Practical 2 : - Newton Raphson Method

Q1 : – Find the 5 th Approximation using Newton Raphson Method for the $f(x) = x^3 + 2x^2 - 3x - 1$ on the interval $(1, 2)$ with the starting approximation $p_o = 1.$

```
In[∘]:= f[x_] := x^3 + 2 x^2 - 3 x - 1;
p = 1;
For[i = 1, i ≤ 5, i++,
 p = p - f[p]/f'[p];
]
Print["The 5th Approximation = ", N[p]]
```

```
The 5th Approximation = 1.19869
```

Q2 : – Find the 5 th Approximation using Newton Raphson Method for the $f(x) = \ln(1 + x) - \cos(x) = 0$ with the starting approximation $p_o = 0.$

```
In[∘]:= Clear["Global*`"];
f[x_] := Log[1 + x] - Cos[x];
p = 0;
For[i = 1, i ≤ 5, i++,
 p = p - f[p]/f'[p];
]
Print["The 5th Approximation = ", N[p]]
```

```
The 5th Approximation = 0.884511
```

Q3 : – Find the root using Newton Raphson Method for the $f(x) = e^{-x} - x = 0$ with the starting approximation $p_o = 0$ with tolerance 10^{-6}.

In[•]:=
```
Clear["Global*`"];
f[x_] := Exp[-x] - x;
p = 0; p1 = 0; ϵ = 10^-6;
For[i = 1, i ≤ Infinity, i++,
 p1 = p - f[p]/f'[p];
 If[Abs[p1 - p] < ϵ, Break[]];
 p = p1;
]
Print["The Final Approximation = ", N[p1]]
```

```
The Final Approximation = 0.567143
```