Practical 4 : - False Position Method

Q1 : Find the 5 th Approximation using False Position Method for f (x) = ln (1 + x) − cos (x) = 0 in the given interval (0, 1).

In[∘]:=
```
f[x_] := Log[1 + x] - Cos[x];
a = 0; b = 1; p = b - f[b] * (b - a)/(f[b] - f[a]);
For[i = 1, i ≤ 4, i++,
 If[f[p] * f[b] < 0, a = p, b = p];
 p = b - f[b] * (b - a)/(f[b] - f[a]);
]
Print["5th Approximation = ", N[p]];
Print["Corresponding Interval = (", N[a], ",", N[b], ")"];
```

```
5th Approximation = 0.884511

Corresponding Interval = (0.884511,1.)
```

Q2 : Find the Root by using False Position Method for f (x) = ln (1 + x) - cos (x) = 0 in the given interval (0, 1) with tolerance 10^{-6} .

In[∘]:=
```
f[x_] := Log[1 + x] - Cos[x];
a = 0; b = 1; p = b - f[b] * (b - a)/(f[b] - f[a]); ϵ = 10^-6;
For[i = 1, i ≤ Infinity, i++,
 If[f[p] * f[b] < 0, a = p, b = p];
 p = b - f[b] * (b - a)/(f[b] - f[a]);
 If[Abs[a - p] < ϵ || Abs[b - p] < ϵ , Break[]]
]
Print["Final Approximation = ", N[p], " , iteration number = ", i];
Print["Corresponding Interval = (", N[a], ",", N[b], ")"];
```

```
Final Approximation = 0.884511 , iteration number = 4

Corresponding Interval = (0.884511,1.)
```

Q3 : Find the Root by using False Position Method for f (x) = $x^3 + 2x^2 - 3x - 1 = 0$ in the given interval (1, 2) with tolerance 10^{-6}.

```
In[•]:= f[x_] := x^3 + 2 x^2 - 3 x - 1;
a = 1; b = 2; p = b - f[b] * (b - a)/(f[b] - f[a]); ϵ = 10^-6;
For[i = 1, i ≤ Infinity, i++,
 If[f[p] * f[b] < 0, a = p, b = p];
 p = b - f[b] * (b - a)/(f[b] - f[a]);
 If[Abs[a - p] < ϵ || Abs[b - p] < ϵ , Break[]]
]
Print["Final Approximation = ", N[p], " , iteration number = ", i];
Print["Corresponding Interval = (", N[a], ",", N[b], ")"];
```

```
Final Approximation = 1.19869 , iteration number = 15

Corresponding Interval = (1.19869,2.)
```