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Method

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Roll no -

Practical no. 2  
Regula- falsi

In[150]:= Ques – 1

```

x0 = Input["Enter first guess: "];
x1 = Input["Enter second guess:"];
Nmax =
  Input["Enter the Maximum number of Iteration:"];
eps = Input["Enter the terminal condition :"];
Print["x0= ", x0];
Print["x1= ", x1];
Print["Nmax= ", Nmax];
Print["epsilon= ", eps];
f[x_] := Cos[x];
Print["f(x) := ", f[x]];
If[N[f[x0] * f[x1]] > 0,
  Print["These values do not
    satisfy the IVp so change the values."],
  For[i = 1, i ≤ Nmax, i++, x2 =
    N[x1 - f[x1] * (x1 - x0) / (f[x1] - f[x0])];
    If[Abs[x1 - x0] < eps, Return[N[x2]],
      Print[i, "th iterations value is :", N[x2]];
      Print["estimated error is:", N[x1 - x0]]];
    If[f[x2] * f[x1] > 0, x1 = x2, x0 = x2]]];
Print["root is: ", N[x2]];
Print["estimated error is:", N[x1 - x0]];
Plot[f[x], {x, -1, 3}]

```

Out[150]:= – 1 + Ques

```

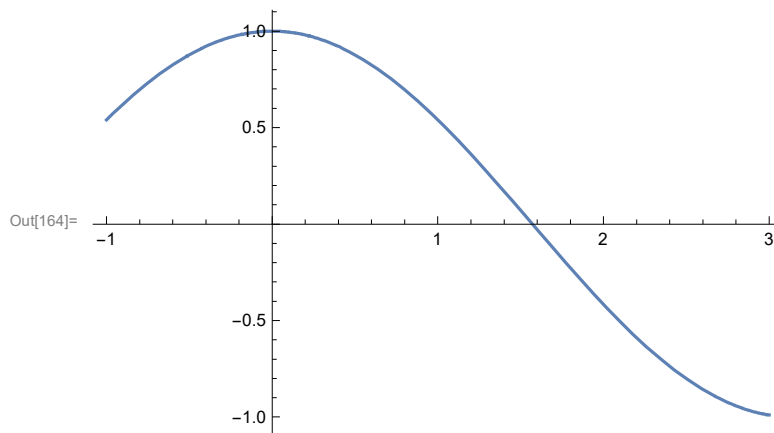
x0= 0
x1= 2
Nmax= 5
epsilon= 0.0001
f(x):=Cos[x]
1th iterations value is :1.41228
estimated error is:2.
2th iterations value is :1.57391
estimated error is:0.587717
3th iterations value is :1.57078
estimated error is:0.161623
4th iterations value is :1.5708
estimated error is:0.0031228

```

Out[161]= Return[1.5708]

root is: 1.5708

estimated error is:0.0000128049



In[195]:= Ques2

```

x0 = Input["Enter first guess: "];
x1 = Input["Enter second guess:"];
Nmax =
  Input["Enter the Maximum number of Iteration:"];
eps = Input["Enter the terminal condition :"];
Print["x0= ", x0];
Print["x1= ", x1];
Print["Nmax= ", Nmax];
Print["epsilon= ", eps];
f[x_] := Cos[x] - x e^x;
Print["f(x) := ", f[x]];
If[N[f[x0] * f[x1]] > 0,
  Print["These values do not
    satisfy the IVp so change the values."],
  For[i = 1, i ≤ Nmax, i++, x2 =
    N[x1 - f[x1] * (x1 - x0) / (f[x1] - f[x0])];
    If[Abs[x1 - x0] < eps, Return[N[x2]],
      Print[i, "th iterations value is :", N[x2]];
      Print["estimated error is:", N[x1 - x0]]];
      If[f[x2] * f[x1] > 0, x1 = x2, x0 = x2]]];
Print["root is: ", N[x2]];
Print["estimated error is:", N[x1 - x0]];
Plot[f[x], {x, -1, 3}]

```

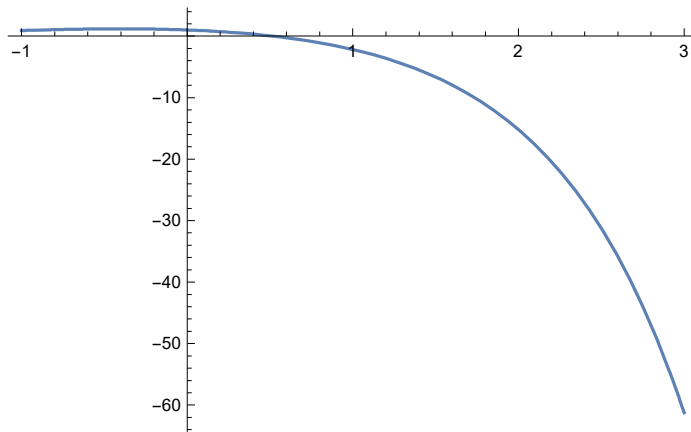
Out[195]:= Ques2

```

x0= 0
x1= 1
Nmax= 5
epsilon= 0.001
f(x) :=-ex x + Cos [x]
1th iterations value is :0.314665
estimated error is:1.
2th iterations value is :0.446728
estimated error is:0.685335
3th iterations value is :0.494015
estimated error is:0.553272
4th iterations value is :0.509946
estimated error is:0.505985
5th iterations value is :0.515201
estimated error is:0.490054
root is: 0.515201
estimated error is:0.484799

```

Out[209]=



In[210]= Ques 3

```

x0 = Input["Enter first guess: "];
x1 = Input["Enter second guess:"];
Nmax =
  Input["Enter the Maximum number of Iteration:"];
eps = Input["Enter the terminal condition :"];
Print["x0= ", x0];
Print["x1= ", x1];
Print["Nmax= ", Nmax];
Print["epsilon= ", eps];
f[x_] := x3 - 5 x + 1;
Print["f(x):=", f[x]];
If[N[f[x0] * f[x1]] > 0,
  Print["These values do not
    satisfy the IVP so change the values."],
  For[i = 1, i ≤ Nmax, i++, x2 =
    N[x1 - f[x1] * (x1 - x0) / (f[x1] - f[x0])];
    If[Abs[x1 - x0] < eps, Return[N[x2]],
      Print[i, "th iterations value is :", N[x2]];
      Print["estimated error is:", N[x1 - x0]]];
    If[f[x2] * f[x1] > 0, x1 = x2, x0 = x2]]];
Print["root is: ", N[x2]];
Print["estimated error is:", N[x1 - x0]];
Plot[f[x], {x, -1, 3}]

```

Out[210]= 3 Ques

```
x0= 0
x1= 1
Nmax= 5
epsilon= 0.001
f(x):=1-5 x + x3
1th iterations value is :0.25
estimated error is:1.
2th iterations value is :0.202532
estimated error is:0.25
3th iterations value is :0.201654
estimated error is:0.202532
4th iterations value is :0.20164
estimated error is:0.201654
5th iterations value is :0.20164
estimated error is:0.20164
root is: 0.20164
estimated error is:0.20164
```

