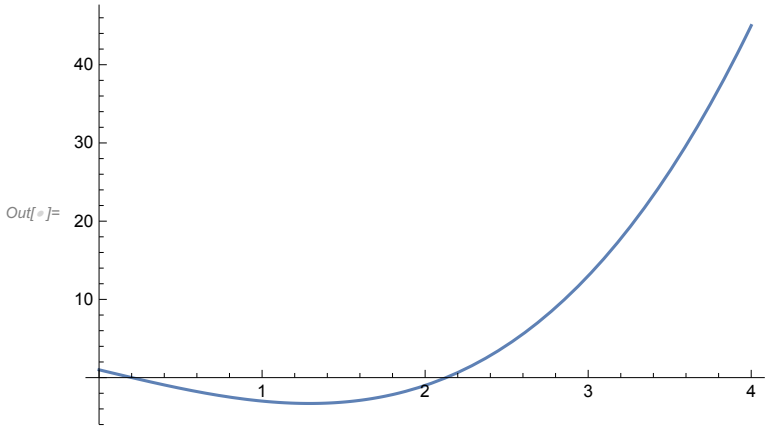
In[ ]:=
```
NewtonRE[x0_, error_, f_] :=
  Module[{xk1, xk = N[x0]},
   k = 0;
   Output = {{k, x0, f[x0], None}};
   approxE = 10 000 000;
   While[approxE > error, fPrimexk = f'[xk];
    If[fPrimexk == 0, Print["The derivation of function at ", k,
      " th iteration is zero, we cannot proceed further with iterative scheme"];
     Break[];];
    xk1 = xk - f[xk] / fPrimexk;
    approxE = Abs[xk1 - xk];
    xk = xk1;
    k++;
    Output = Append[Output, {k, xk, f[xk], approxE}];];
   Print[NumberForm[TableForm[Output,
      TableHeadings → {None, {"k", "xk", "f[xk]", "Approx Error"}}], 8]];
   Print["Number of iterations required to achieve desired accuracy = ", k];
   Print["Root after ", k, " iterations xk= ", NumberForm[xk, 8]];
   Print["Function value at approximated root, f[xk]= ", NumberForm[f[xk], 8]];]
f[x_] := x^3 - 5 x + 1;
error = 10^(-4);
Plot[f[x], {x, 0, 4}]
```

Out[ ]=



Question 1

In[ ]:=
```
NewtonRE[0.5, error, f]
```

k	xk	f[xk]	Approx Error
0	0.5	-1.375	None
1	0.17647059	0.12314268	0.32352941
2	0.20156807	0.0003492764	0.025097486
3	0.20163968	3.1004843×10^{-9}	0.000071600749

Number of iterations required to achieve desired accuracy = 3

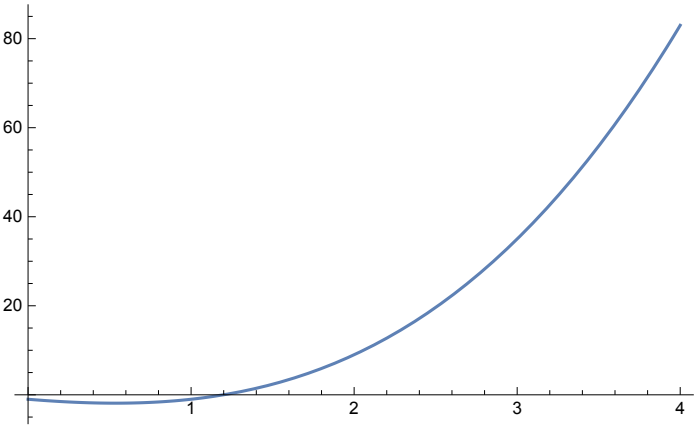
Root after 3 iterations xk= 0.20163968

Function value at approximated root, f[xk]= 3.1004843×10^{-9}

Question 2

In[ ]:=
```
f[x_] := x^3 + 2 x^2 - 3 x - 1;
error = 10^(-5);
Plot[f[x], {x, 0, 4}]
```

Out[ ]=



In[ ]:=
```
NewtonRE[2, error, f];
```

k	xk	f[xk]	Approx Error
0	2	9	None
1	1.4705882	2.0938327	0.52941176
2	1.2471327	0.30899704	0.22345556
3	1.2006987	0.012278977	0.046433946
4	1.1986949	0.000022485706	0.002003806
5	1.1986912	7.5904616×10^{-11}	3.682928×10^{-6}

Number of iterations required to achieve desired accuracy = 5

Root after 5 iterations xk= 1.1986912

Function value at approximated root, f[xk]= 7.5904616×10^{-11}