In[21]:=

■ ques 1

In[11]:=
```
sum = 0;
points = {{1, 2}, {2, 5}, {3, 10}};
No = Length [points ];
Print ["Given values of x[i] are as follows :", y = points [[All , 1]]]
Print ["Given values of f[x[i]] are as follows :", f = points [[All , 2]]]
lagrange [No_ , n_] := Product [If[Equal [k, n], 1,
(x - y[[k]]) / (y[[n]] - y[[k]])], {k, 1, No}]
For[i = 1, i <= No , i++,
sum += (f[[i]] * lagrange [No , i])]
Print [sum]
Print ["The polynomial function will be :", Expand [sum]]
Print ["Polynomial at x=2.5 is:", sum /. x -> 2.5]
```

```
Given values of x[i] are as follows :{1, 2, 3}

Given values of f[x[i]] are as follows :{2, 5, 10}

(2 - x) (3 - x) + 5 (3 - x) (-1 + x) + 5 (-2 + x) (-1 + x)

The polynomial function will be :1 + x^2

Polynomial at x=2.5 is:7.25
```

■ ques 2

In[22]:=
```
sum = 0;
points = {{-2, 4}, {0, 2}, {2, 8}};
No = Length [points ];
Print ["Given values of x[i] are as follows :", y = points [[All , 1]]]
Print ["Given values of f[x[i]] are as follows :", f = points [[All , 2]]]
lagrange [No_ , n_] := Product [If[Equal [k, n], 1,
(x - y[[k]]) / (y[[n]] - y[[k]])], {k, 1, No}]
For[i = 1, i ≤ No , i++,
sum += (f[[i]] * lagrange [No , i])]
Print [sum]
Print ["The polynomial function will be :", Expand [sum]]
Print ["Polynomial at x=2.5 is:", sum /. x → 2.5]
```

```
Given values of x[i] are as follows :{-2, 0, 2}

Given values of f[x[i]] are as follows :{4, 2, 8}

-1/2 (2 - x) x + 1/2 (2 - x) (2 + x) + x (2 + x)

The polynomial function will be :2 + x + x^2

Polynomial at x=2.5 is:10.75
```

■ ques 3

In[32]:=
```
sum = 0;
points = {{0, 0}, {0.5 , 0.19}, {1, 0.26}, {1.5 , 0.29}, {2, 0.31}};
No = Length [points ];
Print ["Given values of x[i] are as follows :", y = points [[All , 1]]]
Print ["Given values of f[x[i]] are as follows :", f = points [[All , 2]]]
lagrange [No_ , n_] := Product [If[Equal [k, n], 1,
(x - y[[k]]) / (y[[n]] - y[[k]])], {k, 1, No}]
For[i = 1, i ≤ No , i++,
sum += (f[[i]] * lagrange [No , i])]
Print [sum]
Print ["The polynomial function will be :", Expand [sum]]
Print ["Polynomial at x=2.5 is:", sum /. x → 2.5]
```

```
Given values of x[i] are as follows :{0, 0.5 , 1, 1.5 , 2}

Given values of f[x[i]] are as follows :{0, 0.19 , 0.26 , 0.29 , 0.31}

0. - 0.506667 (-2 + x)(-1.5 + x)(-1 + x) x - 1.04 (2 - x)(-1.5 + x)(-0.5 + x) x -
 0.773333 (-2 + x)(-1 + x)(-0.5 + x) x + 0.206667 (-1.5 + x)(-1 + x)(-0.5 + x) x

The polynomial function will be :0. + 0.578333 x - 0.491667 x^2 + 0.206667 x^3 - 0.0333333 x^4

Polynomial at x=2.5 is:0.3
```