Practica 6(b)

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Newton Divided Difference Interpolating polyomial

```
In[4]:= NthDividedDiff[x0_, f0_, startindex_, endindex_] :=
          Module[{x = x0, f = f0, i = startindex, j = endindex, answer},
           If[i == j, Return[f[[i]]],
             answer =
              (NthDividedDiff[x, f, i + 1, j] - NthDividedDiff[x, f, i, j - 1]) / (x[[j]] - x[[i]]);
             Return[answer]];
          ];
        x = {0, 1, 3};
        f = {1, 3, 55};
        NthDividedDiff[x, f, 2, 3]
Out[7]= 26

In[8]:= NthDividedDiff[x, f, 1, 3]
Out[8]= 8

In[9]:= x = {-1, 0, 1, 2};
        f = {5, 1, 1, 11};
        NthDividedDiff[x, f, 1, 2]
Out[11]= -4

In[12]:= NthDividedDiff[x, f, 2, 3]
Out[12]= 0

In[13]:= NthDividedDiff[x, f, 1, 3]
Out[13]= 2

In[14]:= NthDividedDiff[x, f, 2, 4]
Out[14]= 5
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In[15]:=
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NthDividedDiff[x, f, 1, 4]
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Out[15]= 1

Q2

In[21]:=
```
NewtonDDPoly[x0_, f0_] :=
  Module[{x1 = x0, f = f0, n, newtonPolynomial, k, j},
   n = Length[x1];
   newtonPolynomial[Y_] = 0;
   For[i = 1, i ≤ n, i++,
    prod[Y_] = 1;
    For[k = 1, k ≤  i - 1, k++,
     prod[Y_] = prod[Y] * (y - x1[[k]])];
    newtonPolynomial[Y_] = newtonPolynomial[Y] + NthDividedDiff[x1, f, 1, i] * prod[Y]];
   Return[newtonPolynomial[Y]];];
nodes = {0, 1, 3};
values = {1, 3, 55};
NewtonDDPoly[nodes, values]
```

Out[24]= $1 + 2\,y + 8\,(-1 + y)\,y$

In[25]:=
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Simplify[1 + 2 y + 8 (-1 + y) y]
```

Out[25]= $1 - 6\,y + 8\,y^2$