Find the number of even integer elements in A.

22. Find the location (sub) of maximum prime element in A. (do for minimum also)

23. Find the maximum prime element in the diagonal of A.

24. Find the minimum prime element in A.

25. Find the prime elements where between -2 and 10 in A.

26. Find the maximum prime number in the upper triangular A.

27. Find the odd elements between -2 and 10 in A.

28. Create the following n by m matrix $B = \begin{pmatrix} e^1 & n & n & & n & n \\ m & e^2 & n & \cdots & n & n \\ m & m & e^3 & & n & n \\ & \vdots & & \ddots & & \vdots \\ m & m & m & \cdots & e^n & n \end{pmatrix}$.

29. Replace the diagonal elements in a square matrix by ones.

30. Create the following matrix $C = \begin{pmatrix} 1 & 1 & 1 & 1 & 1 \\ 0 & 1 & 2 & 3 & 0 \\ 0 & 4 & 5 & 6 & 0 \\ 0 & 7 & 8 & 9 & 0 \end{pmatrix}$

31. From matrix A replace the element in corners by 0.

32. let A=$\begin{pmatrix} 3 & 4 & 8 \\ 10 & 11 & 12 \\ -3 & 5 & 8 \end{pmatrix}$ and B=$(-1 \quad -3 \quad -8)$ Create C=$\begin{pmatrix} -1 & 4 & 8 \\ 10 & -3 & 12 \\ -3 & 5 & -8 \end{pmatrix}$

[**Please write your answer in details such as written in MATLAB command. For any question about even, do the same for odd, as well as for positive and negative, maximum and minimum, upper triangle and lower triangle**]

Let A be any matrix. Mixing MATLAB functions to do the following by one line statement in command window:

1. Write a program to input the matrix $A_{n \times m}$ then find the number of even numbers in each column.

2. Write a program to create the matrix $a_{n \times m}$ where $a_{ij} = \begin{cases} 1 & i+j > n \\ -1 & i+j < n \\ 0 & otherwise \end{cases}$

3. Write a program to input the matrix $A_{n \times m}$ then find the sum of odd numbers in each row.

4. Write a program to find $S = \sum_{k=1}^{\infty} \frac{2^k}{k!}$.

5. Write a program to input the array A_n then find the maximum number in the A_n.

6. Write a program to find the value of z where $z = \begin{cases} \ln(x^2 + y^2) & x^2 + y^2 > 1 \\ 2 & x^2 + y^2 = 1 \\ e^{x^2} + 3y & x^2 + y^2 < 1 \end{cases}$

7. Write a program to find the sum of series $s = \sum_{n=1}^{\infty} \frac{1}{n^2}$ where $\frac{1}{n^2} < e^{-8}$

8. Write a Matlab function to check if the inputted number is prime or not.

9. Write a program to input the matrix $a_{n \times m}$ then find the sum of each column in the

10. Write a program to input the array A_n then find the sum of all prime number in A_n.

11. Write a program to find the value of y where $y = \begin{cases} |2x^2 - 8| & x < -5 \\ e^{x+1} & -5 < x < 0 \\ \ln(x + 2) & 0 < x < 5 \\ 3 - 2x^3 & x > 5 \\ \sin(x\pi) & x = -5, 0, 5 \end{cases}$

12. Write a Matlab function to find $n!$.

13. Write a program to find the sum of series

$$s = \sum_{i=1}^{n} \frac{2x^i \sin(i\pi)}{i(i+2)}.$$

14. Write a program to input the matrix $a_{n \times m}$ then find maximum element in each row

15. Write a program to find the sum of elements in lower triangle of matrix $a_{n \times m}$.

16. Write a program to find the number of negative odd elements in array A_n

17. Write to find the value of z where $z = \begin{cases} \sin(x + y) & x > y \text{ and } x < 0 \\ \cos(x + y) & x > y \text{ and } x \geq 0 \\ 1 & x = y \\ \sinh(x + y) & x < y \text{ and } x < 0 \\ \cosh(x + y) & x < y \text{ and } x \geq 0 \end{cases}$

18. Write a program to find the sum of series $s = \sum_{i=1}^{n} \sum_{j=1}^{m} \frac{x^i y^j}{(i+j)!}$ where $x > 0 \text{ and } y < 0$.

19. Write a program to find the maximum number in upper triangle of matrix $a_{n \times m}$.

20. Write a program to find the sum of negative odd elements in array A_n.

21. Write a program to create the matrix $b_{n \times m}$ where $b_{ij} = \begin{cases} 0 & i > j \text{ and } i + j \text{ is even} \\ -1 & i > j \text{ and } i + j \text{ is odd} \\ 1 & i = j \\ 0.5 & i < j \end{cases}$

22. Write a function to check the integer positive number is prime or not

$s = \sum_{i=1}^{\infty} \frac{2x^i \sin(i\pi)}{i!}$ where $-1 < x < 1$, until $\frac{2x^i \sin(i\pi)}{i!} < e^{-6}$

23. Write a program to input the matrix $A_{n \times m}$ then find the sum of odd numbers in each row

24. Write a MATLAB function to find the value of z where $z = \begin{cases} 4xy^2 + |x-1|^y & x > y \\ ln\left(\frac{x+y}{2}\right) - 3y & x = y \\ e^{x^2+2y} & x < y \end{cases}$

25. Write a program to find the sum of $S = \sum_{k=1}^{\infty} \frac{2^k}{k!}$ until $\frac{2^k}{k!}$ becomes less than 0.0001

26. Write a program to input the matrix $A_{n \times m}$ then find the number of positive integer prime elements in matrix $A_{n \times m}$

27. Write a program to find the value of z where $z = \begin{cases} \sin(xe^{y^2+x}) & x^2 - y^2 > 0 \\ \tan^{-1}\left(\frac{x}{y}\right) & x^2 - y^2 = 0 \\ \ln|x-y| & x^2 - y^2 < 0 \end{cases}$

28. Write a MATLAB function to find the sum of $s = \sum_{i=1}^{n} \sum_{j=1}^{m} \frac{2^{i+j}}{|i-j|!}$

29. Write a program to input n by m matrix then find the sum of each column and then the maximum sum of the column.

30. Write a program to find $S = \sum_{i=1}^{n.m} f(a_i)$ where $f(x) = \begin{cases} |x| & x < 0 \\ 1 & x \text{ is prime} \\ x & otherwise \end{cases}$ and a is n by m matrix.

31. Write the Matlab function to find the value of y where $y = \sum_{k=1}^{n} \frac{[\![x^{k+2}]\!]}{(n-k)!}$

32. Write a program to input n by m matrix then find the sum of each integer prime elements

33. Write a program to find y where $y = \begin{cases} \ln(x) + \frac{\sin^{-1}(x^2-1)}{[\![x]\!]} & x > 1 \\ 0 & x = 1. \\ \frac{\sqrt{|\sin(x)+6|}}{3+|x|} - e^{x^2+1} & x < 1 \end{cases}$

34. Write the Matlab function find the sum of $s = \sum_{k=1}^{n} \frac{2^k e^{x^k}}{k(k-4)}$

35. Write a MATLAB function to check the elements of the input matrix are a prime or not

36. Write a program to create a matrix $A_{n \times m}$ where $A_{i,j} = \begin{cases} -1 & if\ i\ and\ j\ are\ odds \\ 1 & if\ i\ and\ j\ are\ evens \\ 0 & otherwise \end{cases}$

37. Write a program to input a matrix then replaces the location of maximum element with location of minimum element

38. Write a program to create the matrix $A_{n \times m}$ where $A_{i,j} = i + j^2$

39. Write a script or function to find the number of repeat for each elements of input matrix.
40. Write a script to read a matrix a then change the location of maximum number and minimum number between them.
41. Write a program to input the integer number then find the number of digit

42. write a program to input the number x then find s where

$$s = \frac{x^{\frac{1}{2}}}{9} + \frac{x^{\frac{1}{4}}}{27} + \frac{x^{\frac{1}{8}}}{81} + \cdots + \frac{x^{\frac{1}{2(n)}}}{3^{n+1}} \quad until \quad \frac{x^{\frac{1}{2(n)}}}{3^{n+1}} \leq 0.001$$

43. Write a script to read the number n then find S where $S = 2 + 2^2 + 2^3 + \cdots + 2^n$

44. write a program to find the value of $s = \frac{5}{x} + \frac{x^2}{6} + \frac{8}{x^3} + \frac{x^4}{11} + \cdots + stop$ where the value of last term >23, x

    is positive number

45. Write a MATLAB function to find the average of non-zero elements in lower triangle of input matrix
    (using *if*, *for* statements).

46. Write a script or function to input the number then check that even integer number or not

47. Write a program to input x then find

48.

49. $y = \begin{cases} \sin(x) & 0 \leq x < 1 \\ e^{|x|} + 2 & x < 0 \\ x^2 + 3 & 1 \leq x < 10 \\ \frac{1}{x} & x \geq 10 \end{cases}$

50. write a program to input matrix $a_{n \times m}$ then find $s = \sum_{i=1}^{n*m} f(a_i)$ When

$$f(a_i) = \begin{cases} |a_i| & a_i < 0 \\ 1 & if \ a_i \ is \ positive \ prime \ number \\ 0 & other \ wise \end{cases}$$

51. write a program to input the matrix then find out even element and odd element

52. Write a script or function to find the number of repeat for each elements of input matrix.

53. Write a script or function to input two matrices then find out the same rows between them if exist

54. **Write a Matlab script to find the number of repeat for each element in main diagonal of input**

    square matrix.

55. write a program to input x y and n then find s where $s = \frac{x}{1!} + \frac{2!}{x^2} + \frac{x^3}{3!} + \frac{4!}{x^4} + \frac{x^5}{5!} \ldots up \ to \ n \ term$.

56. write a program to input x y and n then find s where $s = \frac{x}{3!} + \frac{y}{6!} + \frac{x^2}{9!} + \frac{y^2}{12!} + \frac{x^3}{15!} + \cdots up \ to \ n \ term$.

57. write a program to input x y and n then find s where $s = \frac{2}{1!} + \frac{x^2}{2!} + \frac{4}{3!} + \frac{x^4}{4!} + \frac{6}{5!} + \frac{x^6}{6!} + \cdots up \ to \ n \ term$.

58. write a program to input x y and n then find s where $s = \frac{x}{2!} + \frac{x^2}{4!} + \frac{y^4}{6!} + \frac{x^4}{8!} + \frac{x^5}{10!} + \frac{y^7}{12!} +$

    $\cdots up \ to \ n \ term$.

59. s= 1+1.5+2.5+4+6+8.5+…up to n term , then find s.

60. Write a program to input x then find the value of the series $y = 1 + \frac{x}{1!} + \frac{x^2}{2!} + \frac{x^3}{3!} + \cdots + \frac{x^n}{n!}$

61. Write a program to input x then find the value of the series $y = -2 + \frac{x}{1!} + \frac{x^3}{3!} + \frac{x^5}{5!} \ldots + \frac{x^n}{n!}$

62. Write a program to input x then find the value of the series $y = -3 - \frac{x}{2} + \frac{x^2}{4} - \frac{x^3}{8} + \cdots$, for **n** terms.

63. Write a program to input x then find the value of the series $y = -7 + \frac{x^5}{1!} + \frac{x^3}{2!} + \frac{x}{3!}$

1. Write a program to find the value of the series $y = -4 + \frac{3}{4} + \frac{4}{5} + \frac{5}{6} + \frac{6}{7} + \frac{7}{8} + \frac{8}{9} + \frac{9}{10}$
2. Write a program to find the sum of elements in lower triangle of matrix $A_{n \times m}$
3. Write a program to find the number of negative odd elements in array A_n , in matrix $A_{n \times m}$
4. Write a program to find the value of z where $z = \begin{cases} \sin(x+y) & x > y \text{ and } x < 0 \\ \cos(x+y) & x > y \text{ and } x \geq 0 \\ 1 & x = y \\ \sinh(x+y) & x < y \text{ and } x < 0 \\ \cosh(x+y) & x < y \text{ and } x \geq 0 \end{cases}$
5. Write a program to find the sum of series $s = \sum_{i=1}^{n} \sum_{j=1}^{m} \frac{x^i y^j}{(i+j)!}$ where $x > 0$ and $y < 0$
6. Write a program to find the maximum number in upper triangle of matrix $a_{n \times m}$
7. Write a program to find the sum of negative odd elements in array A_n
8. Write a program to create the matrix $b_{n \times m}$ where
$$b_{ij} = \begin{cases} 0 & i > j \text{ and } i+j \text{ is even} \\ -1 & i > j \text{ and } i+j \text{ is odd} \\ 1 & i = j \\ 0.5 & i < j \end{cases}$$
9. Write a program to find the sum of series $s = \sum_{i=1}^{\infty} \frac{2x^i \sin(i\pi)}{i!}$ until $\frac{2x^i \sin(i\pi)}{i!} < 0.00001$ where $-1 < x < 1$
10. Write a program to input the array A_n then find the maximum number in the A_n
11. Write a program to find the sum of series $s = \sum_{n=1}^{\infty} \frac{1}{n^2}$ until $\frac{1}{n^2} < 10^{-8}$
12. Write a program to input the array A_n then find the sum of all prime number in A_n
13. Write a program to find the sum of series $s = \sum_{i=1}^{n} \frac{2x^i \sin(i\pi)}{i(i+2)}$
14. **Write a Matlab function to find n!**
15. **Write a function to check the integer positive number is prime or not**
16. **Write a script to read the number n then find S where $S = 2 + 2^2 + 2^3 + \cdots + 2^n$**
17. **Write a program to find the value of the series $y = -4 + \frac{3}{4} + \frac{4}{5} + \frac{5}{6} + \frac{6}{7} + \frac{7}{8} + \frac{8}{9} + \frac{9}{10}$**
18. **Write a program to input the string then finds all prime number between them.**
19. **Write a program to input a string then finds the summation of all even numbers between them.**
20. **Write Matlab a function to find the sum of digits in the input string**
21. **Write a program to input number then finds the sum of even digits in it.**
22. **Write a program to input the string then finds all small letters.**
23. **Write a program to input the string then removes all space between them.**

24. Write a program to input the string then convert all small letters to Capital letter and convert all capital letter to small letter.

25. Write a program to input string then separated Capital letters, small letters, digits and symbols.

26. Write a program to input two strings and check them which are same or deferent.

27. Write a program to input two strings and one letter and then show which of the two strings contains more number of the letter.

28. Write a program to input a string and a letter then find the number of letter in the string and then write it in the string by capital.