In[67]:=
```
y = {0, 1, 3};
f = {1, 3, 55};
n = Length[y];
n = Length[f];
dd[n_] := Sum[f[[i]] / ((Product[(y[[i]] - y[[j]]), {j, 1, i - 1}]) (Product[(y[[i]] - y[[j]]), {j, i + 1, n}])), {i, 1, n}]
p[x_] = Sum[(dd[i] * Product[If[i ≤ j, 1, x - y[[j]]], {j, 1, i - 1}]), {i, 1, n}]
Print["Newton Polynomial=", p[x]]
Print["Simplified Newton Polynomial=", Simplify[p[x]]]
Evaluate[p[2]]
```

Out[72]=
$$1 + 2\,x + 8\,(-1 + x)\,x$$

Newton Polynomial=$1 + 2\,x + 8\,(-1 + x)\,x$

Simplified Newton Polynomial=$1 - 6\,x + 8\,x^2$

Out[75]=
$$21$$

In[76]:=
```
y = {0, 5, 9};
f = {1, 3, 5};
n = Length[y];
n = Length[f];
dd[n_] := Sum[f[[i]] / ((Product[(y[[i]] - y[[j]]), {j, 1, i - 1}]) (Product[(y[[i]] - y[[j]]), {j, i + 1, n}])), {i, 1, n}]
p[x_] = Sum[(dd[i] * Product[If[i ≤ j, 1, x - y[[j]]], {j, 1, i - 1}]), {i, 1, n}]
Print["Newton Polynomial=", p[x]]
Print["Simplified Newton Polynomial=", Simplify[p[x]]]
Evaluate[p[2]]
```

Out[81]=
$$1 + \frac{2\,x}{5} + \frac{1}{90}\,(-5 + x)\,x$$

Newton Polynomial=$1 + \frac{2\,x}{5} + \frac{1}{90}\,(-5 + x)\,x$

Simplified Newton Polynomial=$\frac{1}{90}\left(90 + 31\,x + x^2\right)$

Out[84]=
$$\frac{26}{15}$$

In[85]:=
```
y = {3, 7, 9};
f = {6, 8, 15};
n = Length[y];
n = Length[f];
dd[n_] := Sum[f[[i]] / ((Product[(y[[i]] - y[[j]]), {j, 1, i - 1}]) (Product[(y[[i]] - y[[j]]), {j, i + 1, n}])), {i, 1, n}]
p[x_] = Sum[(dd[i] * Product[If[i ≤ j, 1, x - y[[j]]], {j, 1, i - 1}]), {i, 1, n}]
Print["Newton Polynomial=", p[x]]
Print["Simplified Newton Polynomial=", Simplify[p[x]]]
Evaluate[p[2]]
```

Out[90]=
$$6 + \frac{1}{2}(-3 + x) + \frac{1}{2}(-7 + x)(-3 + x)$$

Newton Polynomial=$6 + \frac{1}{2}(-3 + x) + \frac{1}{2}(-7 + x)(-3 + x)$

Simplified Newton Polynomial=$\frac{1}{2}\left(30 - 9\,x + x^2\right)$

Out[93]= 8