

①

MEC232

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Roll No: RM2041A01

Reg No: 12011878

1. The function $\sin(x)$ can be written as a Taylor series by:

$$\sin x = \sum_{k=0}^{\infty} \frac{(-1)^k x^{2k+1}}{(2k+1)!}$$

Write a user-defined function file that calculates $\sin(x)$ by using the Taylor series. For the function name and arguments use $y = \text{Tsin}(x, n)$. The input arguments are the angle x in degrees and n , the number of terms in the series. Use the function to calculate $\sin(150)$ using R no of terms (where R is last digit of registration no; use 10 if last digit digit zero & use 11 if last digit is 1)

Solⁿ =

```
k=8;
x=5*pi/6;
y=zeros(1,k);
fprintf('The value of x is 150 degrees\n')
for i=0:k-1      '% R=8 terms 0-7'
    y(i+1)=(-1)^i*x^(2*i+1)/factorial(2*i+1);
end
sin_x = sum(y)
```

Output:

The value of x is 150 degrees

$\sin_x = 0.5000$

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2. A football stadium has $R00,000$ seats (where R is last digit of registration number; use 1 if last digit is zero). In a game with full capacity people with following ticket and associated cost attended the game:

	Student	Alumni	Faculty	Public	Veterans	Guests
Cost	\$25	\$40	\$60	\$70	\$32	\$0

Determine the number of people that attended the game in each cost category if the total revenue was \$4,897,000, there were 11,000 more alumni than faculty, the number of public plus alumni together was 10 times the number of veterans, the number of faculty plus alumni together was the same as the number of students, and the number of faculty plus students together was four times larger than the number of guests and veterans together.

(solve by using numerical method)

Solⁿ =

format long g

$A = [1 \ 1 \ 1 \ 1 \ 1 \ 1; 25 \ 40 \ 60 \ 70 \ 32 \ 0; 0 \ 1 \ -1 \ 0 \ 0 \ 0; 0 \ 1 \ 0 \ 1 \ -10 \ 0; -1 \ 1 \ 0 \ 0 \ 0; 1 \ 0 \ 1 \ 0 \ -4 \ -4];$

$C = [800000; 4897000; 11000; 0; 0; 0];$

fprintf('In Number of seats for each category')

$X = A \setminus C;$

fprintf('In Number of students: %d', $X(1,:)$)

fprintf('In Number of alumni: %d', $X(2,:)$)

fprintf('In Number of faculty: %d', $X(3,:)$)

fprintf('In Number of public: %d', $X(4,:)$)

fprintf('In Number of veterans: %d', $X(5,:)$)

fprintf('In Number of guests: %d\n', $X(6,:)$)


Output:

Number of seats for each category

Number of students: 551889

Number of alumni: 281445

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Number of faculty: 270445

Number of public: - 509362

Number of veterans: - 22791.8

Number of guests: 228375

Command Window

```
>> CA2
The value of x is 150 degrees
sin_x = 0.5000

Number of seats for each category
Number of students: 551889
Number of alumni: 281445
Number of faculty: 270445
Number of public: -509362
Number of veterans: -22791.8
Number of guests: 228375
>>
```

```

1 %Name: Rohan Kumar Saini
2 %Roll Number: RM2041A01
3 %Registration Number: 12011878
4 %CA2
5
6 %Question1
7 format short
8 k=8;
9 x=5*pi/6;
10 y=zeros(1,k);
11 fprintf('The value of x is 150 degrees\n')
12 for i=0:k-1 %R=8 terms 0-7
13     y(i+1)=(-1)^i*x^(2*i+1)/factorial(2*i+1);
14 end
15 sin_x=sum(y)
16
17 %Question2
18 format long g
19 A=[1 1 1 1 1 1;25 40 60 70 32 0;0 1 -1 0 0 0;0 1 0 1 -10 0;-1 1 1 0 0 0;1 0 1 0 -4 -4];
20 C=[800000;4897000;11000;0;0;0];
21 fprintf('\nNumber of seats for each category')
22 X=A\C;
23 fprintf('\nNumber of students: %d',X(1,:))
24 fprintf('\nNumber of alumni: %d',X(2,:))
25 fprintf('\nNumber of faculty: %d',X(3,:))
26 fprintf('\nNumber of public: %d',X(4,:))
27 fprintf('\nNumber of veterans: %d',X(5,:))
28 fprintf('\nNumber of guests: %d\n',X(6,:))

```

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