EXERCISE

1. Apply Lagrange's formula to find the cubic polynomial which includes the following values of x and y_x:

x:	0	1	4	6
y_x:	1	-1	1	-1

Ans : $\frac{x^3-9x^2+20x-6}{-6}$.

2. Apply Lagrange's formula to find f (5), given that f(2)=4, f(3)=8, f(4)=16, f(7)=128 and explain why the result differs from 2^x.
3. By the use of Lagrange's formula find the polynomial of degree three passing through (0,1), (1,1), (2,2), (4,5)

Ans: $1-\frac{2}{3}x+\frac{3}{4}x^2-\frac{1}{12}x^3$

4. By means of Newton's divided difference formula, find the values of f(8) and f(15) from the data:

x :	4	5	7	10	11	13
f(x) :	48	100	294	900	1210	2028.

Ans: 448, 3150

5. The following table gives the normal weights of babies during the first 12 months of life:

Age in months :	0	2	5	8	10	12
Weight in lbs :	7.5	10.25	15	16	18	21

Estimate the weight of the baby at the age of 7 months. Ans: 15.67 lbs

6. Find the form of the function f (x) for the following table:

x :	0	1	4	5
f(x) :	8	11	68	123.

Ans: x^3-x^2+3x+8

7. Given that $f(1)=4, f(2)=5, f(7)=5, f(8)=4$. Using Newton's divided difference formula, show that
   $f(6)=5.67$ *and* $f(x)=(-x^2+9x+16)/6$.
8. If $log_e 2=0.30103,\ log_e 3=0.47712,\ log_e 5=0.69897,\ log_e 7=0.84510,$
   then find the value of $log_e 4.7$ correct to 4-decimals. Ans: 0.6734
9. Obtain the value of T when A = 85 from the following table using Lagrange's method:

T:	2	5	8	14

A: 94.4 87.9 81.3 68.7 Ans: 6.5928

10. Find the smallest positive root of the equation $x^3 - 5x + 3 = 0$ by making a difference table taking $x = 0, 1, 2$ and 3 correct to 2D. Ans: 0.66
11. Find the root of equation $x^3 + x - 3 = 0$ lying between 1.2 and 1.3 up to 4D by making a difference table for h = 0.1. Ans: 1.2134
12. Find the value x to 2 - decimal accuracy lying between 15 and 25 satisfying the equation $x^2 + 250\, log_{10}x = 635$ using the method of successive approximations.