

PRE BOARD-1- 2024
APPLIED MATHEMATICS (241)

Class: XII Commerce

Duration: 3 Hour

Date: 22/11/24

MARKING SCHEME

Max. Marks: 80

Q No.	Answer	Scheme
1	(D)	3.6km
2	(A)	(0,1]
3	(D)	512
4	(A)	4
5	(D)	I-A
6	(B)	3
7	(B)	$2a^{2x+3}\log a$
8	(A)	$-\frac{1}{2at^3}$
9	(A)	(2,8)
10	(B)	$\frac{(\log x)^6}{6} + c$
11	(C)	9
12	(B)	$500+10x-2x^2+x^3$
13	(A)	27
14	(C)	$\sqrt{1-x^2}$
15	(B)	3,2
16	(A)	11/36
17	(C)	$\frac{1}{81}$
18	(D)	Irregular trend
19	(C)	
20	(B)	
21		$5^{60}, 5^1 = 5 \pmod{7}$ Remainder is 5
22		$6-x \geq 2, -x \geq -4$ $x \leq 4$ OR $4x \leq 88$ and $x \geq 8$ $x \leq 22$ and $x \geq 8$
23		$C(x) = R(x)$ $5x+350 = 50x-x^2$ $x^2-45x+350=0$ $x^2-35x-10x+350=0$ $x(x-35) -10(x-35)=0$ $x=35$ and 10
24		Given function is not a proper function

	$1 + \frac{4x-3}{(x-1)(x-3)}$ $\frac{4x-3}{(x-1)(x-3)} = \frac{A}{x-1} + \frac{B}{x-3}$ <p>A = -1/2, B = 9/2</p> <p>Integration</p> $x - \frac{1}{2} \log(x-1) + \frac{9}{2} \log(x-3) + C$ <p>OR</p> <p>By using properties of definite integrals</p> $\int_2^3 -(x-3) dx + \int_3^5 (x-3) dx = -\frac{1}{2}$
25	<p>Sample space {1,1,1,2,2,5}</p> <p>P(1) = 1/2, P(2) = 1/3, P(5) = 1/6</p> <p>Mean = 1/2 + 2/3 + 5/6 = 2</p>
26	<p>Apply log to both side, $y \log x = x \log y$</p> <p>Differentiating both side w.r.t x</p> $\frac{dy}{dx} = \frac{y(x \log y - y)}{x(y \log x - x)}$
27	<p>Let $x^2 = t$, $2x dx = dt$</p> <p>$\frac{1}{2} \int \frac{t dt}{t^2 + 3t + 2}$ integrate with the help of partial fraction method</p> $\log x^2 + 2 - \frac{1}{2} \log x^2 + 2 + C$ <p>OR</p> <p>Apply the identity of $(a-b)^3$ and integrate</p> $\frac{x^4}{4} + \frac{1}{2x^2} \frac{3}{2} x^2 + 3 \log x + C$
28	<p>By using variable separable method, we have</p> $\frac{x^2}{2} + x + \log(x-1) + \frac{y^2}{2} + \log(y+1) + C$
29	<p>P(X=0) = 1/8</p> <p>P(X=1) = 3/8</p> <p>P(X=2) = 3/8</p> <p>P(X=3) = 1/8</p> <p>OR</p> <p>$P(X=3) = \frac{2^3 e^{-2}}{3!} = 0.180$</p> <p>$P(X > 2) = 1 - 5e^{-2} = 1 - 5(0.1353) = 0.323$</p>
30	<p>Given $\mu_0 = 72$ beats /minute, $n=25$, $\bar{x} = 69$ beats /minute and $S = 6.5$</p> <p>$t = -\frac{3x_5}{6.5} = -2.3077$, $df = 24$, $t_{\alpha} = t_{0.05} = 1.711$</p> <p>$t < t_{\alpha}$, so do not reject null hypothesis</p>
31	<p>P.V = 20000</p> <p>F.V = 32000</p> <p>Number of years = 5</p> <p>$CAGR = \left(\frac{F.V}{P.V}\right)^{1/n} - 1 = (1.6)^{1/5} - 1 = 1.098 - 1 = 0.098 \times 100 = 9.8$.</p>
32	<p>$C(x) = \int MC dx = \int (30 + 2x) dx = 30x + x^2 + k$, When $x=0$, $C(x) = 120$</p> <p>$K = 120$</p> <p>$C(X) = 120 + 30x + x^2$, Total cost of producing 100 units is Rs.13120</p> <p>Cost of increasing output from 100 to 200 = $C(200) - C(100) = \text{Rs.}33000$</p>
33	<p>Proper table formation</p> <p>$a = \frac{\sum y}{n} = \frac{47.8}{8} = 5.975$</p> <p>$b = \frac{\sum y}{n} = \frac{4.3}{42} = 0.102$</p>

	<p>so, $y = 5.975 + 0.10x$ hence trend values are 5.62, 5.72, 5.82, 5.92, 6.03, 6.13, 6.23, 6.33.</p>
34	<p>Cost of house = Rs. 4500000 Down payment = Rs. 500000 Balance = 4000000 $EMI = \frac{4000000 \times 0.005 \times (1.005)^{300}}{(1.005)^{300} - 1} = 25772$ OR $R = Rs. 5000$, $r = 0.5\%$ per month, $i = 0.005$ $P = R + R/i$ $= 5000 + 1000000 = 1005000$ 1005000 are need to invest now to get Rs. 500 at the beginning of month.</p>
35	<p>Proper graph Corner points (0,0), (2,0), (8/5, 6/5), (0,2) Maximum value at (0,2) is 10 OR Proper graph (0,0), (6,0), (4,3), (0, 19/3) Maximum production is 320 at (4,3)</p>
36	(A) $P = -1/x$, $Q = 2x^2$ (B) $1/x$, (C) $y = x^3 + Cx$
37	<p>By using the concept of adjoint and inverse of matrix, we will have A) Rs1 B) Rs 5 C) Rs. 2</p>
38	<p>(A) 50/3, 40/3 (B) (0,20), (50/3, 40/3), (30,0) (C) (30,0)</p>