***Mth603***

***Student id***

**Question 1 (Marks: 5)**

**Task:** Construct the divided difference table and find the interpolating polynomial using Newton's Divided Difference Formula.

**Step 1: Divided Difference Table**

Given data:

* X0=0,y0=0
* X1=0,y1=0
* X2=0,y2=0

F[x0,x1]=$\frac{f\left(x1\right)-f\left(x0\right)}{x1-x0}$=2/π=0.6366

F[x1,x2]=$\frac{f\left(x2\right)-f\left(x1\right)}{π-π/2}$=-2/π=-0.6366

Second divided difference:

F[x0,x1,x2 ]=$\frac{f\left[x1,x2\right]-\left[x0,x1\right]}{x2-x0}$ =-4/π2=0.4053

|  |  |  |  |
| --- | --- | --- | --- |
| **x** | **Y=f(x)** | **F(x0,x1)** | F(x0,x1,x2) |
| **0** | 0 | 2/π | -4/π2 |
| π/2 | 1 | -2/π |  |
| **π** | 0 |  |  |

 P(x)=(2/π )x-4/π2 x(x-π/2)

 P(x)=(0.6366)x-0.4053x(x-π/2)

**Question 2 (Marks: 5)**

**Task:** Compute f′(1.5)f'(1.5)f′(1.5) using the forward difference formula.

**Step 1: Forward Difference Formula**

F’(x$)=\left( f\left(x+h\right)-f\left(x\right)\right)/h$

X=1.5

f′(1.5)= 7.25