



NH - 67, Karur - Trichy Highways, Puliur C.F, 639 114 Karur District

MA8491-NUMERICAL METHODS
UNIT-II - Interpolation and Approximation

1. Newton- Gregory Forward interpolation formula can be used _____

- A. only for equally spaced intervals
- B. only for unequally spaced intervals
- C. for both equally and unequally spaced intervals
- D. for unequally intervals

Answer: (A)

2. Find n for the following data if $f(0.2)$ is asked.

x	0	1	2	3	4	5	6
f(x)	176	185	194	203	212	220	229

A. 0.4

B. 0.2

C. 1

D. 0.1

Answer: (B)

3. Find n for the following data if $f(1.8)$ is asked.

x	0	0.5	1	1.5	2
f(x)	0.3989	0.3521	0.2420	0.1295	0.0540

A.2.4

B.3.4

C.2.6

D.3.6

Answer: (D)

4. Find the polynomial for the following data.

x	4	6	8	10
f(x)	1	3	8	16

A. $(3x^2-22x+368)/8$ B. $3x^2-22x+36$ C. $(3x^2+22x+368)/2$ D. $(3x^2-19x+368)/8$

Answer: (A)

5. Using Newton's Forward formula, find $\sin(0.1604)$ from the following table.

x	0.160	0.161	0.162
f(x)	0.1593182066	0.1603053541	0.1612923412

A. 0.169713084

B. **0.159713084**

C. 0.158713084

D. 0.168713084

Answer: (B)

6. Find $f(5)$ using Newton's Forward interpolation formula from the following table.

x	0	2	4	6	8
f(x)	4	26	58	112	466

A. 71.109375

B. 61.103975

C. 70.103957

D. 71.103957

Answer: (A)

7. Find $f(0.18)$ from the following table using Newton's Forward interpolation formula.

x	0	0.1	0.2	0.3	0.4
f(x)	1	1.052	1.2214	1.3499	1.4918

A. 1.18878784

B. 1.8878784

C. 1.9878785

D. 0.8878784

Answer: (A)

8. Find n if $x_0 = 0.75825$, $x = 0.759$ and $h = 0.00005$.

A. 1.5

B. 15

C. 2.5

D. 25

Answer: (B)

9. Find x if $x_0 = 0.6$, $n = 2.6$ and $h = 0.2$.

A. 12

B. 1.2

C. 1.12

D. 1.22

Answer: (C)

10. What is forward difference operator?

A. $\Delta y_x = y_x - y_{x-1}$

B. $\Delta y_x = y_{x+1} + y_x$

C. $\Delta y_x = y_{x+1} - y_x$

D. $\Delta y_x = y_{x-1} - y_x$

Answer: (C)

11. What is backward difference operator?

A. $\nabla y_x = y_x - y_{x-1}$

B. $\nabla y_x = y_x + y_{x-1}$

C. $\nabla y_x = y_{x-1} - y_x$

D. $\nabla y_x = y_{x-1} - y_{x+1}$

Answer: (A)

12. Find $\Delta \log x$.

A. $\log\left(\frac{x+h}{x}\right)$

B. $\log\left(\frac{x}{x+h}\right)$

C. $\log(x+h)$

D. $\log x$

Answer: (A)

13. Taking h to be the interval of differencing, find $\Delta^2(e^x)$

- A. $e^x(e^h - 1)^2$
- B. $e^x(e^h + 1)^2$
- C. $e^h(e^x - 1)^2$
- D. $e^x(e^h - 1)^3$

Answer: (A)

14. Which method can be used for both equal and unequal intervals?

- A. Lagrange's Method**
- B. Divided difference method
- C. Cubic spline method
- D. Newton's method

Answer: (A)

15. A cubic polynomial which has continuous slope and curvature is called

- A. Lagrange's Method
- B. Divided difference method
- C. Cubic spline method**
- D. Newton's method

Answer: (C)

16. A cubic spline fitted to the given data such that the end cubics approach linearity at their extremities is called

- A. natural cubic spline**
- B. cubic spline
- C. spline
- D. None of these

Answer: (A)

17. The conditions for a natural cubic spline is

- A. $s_n = g_n''(x) \neq 0$ and $s_n = g_0''(x) \neq 0$
- B. $s_n = g_n''(x) = 0$ and $s_n = g_0''(x) \neq 0$
- C. $s_n = g_n''(x) \neq 0$ and $s_n = g_0''(x) = 0$
- D. $s_n = g_n''(x) = 0$ and $s_n = g_0''(x) = 0$**

Answer: (D)

18. Find the parabola is of the form $y=ax^2+bx+c$ passing through the points (0,0), (1,1), and (2,20)

- A. $y=8x^2+x$
 B. $y=8x^2-9x$
C. $y=9x^2-8x$
 D. $y=8x^2-x$
 Answer: (C)

19. The process of finding the value of x for the corresponding value of y is called

- A. interpolation
B. inverse interpolation
 C. cubic spline
 D. divided difference
 Answer: (B)

20. Find the second degree polynomial through the points (0,2),(2,1) and (1,0) using Lagrange's formula

- A. $\frac{1}{2}(3x^2-7x+4)$**
 B. $\frac{1}{2}(x^2-7x+4)$
 C. $\frac{1}{2}(3x^2-4x+4)$
 D. $\frac{1}{2}(3x^2-7x-4)$
 Answer: (A)

21. If a polynomial of degree n has more than n zeros, then the polynomial is

- A. oscillatory
B. zero everywhere
 C. quadratic
 D. not defined
 Answer: (B)

22. Find f(3) by using Lagrange's formula $f(0)=2$, $f(1)=3$, $f(2)=12$, $f(5)=147$

- A. 25
 B. 27
C. 30
 D. 32

Answer: (C)

23. Find y(10) by using Lagrange's formula $y(5)=12$, $y(6)=13$, $y(9)=14$, $f(11)=16$

- A. 14.67**

B. 15.24

C. 16.17

D. 17.42

Answer: (A)

24. Relation between the operators which is correct?

A. $\Delta = E - 1$

B. $\Delta = E + 1$

C. $\nabla = E - 1$

D. $\nabla = E + 1$

Answer: (A)

25. Relation between the operators which is correct?

A. $\Delta = E - 1$

B. $\Delta = E + 1$

C. $\nabla = 1 - (1/E)$

D. $\nabla = (1/E) + 1$

Answer: (C)