In[]:=
```
RegulaFalsiWI[x0_, x1_, n_, f_] :=
  Module[{xk, xk1, xk2}, xk = N[x0]; xk1 = N[x1];
   If[f[xk] * f[xk1] > 0,
    Print["We cannot continue with Regula Falsi Method as function
       values are not of opposite sign at end points of intervals"];
    Return[]];
   i = 1;
   output = {};
   While[i ≤ n, xk2 = (xk * f[xk1] - xk1 * f[xk]) / (f[xk1] - f[xk]);
    interval =
     "[" <> ToString[NumberForm[xk, 12]] <> ", " <> ToString[NumberForm[xk1, 12]] <> "]";
    output = Append[output, {i, interval, xk2, f[xk2]}];
    If[Sign[f[xk1]] == Sign[f[xk2]], xk1 = xk2, xk = xk2]; i++;];
   Print[NumberForm[
     TableForm[output, TableHeadings → {None, {"i", "Interval", "xi", "f[xi]"}}], 8]];
   Print["Root after ", n, " iterations = ", NumberForm[xk2, 8]];
   Print["Function value at approximated root, f[xi] = ", NumberForm[f[xk2], 8]];];
```

Question 1

```
g[x_] := x^3 - 5 x + 1;
RegulaFalsiWI[-1, 1, 10, g]
```

Out[]= Question

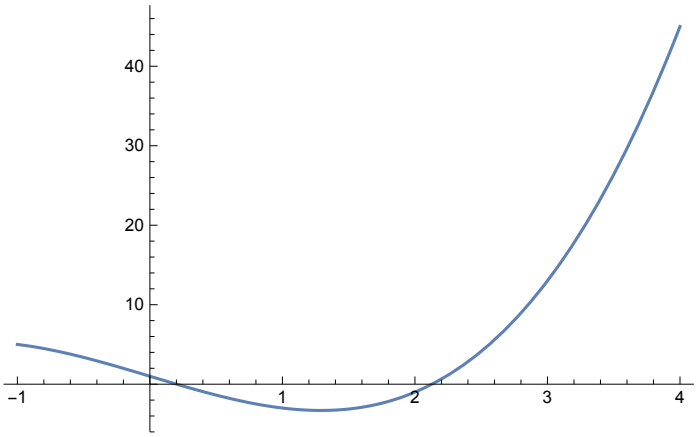
i	Interval	xi	f[xi]
1	[-1., 1.]	0.25	-0.234375
2	[-1., 0.25]	0.19402985	0.037155501
3	[0.194029850746, 0.25]	0.20168865	-0.00023892045
4	[0.194029850746, 0.201688654959]	0.20163972	-2.2244344×10^{-7}
5	[0.194029850746, 0.201639721325]	0.20163968	-2.0708324×10^{-10}
6	[0.194029850746, 0.201639675766]	0.20163968	-1.9273472×10^{-13}
7	[0.194029850746, 0.201639675723]	0.20163968	-4.4408921×10^{-16}
8	[0.194029850746, 0.201639675723]	0.20163968	1.110223×10^{-16}
9	[0.201639675723, 0.201639675723]	0.20163968	1.110223×10^{-16}
10	[0.201639675723, 0.201639675723]	0.20163968	-2.220446×10^{-16}

Root after 10 iterations = 0.20163968

Function value at approximated root, f[xi] = -2.220446×10^{-16}

In[]:=
```
Plot[g[x], {x, -1, 4}]
```

Out[]=



Question 2

In[•]:=
```
g[x_] := Cos[x] - x * Exp[x]
RegulaFalsiWI[0, 1, 8, g]
```

i	Interval	xi	f[xi]
1	[0., 1.]	0.31466534	0.51987117
2	[0.314665337801, 1.]	0.44672814	0.20354478
3	[0.446728144591, 1.]	0.49401534	0.070802349
4	[0.494015336596, 1.]	0.50994614	0.023607719
5	[0.509946140365, 1.]	0.51520101	0.0077601137
6	[0.515201009902, 1.]	0.51692221	0.0025388647
7	[0.516922210011, 1.]	0.51748468	0.00082935789
8	[0.517484676785, 1.]	0.51766834	0.00027078573

Root after 8 iterations = 0.51766834

Function value at approximated root, f[xi] = 0.00027078573

In[•]:=
Question 3

```
g[x_] := x^4 - 3 x^2 + x - 10;
RegulaFalsiWI[2, 3, 7, g]
```

Out[•]=
3 Question

i	Interval	xi	f[xi]
1	[2., 3.]	2.0784314	-2.2198625
2	[2.07843137255, 3.]	2.119995	-1.1637008
3	[2.11999499205, 3.]	2.1412571	-0.59162874
4	[2.14125711528, 3.]	2.1519325	-0.29607559
5	[2.15193245843, 3.]	2.1572414	-0.1469951
6	[2.15724139986, 3.]	2.159869	-0.072691406
7	[2.15986895617, 3.]	2.1611663	-0.035876602

Root after 7 iterations = 2.1611663

Function value at approximated root, f[xi] = -0.035876602