```
NewtonR[x0_, n_, f_] := Module[{xk1, xk = N[x0]},
   k = 0; Output = {{k, x0, f[x0]}}; While[k < n, fPrimexk = f'[xk];
    If[fPrimexk == 0, Print["The Derivative of function at", k,
      "the iteration is zero, we cannot proceed further with the iterative scheme"];
     Break[]];
    xk1 = xk - f[xk] / fPrimexk;
    xk = xk1;
    k++;
    Output = Append[Output, {k, xk, f[xk]}];];
   Print[
    NumberForm[TableForm[Output, TableHeadings → {None, {"k", "xk", "f[xk]"}}], 10]];
   Print["Root after ", n, " iteration xk=", NumberForm[xk, 10]];
   Print["Function value at approximated root, f[xk]=", NumberForm[f[xk], 10]];];
```

```
f[x_] := x^3 - 5 * x + 1
NewtonR[0.5, 5, f]
```

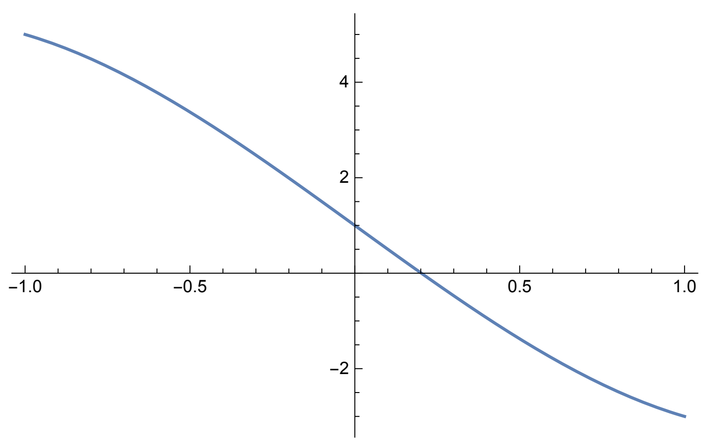
k	xk	f[xk]
0	0.5	-1.375
1	0.1764705882	0.1231426827
2	0.2015680743	0.0003492763989
3	0.2016396751	$3.100484314 \times 10^{-9}$
4	0.2016396757	$1.110223025 \times 10^{-16}$
5	0.2016396757	$1.110223025 \times 10^{-16}$

Root after 5 iteration xk=0.2016396757

Function value at approximated root, f[xk]=$1.110223025 \times 10^{-16}$

In[•]:= `Plot[f[x], {x, -1, 1}]`

Out[•]=



Question 2 :

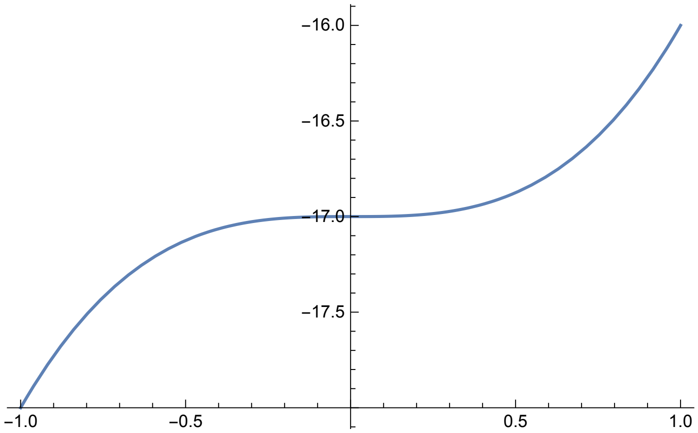
In[•]:=
```
f[x_] := x^3 - 17
NewtonR[2, 4, f]
Plot[f[x], {x, -1, 1}]
```

k	xk	f[xk]
0	2	-9
1	2.75	3.796875
2	2.582644628	0.2263772599
3	2.571331512	0.0009901837441
4	2.571281592	1.922353121×10^{-8}

Root after 4 iteration xk=2.571281592

Function value at approximated root, f[xk]=1.922353121×10^{-8}

Out[∘]=



Question 3 :

In[∘]:=
```
f[x_] := x^3 + 2 * x^2 - 3 * x - 1
NewtonR[-3, 4, f]
Plot[f[x], {x, -5, 5}]
```

k	xk	f[xk]
0	-3	-1
1	-2.916666667	-0.04803240741
2	-2.912241416	-0.0001320975296
3	-2.912229179	$-1.008864103\times10^{-9}$
4	-2.912229178	0.

Root after 4 iteration xk=-2.912229178

Function value at approximated root, f[xk]=0.

Out[∘]=