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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. ½($3x^2$-7x+4)
B. ½(x^2-7x+4)
C. ½($3x^2$-4x+4)
D. ½($3x^2$-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 ,f 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)