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Aerodynamics and Propulsion

Q1. Results for Q1 is :

Sl.no.	x	F(x)
1	0.00	0.000000
2	1.00	0.500000
3	2.00	0.800000
4	3.00	0.900000
5	4.00	0.941176
6	5.00	0.961538

Co-eff. matrix(A) of D2f variable is:

1	0	0	0	0	0
1	4	1	0	0	0
0	1	4	1	0	0
0	0	1	4	1	0
0	0	0	1	4	1
0	0	0	0	0	1

Constant vector b is:

0
-1.2000
-1.2000
-0.3529
-0.1249
0

value of double derivative at all knots is:

0

-0.2416

-0.2337

-0.0235

-0.0254

0

Interpolated value of function at x = 1.30 is : 0.615008

true value at x = 1.30 is : 0.628253

absolute error is : 2.108130 percent

Interpolated value of function at x = 4.10 is : 0.943935

true value at x = 4.10 is : 0.943852

absolute error is : 0.008801 percent

Q2. Results for Q2 is:

Sl.no.	x	F(x)
1	0.00	14.621000
2	8.00	11.843000
3	16.00	9.870000
4	24.00	8.418000
5	32.00	7.305000
6	40.00	6.413000

Co-eff. matrix(A) of D2f variable is:

1	0	0	0	0	0
8	32	8	0	0	0
0	8	32	8	0	0
0	0	8	32	8	0
0	0	0	8	32	8
0	0	0	0	0	1

Constant vector b is:

0

0.6037

0.3908

0.2543

0.1658

0

value of double derivative at all knots is:

0

0.0172

0.0066

0.0053

0.0038

0

Interpolated value of function at x = 27.00 is : 7.965709

true value at x = 27.00 is : 7.986000

absolute error is : 0.254084 percent

Q3. Results for Q3 is :

Sl.no.	x	F(x)
1	0.00	26.000000
2	1.80	16.415000
3	5.00	5.375000
4	6.00	3.500000
5	8.20	2.015000
6	9.20	2.540000
7	12.00	8.000000

Lagrange Interpolation Result:

f(3.5) = 9.593750

Absolute Errors at Data Points:

x = 0.00, F(x) = 26.000000, Interpolated Value = 26.000000, Absolute Error = 0.000000

x = 1.80, F(x) = 16.415000, Interpolated Value = 16.415000, Absolute Error = 0.000000

x = 5.00, F(x) = 5.375000, Interpolated Value = 5.375000, Absolute Error = 0.000000

x = 6.00, F(x) = 3.500000, Interpolated Value = 3.500000, Absolute Error = 0.000000

x = 8.20, F(x) = 2.015000, Interpolated Value = 2.015000, Absolute Error = 0.000000

x = 9.20, F(x) = 2.540000, Interpolated Value = 2.540000, Absolute Error = 0.000000

x = 12.00, F(x) = 8.000000, Interpolated Value = 8.000000, Absolute Error = 0.000000