Practical -4

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NA Practical

Secant Method

Ques-1. x^3 -5 x +1, (0,1)

In[68]:=

```
ClearAll;
SecantMethod[ao_, bo_, m_] :=
  Module[ {a = N[ao], b = N[bo]},
   k = 0;
   While[k < m,
    If[f[a] == f[b], Print["Same root will print"]
      Break[],
     c = (a * f[b] - b * f[a]) / (f[b] - f[a]);

     Print["value at ", k + 1, " th iteration is = ", NumberForm[c, 16]];
     a = b;
     b = c;

    ];
    k = k + 1];
  ];
f[x_] = x^3 - 5 x + 1;
SecantMethod[0, 1, 10];
```

```
value at 1 th iteration is = 0.25
value at 2 th iteration is = 0.1864406779661017
value at 3 th iteration is = 0.2017362561791272
value at 4 th iteration is = 0.2016398528913041
value at 5 th iteration is = 0.2016396757212823
value at 6 th iteration is = 0.2016396757234047
value at 7 th iteration is = 0.2016396757234046
value at 8 th iteration is = 0.2016396757234046
Same root will print
```

Ques-2. Tan[πx] -x -6, (0.4, 0.48)

In[72]:=

```
f[x_] = Tan[π x] - x - 6;
SecantMethod[.4, .48, 10];
```

```
value at 1 th iteration is = 0.4208674107871754
value at 2 th iteration is = 0.4332027500739759
value at 3 th iteration is = 0.4620367139636613
value at 4 th iteration is = 0.4470431840922259
value at 5 th iteration is = 0.4501486990267678
value at 6 th iteration is = 0.4511207210146642
value at 7 th iteration is = 0.4510459109744277
value at 8 th iteration is = 0.4510472568084062
value at 9 th iteration is = 0.4510472588302876
value at 10 th iteration is = 0.451047258830232
```

Ques-3. x^3 +2 x^2 -3x -1, (-3,-2)

In[74]:=
```
f[x_] = x^3 + 2 x^2 - 3 x - 1;
SecantMethod[-3, -2, 10];
```

```
value at 1 th iteration is = -2.833333333333333
value at 2 th iteration is = -2.994475138121547
value at 3 th iteration is = -2.908188374501305
value at 4 th iteration is = -2.912029236948963
value at 5 th iteration is = -2.91222968372554
value at 6 th iteration is = -2.912229178421345
value at 7 th iteration is = -2.912229178484397
value at 8 th iteration is = -2.912229178484397
Same root will print
```

Ques-4. x^7-3, (1,2)

In[76]:=
```
f[x_] = x^7 - 3;
SecantMethod[1, 2, 10];
```

```
value at 1 th iteration is = 1.015748031496063
value at 2 th iteration is = 1.030365595191943
value at 3 th iteration is = 1.250478585013422
value at 4 th iteration is = 1.139984784816519
value at 5 th iteration is = 1.164126462702531
value at 6 th iteration is = 1.170395156813485
value at 7 th iteration is = 1.169923859430988
value at 8 th iteration is = 1.169930804483701
value at 9 th iteration is = 1.169930812758834
value at 10 th iteration is = 1.169930812758687
```

Ques-5. e^(-1) -x, (0,1)

In[78]:=
```
f[x_] = e^(-1) - x;
SecantMethod[0, 1, 10];
```

```
value at 1 th iteration is = 0.3678794411714423

value at 2 th iteration is = 0.3678794411714423

Same root will print
```