

Sheet 3

1. Given the values

x	5	7	11	13	17
$F(x)$	150	392	1452	2366	5202

evaluate $f(9)$, using Lagrange's formula.

2. Find the polynomial $f(x)$ by using Lagrange's formula and hence find $f(3)$ for

x	0	1	2	5
$F(x)$	2	3	12	147

3. A curve passes through the points $(0,18)$, $(1,10)$, $(3, -18)$ and $(6,90)$.

Find the slope of the curve at $x=2$.

4. Find the distance moved by a particle and its acceleration at the end of 4 seconds, if the time verses velocity data is as follows:

t	0	1	3	4
v	21	15	12	10

5. Find the missing term in the following table using interpolation

t	1	2	4	5	6
v	14	15	5		9

6. Use Lagrange's interpolation formula to find the value of y when $x = 10$, if the following values of x and y are given:

x	5	6	9	11
y	12	13	14	16

7. Given $\log_{10} 654 = 2.8156$, $\log_{10} 658 = 2.8182$, $\log_{10} 659 = 2.8189$, $\log_{10} 661 = 2.8202$, find by using Lagrange's formula, the value of $\log_{10} 656$.

8. Given the Values

x	5	7	11	13	17
y	150	392	1452	2366	5202

evaluate $f(9)$, using Newton's divided difference formula

9. Using Newton's divided differences formula, evaluate $f(8)$ and $f(15)$ given:

x	4	5	7	10	11	13
y	48	100	294	900	1210	2028

10. Find the missing term in the following table using Newton divided difference formula.

x	0	1	2	3	4
y	1	3	9		81

11. The observed values of a function are respectively 168, 120, 72, and 63 at the four positions 3, 7, 9, and 10 of the independent variable. What is the best estimate value of the function at the position 6?

12. The table gives the distance in nautical miles of the visible horizon for the given heights in feet above the earth's surface:

x	100	150	200	250	300	350	400
y	10.63	13.03	15.04	16.81	18.42	19.90	21.27

Find the values of y when

- I. $x = 160$ ft.
- II. $x = 410$.

13. Find the cubic polynomial which takes the following values:

x	0	1	2	3
y	1	2	1	10

Hence or otherwise evaluate $f(4)$.

14. The following table gives the values of x and y :

x	1.2	2.1	2.8	4.1	4.9	6.2
y	4.2	6.8	9.8	13.4	15.5	19.6

Find the value of x corresponding to $y = 12$, using Lagrange's technique.

15. Apply Lagrange's formula inversely to obtain a root of the equation $f(x) = 0$, given that $f(30) = -30$, $f(34) = -13$, $f(38) = 3$, and $f(42) = 18$.

16. Using inverse interpolation, find the real root of the equation $x^3 + x - 3 = 0$, which is close to 1.2.

WITH MY BEST WISHES
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