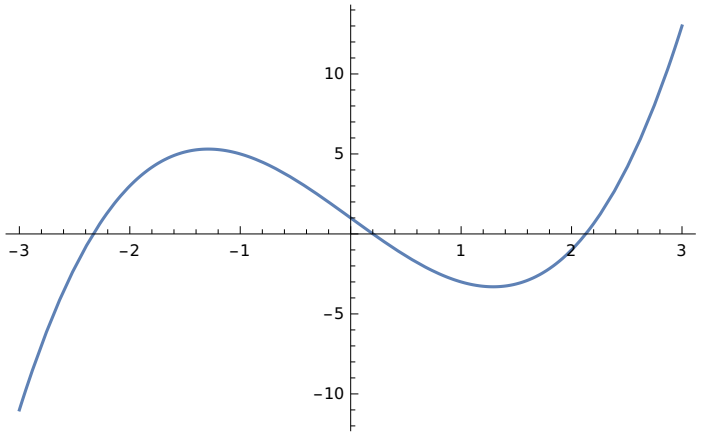
■ REGULAR FALSI METHOD

In[ ]:=
```
f[x_] := x^3 - 5 x + 1
Plot[f[x], {x, -3, 3}]
```

Out[ ]=



In[ ]:=
```
f[x_] := x^3 - 5 x + 1
a[0] = 2.0;
b[0] = 3.0;
Do[p[n + 1] = b[n] - ((b[n] - a[n])/(f[b[n]] - f[a[n]])) * f[b[n]];
  If[f[a[n]] × f[p[n + 1]] < 0, a[n + 1] = a[n];
   b[n + 1] = p[n + 1], a[n + 1] = p[n + 1];
   b[n + 1] = b[n]], {n, 0, 20}]
TableForm[Table[{n, a[n], b[n], p[n + 1], f[p[n + 1]]}, {n, 0, 20}]]
```

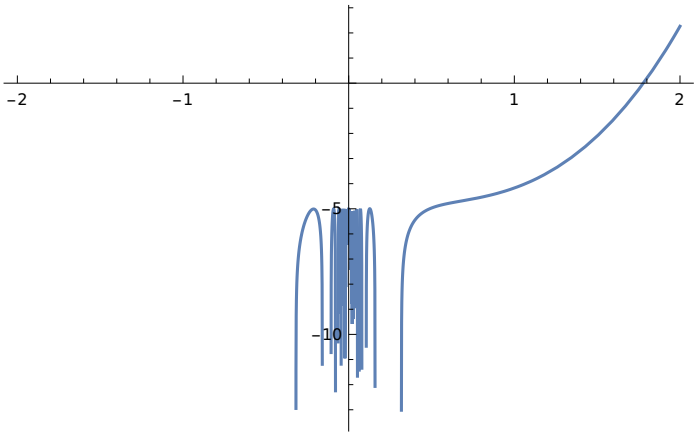
Out[ ]//TableForm=

0	2.	3.	2.07143	−0.469023
1	2.07143	3.	2.10376	−0.207936
2	2.10376	3.	2.11787	−0.0898843
3	2.11787	3.	2.12393	−0.0384295
4	2.12393	3.	2.12651	−0.016353
5	2.12651	3.	2.12761	−0.00694483
6	2.12761	3.	2.12808	−0.00294682
7	2.12808	3.	2.12827	−0.00124994
8	2.12827	3.	2.12836	−0.0005301
9	2.12836	3.	2.12839	−0.000224801
10	2.12839	3.	2.12841	−0.0000953293
11	2.12841	3.	2.12841	−0.000040425
12	2.12841	3.	2.12842	−0.0000171424
13	2.12842	3.	2.12842	-7.26928×10^{-6}
14	2.12842	3.	2.12842	-3.08256×10^{-6}
15	2.12842	3.	2.12842	-1.30717×10^{-6}
16	2.12842	3.	2.12842	-5.54307×10^{-7}
17	2.12842	3.	2.12842	-2.35055×10^{-7}
18	2.12842	3.	2.12842	-9.96757×10^{-8}
19	2.12842	3.	2.12842	-4.22677×10^{-8}
20	2.12842	3.	2.12842	-1.79237×10^{-8}

■ QUESTION 2

In[ ]:=
```
f[x_] := Log[Sin[1 / x]] + x ^ 3 - 5
Plot[f[x], {x, -2, 2}]
```

Out[ ]=



In[ ]:=
```
a[0] = 1.0;
b[0] = 2.0;
Do[p[n + 1] = b[n] - ((b[n] - a[n])/(f[b[n]] - f[a[n]])) * f[b[n]];
  If[f[a[n] × f[p[n + 1]]] < 0, a[n + 1] = a[n];
    b[n + 1] = p[n + 1], a[n + 1] = p[n + 1];
    b[n + 1] = b[n]], {n, 0, 20}]
TableForm[Table[{n, a[n], b[n], p[n + 1], f[p[n + 1]]}, {n, 0, 20}]]
```

Less: Invalid comparison with −6.50275 + 3.14159 *i* attempted.

Less: Invalid comparison with −5.03415 + 3.14159 *i* attempted.

Less: Invalid comparison with −6.07486 + 3.14159 *i* attempted.

General: Further output of Less::nord will be suppressed during this calculation.

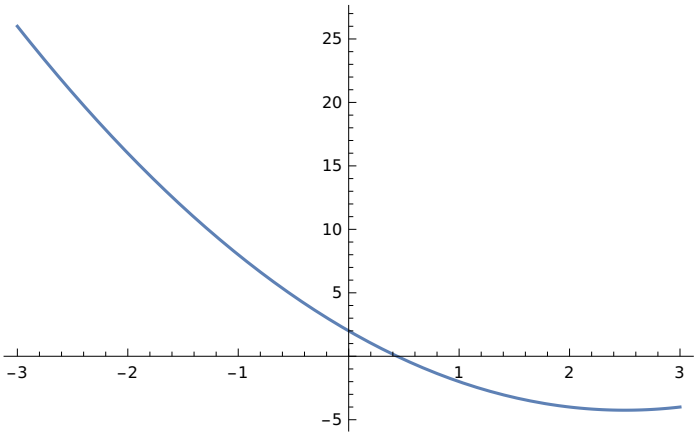
Out[ ]//TableForm=

0	1.	2.	1.64818	−1.08454
1	2.07143	3.	1.90828	1.25669
2	1.90828	3.	1.83838	0.554347
3	1.90828	1.83838	1.7832	0.0388688
4	1.90828	1.7832	1.77921	0.00287221
5	1.90828	1.77921	1.77892	0.000213055
6	1.90828	1.77892	1.77889	0.0000158085
7	2.12808	3.	1.9313	1.50027
8	1.9313	3.	1.84858	0.653334
9	1.9313	1.84858	1.78476	0.0529828
10	2.12839	3.	1.93142	1.50163
11	1.93142	3.	1.84863	0.65388
12	1.93142	1.84863	1.78477	0.053066
13	2.12842	3.	1.93143	1.50173
14	1.93143	3.	1.84864	0.653922
15	1.93143	1.84864	1.78477	0.0530724
16	2.12842	3.	1.93143	1.50174
17	1.93143	3.	1.84864	0.653925
18	1.93143	1.84864	1.78477	0.0530729
19	2.12842	3.	1.93143	1.50174
20	1.93143	3.	1.84864	0.653925

QUSTION 3

In[ ]:=
```
f[x_] := x^2 - 5 x + 2
Plot[f[x], {x, -3, 3}]
```

Out[ ]=



In[ ]:=
```
a[0] = 0.0;
b[0] = 1.0;
Do[p[n + 1] = b[n] - ((b[n] - a[n])/(f[b[n]] - f[a[n]])) * f[b[n]];
  If[f[a[n] × f[p[n + 1]]] < 0, a[n + 1] = a[n];
    b[n + 1] = p[n + 1], a[n + 1] = p[n + 1];
    b[n + 1] = b[n]], {n, 0, 20}]
TableForm[Table[{n, a[n], b[n], p[n + 1], f[p[n + 1]]}, {n, 0, 20}]]
```

Out[ ]//TableForm=

0	0.	1.	0.5	−0.25
1	0.5	1.	0.428571	0.0408163
2	0.428571	1.	0.44	−0.0064
3	0.44	1.	0.438202	0.00100997
4	0.438202	1.	0.438486	−0.000159221
5	0.438486	1.	0.438441	0.0000251051
6	0.438441	1.	0.438448	-3.95833×10^{-6}
7	0.438448	1.	0.438447	6.24113×10^{-7}
8	0.438447	1.	0.438447	-9.84044×10^{-8}
9	0.438447	1.	0.438447	1.55155×10^{-8}
10	0.438447	1.	0.438447	-2.44634×10^{-9}
11	0.438447	1.	0.438447	3.85717×10^{-10}
12	0.438447	1.	0.438447	-6.08158×10^{-11}
13	0.438447	1.	0.438447	9.58877×10^{-12}
14	0.438447	1.	0.438447	-1.51212×10^{-12}
15	0.438447	1.	0.438447	2.38476×10^{-13}
16	0.438447	1.	0.438447	-3.77476×10^{-14}
17	0.438447	1.	0.438447	5.9952×10^{-15}
18	0.438447	1.	0.438447	-1.33227×10^{-15}
19	0.438447	1.	0.438447	0.
20	0.438447	1.	0.438447	0.