Let' s have a look at Newton' s method for a few functions and starting points :

In[215]:=
```
(* This is Newton's method: *)
Newton[f_, x0_] := x0 - f[x0] / f'[x0]
```

In[216]:=
```
Clear[f]
f[x_] := Log[x] - 1.23
x0 = 1.2
x1 = Newton[f, x0]
x2 = Newton[f, x1]
x3 = Newton[f, x2]
x4 = Newton[f, x3]
Solve[f[x] == 0, x]
p1 = Plot[f[x], {x, 1, 4}];
p2 = ListPlot[
   {{x0, f[x0]}, {x1, f[x1]}, {x2, f[x2]}, {x3, f[x3]}, {x4, f[x4]}}, PlotMarkers → Automatic];
Show[
 p1,
 p2]
```

Out[218]= 1.2

Out[219]= 2.45721

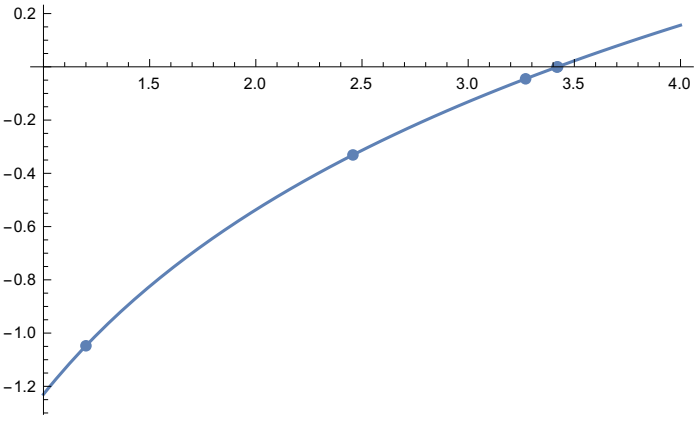
Out[220]= 3.27048

Out[221]= 3.41786

Out[222]= 3.42123

Out[223]= {{x → 3.42123}}

Out[226]=



In[227]:=
```
Clear[f]
f[x_] := Cos[x] - .23
x0 = 1.2
x1 = Newton[f, x0]
x2 = Newton[f, x1]
x3 = Newton[f, x2]
x4 = Newton[f, x3]
Solve[f[x] == 0, x]
p1 = Plot[f[x], {x, 1, 1.5}];
p2 = ListPlot[
   {{x0, f[x0]}, {x1, f[x1]}, {x2, f[x2]}, {x3, f[x3]}, {x4, f[x4]}}, PlotMarkers → Automatic];
Show[
 p1,
 p2]
```

Out[229]= 1.2

Out[230]= 1.34201

Out[231]= 1.33872

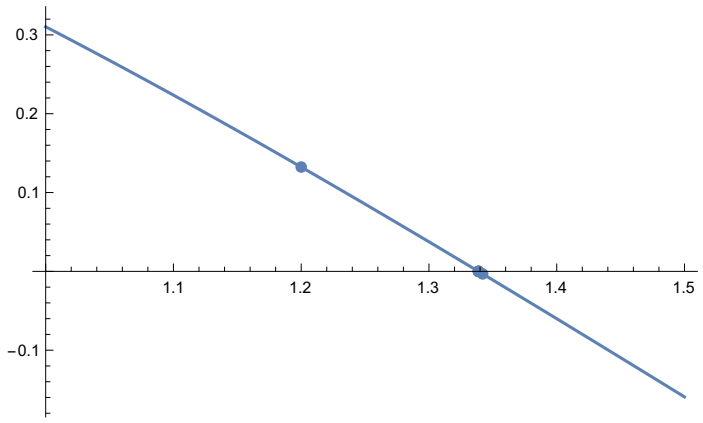
Out[232]= 1.33872

Out[233]= 1.33872

Solve: Inverse functions are being used by Solve, so some solutions may not be found; use Reduce for complete solution information.

Out[234]= {{x → -1.33872}, {x → 1.33872}}

Out[237]=



In[238]:=
```
Clear[f]
f[x_] := x (x ^ 2 - 1)
x0 = .4
x1 = Newton[f, x0]
x2 = Newton[f, x1]
x3 = Newton[f, x2]
x4 = Newton[f, x3]
Solve[f[x] == 0, x]
p1 = Plot[f[x], {x, -1, 1}];
p2 = ListPlot[
   {{x0, f[x0]}, {x1, f[x1]}, {x2, f[x2]}, {x3, f[x3]}, {x4, f[x4]}}, PlotMarkers → Automatic];
Show[
 p1,
 p2]
```

Out[240]= 0.4

Out[241]= -0.246154

Out[242]= 0.0364567

Out[243]= -0.0000972964

Out[244]= 1.84213×10^{-12}

Out[245]= {{x → -1}, {x → 0}, {x → 1}}

Out[248]=