

# Agnihotri Engg. & GATE Classes

Scripting success stories

## INTERPOLATION & EXTRAPOLATION

Q.1) Apply Newton's forward formula to solve following questions?

a) Find the cubic polynomial which takes the following values & hence find  $f(4)$ ?

x	0	1	2	3
y	1	2	1	10

( Ans = ;  $f(x) = 2x^3 - 7x^2 + 6x + 1$  ,  $f(4) = 41$  )

b) Estimate the sale for 1966 using the following table ?

Years	1931	1941	1951	1961	1971	1981
Sale ( in Thousand )	12	15	20	27	39	52

( Ans = ; 32.3437 Thousand )

c) From the following table Estimate the number of students who obtained marks between 40 & 45 ?

Marks	30-40	40-50	50-60	60-70	70-80
No. Of students	31	42	51	35	31

( Ans = ; 17 )

d) Find the number of men getting wages between Rs 10 & Rs 15 from the following table ?

Wages (in Rs)	0-10	10-20	20-30	30-40
No. Of Men	9	30	35	42

( Ans = ; 15 )

Q.2) Apply Newton's Backward formula to solve the following ?

a) Evaluate  $f(42)$  from the following data

X	20	25	30	35	40
f(x)	354	332	291	260	231

( Ans = ; 211.123 )

b) Find polynomial & hence find  $f(4)$  from the following data ?

x	0	1	2	3
y	1	2	1	10

( Ans = ;  $f(x) = 2x^3 - 7x^2 + 6x + 1$  ,  $f(4) = 41$  )

c) Estimate the population for the year 1925 from the following data ?

Years	1891	1901	1911	1921	1931
Population (in thousand)	46	66	81	93	101

( Ans = ; 96.84 Thousand )

Q.3 ) Solve the Following by applying Sterling's Formula ?

a) Evaluate  $f(1.22)$  from the following table ?

x	1.0	1.1	1.2	1.3
F(x)	8.403	8.781	9.129	9.451

( Ans = ; 9.136 )

b) Find  $f(28)$  using Sterling's Formula ?

X	20	25	30	35	40
F(x)	49225	48316	47236	45926	44306

( Ans = ; 47692 )

c) Use sterling formula to find  $f(35)$  as per following data ?

x	20	30	40	50
f(x)	512	439	346	243

( Ans = ; 395 )

Q.4) Use Bessel's formula to solve the following ?

a) Obtain value of y at x = 25 ?

x	20	24	28	32
y	24	32	35	40

 ( Ans = ; 32.945 )

b) Obtain value of y at x = 25 ?

x	20	24	28	32
y	2854	3162	3544	3992

 ( Ans = ; 3250.875 )

c) Obtain value of y at x = 3.75?

x	2.5	3.0	3.5	4.0	4.5	5.0
y	24.145	22.043	20.225	18.644	17.262	16.047

 (Ans. = ; 19.4074 )

Q.5) Solve following by using Lagrange's interpolation formula ?

a) Use Lagrange's interpolation formula to find f (15) ?

x	10	12	14	16	18	20
y= f(x)	2420	1942	1497	1109	790	540

 (Ans = ; 1294.85 )

b) Find the value of  $\tan 33^\circ$  from given table ?

x (Angle)	30	32	35	38
y = tan x	0.5774	0.6249	0.7002	0.7813

 ( Ans = ; 0.6494 )

Q.6) Evaluate f (8) by using a) Lagrange's Formula & b) Newton's divided difference formula

x	4	5	7	10	11	13
f(x)	48	100	294	900	1210	2028

 ( Ans = ; 448 )

Q.7) Solve the following by applying Newton's divided difference formula ?

a) Use Newton's divided difference formula to obtain a polynomial from given table and hence evaluate f (2) ?

x	0	2	3	6
y	648	704	729	792

 ( Ans = ;  $-x^2 + 30x + 648$  , 704 )

b) Evaluate f (9) ?

x	5	7	11	13	17
y	150	392	1452	2366	5202

 ( Ans = ; 810 )

c) Find f (6) if

x	3	5	8	9	12
y	24	120	504	720	1716

 ( Ans = 210 )

Classes on (ED,BEEE,M1,M2,M3,NA,CONTROL,DSP & other GATE oriented Engineering Subjects)

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