- Lagrange Interpolation :
- Question 1:

In[90]:=
```
y = {1, 2, 3, 10, 11};
f = {2, 5, 10, 20, 3};
n = Length[y];
n = Length[f];
i = 1;
While[i ≤ n ,
  L[i, x_] = (∏_{j=1}^{i-1} (x - y[[j]])/(y[[i]] - y[[j]])) (∏_{j=i+1}^{n} (x - y[[j]])/(y[[i]] - y[[j]])); i++];
Lagrange[x_] = ∑_{k=1}^{n} L[k, x] * f[[k]];
g = Simplify[N[Lagrange[x]]]
Print["Simplified Langrange Interpolating Polynomial=" g]
```

Out[97]= $1.69048 - 1.23849\,x + 1.64028\,x^2 - 0.0876984\,x^3 - 0.00456349\,x^4$

```
Simplified Langrange Interpolating Polynomial=
```
$(1.69048 - 1.23849\,x + 1.64028\,x^2 - 0.0876984\,x^3 - 0.00456349\,x^4)$

- Question 2:

In[99]:=
```
y = {3, 4, 5, 7};
f = {4, 7, 12, 22};
n = Length[y];
n = Length[f];
i = 1;
While[i ≤ n ,
  L[i, x_] = (∏_{j=1}^{i-1} (x - y[[j]])/(y[[i]] - y[[j]])) (∏_{j=i+1}^{n} (x - y[[j]])/(y[[i]] - y[[j]])); i++];
Lagrange[x_] = ∑_{k=1}^{n} L[k, x] * f[[k]];
g = Simplify[N[Lagrange[x]]]
Print["Simplified Langrange Interpolating Polynomial=" g]
```

Out[106]= $22. - 15.75\,x + 4.\,x^2 - 0.25\,x^3$

```
Simplified Langrange Interpolating Polynomial=
```
$(22. - 15.75\,x + 4.\,x^2 - 0.25\,x^3)$

- Question 3:

In[108]:=
```
y = {4, 5, 6};
f = {5, 8, 13};
n = Length[y];
n = Length[f];
i = 1;
While[i ≤ n ,
  L[i, x_] = (∏_{j=1}^{i-1} (x - y[[j]])/(y[[i]] - y[[j]])) (∏_{j=i+1}^{n} (x - y[[j]])/(y[[i]] - y[[j]])); i++];
Lagrange[x_] = ∑_{k=1}^{n} L[k, x] * f[[k]];
g = Simplify[N[Lagrange[x]]]
Print["Simplified Langrange Interpolating Polynomial=" g]
```

Out[115]= $13. - 6.\,x + 1.\,x^2$

```
Simplified Langrange Interpolating Polynomial=(13. - 6. x + 1. x^2)
```