MATHS

BOOKS - XII BOARDS PREVIOUS YEAR

QUESTION PAPER 2022 TERM 1 SET 1

Section A

1. Differential of $\log\left[\log\left(\log x^5\right)\right]$ w.r.t. x is

A. $\dfrac{5}{x\log(x^5)\log\left(\log x^5\right)}$

B. $\frac{5}{x \log\left(\log x^5\right)}$

C. $\frac{5x^4}{\log(x^5)\log\left(\log x^2\right)}$

D. $\frac{5x^4}{\log x^5 \log\left(\log x^5\right)}$

Answer:

Watch Video Solution

2. The number of all possible matrices of order

2×3 with each entry 1 or 2 is

A. 16

B. 6

C. 64

D. 24

Answer:

Watch Video Solution

3. A function $f: R \to R$ is defined as $f(x) = x^3 + 1$. Then the function has

A. no minimum value

B. no maximum value

C. both maximum and minimum values

D. neither maximum value nor minimum value

Answer:

Watch Video Solution

4. if $\sin y = x\cos(a+y)$, then $\frac{dx}{dy}$ is

A. $\frac{\cos a}{\cos^2(a+y)}$

B. $\frac{-\cos a}{\cos^2(a+y)}$

C. $\frac{\cos a}{\sin^2 y}$

D. $\frac{-\cos a}{\sin^2 y}$

Answer:

Watch Video Solution

5. The points on the curve $\frac{x^2}{9}+\frac{y^2}{25}=1$, where tangent is parallel to x-axis are

A. $(\pm 5, 0)$

B. $(0, \pm 5)$

C. $(0, \pm 3)$

D. $(\pm 3, 0)$

Answer:

Watch Video Solution

6. Three points $P(2x, x+3), Q(0, x)$ and $R(x+3, x+6)$ are collinear , then x is equal to

A. 0

B. 2

C. 3

D. 1

Answer:

Watch Video Solution

7. The principal value of $\cos^{-1}\left(\frac{1}{2}\right) + \sin^{-1}\left(-\frac{1}{\sqrt{2}}\right)$ is

A. $\frac{\pi}{12}$

B. π

C. $\frac{\pi}{3}$

D. $\frac{\pi}{6}$

Answer:

Watch Video Solution

8. If $\left(x^2+y^2\right)^2 = xy$, then $\frac{dy}{dx}$ is

A. $\frac{y+4x\left(x^2+y^2\right)}{4y(x^2+y^2)-x}$

B. $\frac{y-4x\left(x^2+y^2\right)}{x+4\left(x^2+y^2\right)}$

C. $\frac{y-4x\left(x^2+y^2\right)}{4y\left(x^2+y^2\right)-x}$

D. $\frac{4y\left(x^2+y^2\right)-x}{y-4x\left(x^2+y^2\right)}$

Answer:

Watch Video Solution

9. If the matrix A is both symmetric and skew-symmetric , then

A. Diagonal matrix

B. Zero square matrix

C. Square matrix

D. Identity matrix

Answer:

Watch Video Solution

10. Let set X={1,2,3} and a relation R is defined in X as : R = $\{(1,3),(2,2),(3,2)\}$, then minimum ordered pairs which should be

added in relation R to make it reflexive and symmetric are

A. $\{(1, 1), (2, 3), (1, 2)\}$

B. $\{(3, 3), (3, 1), (1, 2)\}$

C. $\{(1, 1), (3, 3), (3, 1), (2, 3)\}$

D. $\{(1, 1), (3, 3), (3, 1), (1, 2)\}$

Answer:

 Watch Video Solution

11. A Linear Programming Problem is as follows

:

Minimise $z = 2x + y$

subject to the constraints

$x \geq 3, x \geq 9, y \geq 0$

$x - y \geq 0, x + y \leq 14$

The feasible region has

A. 5 corner points including (0,0) and (9, 5)

B. 5 corner points including (7, 7) and (3, 3)

C. 5 corner points including (14, 0) and (9, 0)

D. 5 corner points including (3, 6) and (9, 5)

Answer:

Watch Video Solution

12. The function f(x) = $\begin{cases} \frac{e^{3x} - e^{-5x}}{x}, & \text{if } x \neq 0 \\ k, & \text{if } x = 0 \end{cases}$

is continuous at x = 0 for the value of k, as

A. 3

B. 5

C. 2

D. 8

Answer:

Watch Video Solution

13. If C_{ij} denotes the cofactor of element p_{ij} of the matrix $P = \begin{bmatrix} 1 & -1 & 2 \\ 0 & 2 & -3 \\ 3 & 2 & 4 \end{bmatrix}$ then the value of $C_{31}.\ C_{23}$ is

A. 5

B. 24

C. -24

D. -5

Answer:

Watch Video Solution

14. The function $y = x^2 e^{-x}$ is decreasing in the interval

A. $(0, 2)$

B. $(2, \infty)$

C. $(-\infty, 0)$

D. $(-\infty, 0) \cup (2, \infty)$

Answer:

Watch Video Solution

15. If $R = \{(x, y), x, y, \in Z, x^2 + y^2 \leq 4\}$ is a relation in set Z, then domain of R is

A. $\{0, 1, 2\}$

B. $\{-2, -1, 0, 1, 2\}$

C. $\{0, -1, -2\}$

D. $\{-1, 0, 1\}$

Answer:

Watch Video Solution

16. The system of linear equations

$5x + ky = 5,$

$3x + 3y = 5,$

will be consistent if

A. $k \neq -3$

B. $k = -5$

C. $k = 5$

D. $k \neq 5$

Answer:

Watch Video Solution

17. The equation of the tangent to the curve $y\left(1+x^2\right)=2-x$. Where is crosses the x-axis is

A. $x-5y=2$

B. $5x-y=2$

C. $x+5y=2$

D. $5x+y=2$

Answer:

Watch Video Solution

18. If $\begin{bmatrix} 3c+6 & a-d \\ a+d & 2-3b \end{bmatrix} = \begin{bmatrix} 12 & 2 \\ -8 & -4 \end{bmatrix}$ are equal, than value of ab - cd is

A. 4

B. 16

C. -4

D. -16

Answer:

Watch Video Solution

19. The principal value of $\tan^{-1}\left(\tan\frac{9\pi}{8}\right)$ is

A. $\frac{\pi}{8}$

B. $\frac{3\pi}{8}$

C. $-\frac{\pi}{8}$

D. $-\frac{3\pi}{8}$

Answer:

Watch Video Solution

20. For two matrices $\begin{bmatrix} 3 & 4 \\ -1 & 2 \\ 0 & 1 \end{bmatrix}$ and $Q^T = \begin{bmatrix} -1 & 2 & 1 \\ 1 & 2 & 3 \end{bmatrix}$ P - Q is

A. $\begin{bmatrix} 2 & 3 \\ -3 & 0 \\ 0 & -3 \end{bmatrix}$

B. $\begin{bmatrix} 4 & 3 \\ -3 & 0 \\ -1 & -2 \end{bmatrix}$

C. $\begin{bmatrix} 4 & 3 \\ 0 & -3 \\ -1 & -2 \end{bmatrix}$

D. $\begin{bmatrix} 2 & 3 \\ 0 & -3 \\ 0 & -3 \end{bmatrix}$

Answer:

Watch Video Solution

Section B

1. The function $f(x) = 2x^3 - 15x^3 + 36x + 6$ is increasing in the interval

A. $(-\infty, 2) \cup (3, \infty)$

B. $(-\infty, 2)$

C. $(-\infty, 2] \cup [3, \infty)$

D. $[3, \infty)$

Answer:

Watch Video Solution

2. If

$x = 2\cos\theta - \cos 2\theta$ and $y = 2\sin\theta - \sin 2\theta$,

then $\frac{dy}{dx}$ is

A. $\frac{\cos\theta + \cos 2\theta}{\sin\theta - \sin 2\theta}$

B. $\frac{\cos\theta - \cos 2\theta}{\sin 2\theta - \sin\theta}$

C. $\frac{\cos\theta - \cos 2\theta}{\sin\theta - \sin 2\theta}$

D. $\frac{\cos 2\theta - \cos\theta}{\sin 2\theta + \sin\theta}$

Answer:

Watch Video Solution

3. What is the domain of the function $\cos^{-1}(2x - 3)$?

A. (1, 2)

B. (-1, 1)

C. [1, 2]

D. [4,2]

Answer:

Watch Video Solution

4. A matrix A = $\left[a_{ij}\right]_{3\times 3}$ is defined by

$$a_{ij}=\begin{cases}2i+3j & ,i<j\\ 5 & ,i=j\\ 3i-2j & ,i>j\end{cases}$$

The number of elements in A which are more than 5, is

A. 3

B. 4

C. 5

D. 6

Answer:

Watch Video Solution

5. If a function f defined by

$$f(x) = \begin{cases} \frac{k\cos x}{\pi - 2x} & , \text{if } x \neq \frac{\pi}{2} \\ 3 & , \text{if } x = \frac{\pi}{2} \end{cases}$$

is continuous at $x = \frac{\pi}{2}$, then the value of k is

A. 2

B. 3

C. 6

D. -6

Answer:

Watch Video Solution

6. For the matrix $X = \begin{bmatrix} 0 & 1 & 1 \\ 1 & 0 & 1 \\ 1 & 1 & 0 \end{bmatrix}$, then find $\left(X^2 - X\right)$ is

A. 2I

B. 3I

C. I

D. 5I

Answer:

Watch Video Solution

7. Let X $= \{x^2 : x \in N\}$ and the function $f : N \to X$ is defined by $f(x) = x^2, x \in N$.

Then this function is

A. injective only

B. not bijective

C. surjective only

D. bijective

Answer:

8. The corner points of the feasible region for a linear programming problem are P(0,5),

Q(1,5), R(4,2) and S(12,0). The minimum value of the objective function $Z = 2x + 5y$ is the point

A. P

B. Q

C. R

D. S

Answer:

Watch Video Solution

9. The equation of the normal to the curve $ay^2 = x^3$ at the point (am^2, am^3) is

A. $2y - 3mx + am^3 = 0$

B. $2x + 3my - 3am^4 - am^2 = 0$

C. $2x + 3my + 3am^4 - 2am^2 = 0$

D. $2x + 3my - 3am^4 - 2am^2 = 0$

Answer:

Watch Video Solution

10. If A is a square matrix of order 3 and |A|=-5 then |adj A| is

A. 125

B. -25

C. 25

D. ± 25

Answer:

Watch Video Solution

11. Write the simplest form :

$$\frac{\tan^{-1}\left(\sqrt{1+x}-\sqrt{1-x}\right)}{\sqrt{1+x}+\sqrt{1-x}}, \frac{-1}{\sqrt{2}} \leq x \leq 1$$

A. $\frac{\pi}{4}-\frac{x}{2}$

B. $\frac{\pi}{1}+\frac{x}{2}$

C. $\frac{\pi}{4}-\frac{1}{2}\cos^{-1}x$

D. $\frac{\pi}{4}+\frac{1}{2}\cos^{-1}x$

Answer:

Watch Video Solution

12. If for the matrix $A = \begin{bmatrix} \alpha & -2 \\ -2 & \alpha \end{bmatrix}, |A^3| = 125$, then the value of α is

A. ± 3

B. -3

C. ± 1

D. -1

Answer:

Watch Video Solution

13. If $y = \sin\left(m \sin^{-1} x\right)$. then which one of the following equations is true ?

A. $\left(1 - x^2\right) \frac{d^2y}{dx^2} + x \frac{dy}{dx} + m^2 y = 0$

B. $\left(1 - x^2\right) \frac{d^2y}{dx^2} - x \frac{dy}{dx} + m^2 y = 0$

C. $\left(1 + x^2\right) \frac{d^2y}{dx^2} - x \frac{dy}{dx} - m^2 y = 0$

D. $\left(1 + x^2\right) \frac{d^2}{dx^2} + x \frac{dy}{dx} - m^2 x = 0$

Answer:

Watch Video Solution

14. Write the principal value of $\tan^{-1}\sqrt{(3)} - \cot^{-1} - \sqrt{(3)}$.

A. π

B. $-\frac{\pi}{2}$

C. 0

D. $2\sqrt{3}$

Answer:

Watch Video Solution

15. The maximum value of $\left(\frac{1}{x}\right)^x$ is

A. $e^{1/e}$

B. e

C. $\left(\frac{1}{e}\right)^{1/e}$

D. e^e

Answer:

Watch Video Solution

16. Let matrix $X = [x_{ij}]$ is given by $x = \begin{bmatrix} 1 & -1 & 2 \\ 3 & 4 & -5 \\ 2 & -1 & 3 \end{bmatrix}$. Then the matrix $Y = [m_{ij}]$, where m_{ij} = Minor of x_{ij}, is

A. $\begin{bmatrix} 7 & -5 & 3 \\ 19 & 1 & -11 \\ -11 & 1 & 7 \end{bmatrix}$

B. $\begin{bmatrix} 7 & -19 & -11 \\ 5 & -1 & -1 \\ 3 & 11 & 7 \end{bmatrix}$

C. $\begin{bmatrix} 7 & 19 & -11 \\ -3 & 11 & 7 \\ -5 & -1 & -1 \end{bmatrix}$

D. $\begin{bmatrix} 7 & 19 & -11 \\ -1 & -1 & 1 \\ -3 & -11 & 7 \end{bmatrix}$

Answer:

Watch Video Solution

17. A function $f: R \to R$ defined by $f(x) = 2 + x^2$ is

A. not one-one

B. one-one

C. not onto

D. neither one-one nor onto

Answer:

Watch Video Solution

18. A Linear Programming Problem is as follows

:

Maximise / Minimise objective function

$Z = 2x - y + 5$

Subject to the constraints

$3x + 4y \leq 60$

$x + 3y \leq 30$

$x \geq 0, y \geq 0$

If the corner points of the feasible region are A(0,10) , B(12,6) , C(20,0) and O(0,0), then which of the following is true ?

A. Maximum value of Z is 40

B. Minimum value of Z is -5

C. Difference of maximum and minimum value of Z is 35

D. At two corner points , value of Z are equal

Answer:

Watch Video Solution

19. If $x = -4$ is a root of $\begin{vmatrix} x & 2 & 3 \\ 1 & x & 1 \\ 3 & 2 & x \end{vmatrix} = 0$, then the sum of the other two roots is

A. 4

B. -3

C. 2

D. 5

Answer:

Watch Video Solution

20. The absolute maximum value of the function $f(x) = 4x - \frac{1}{2}x^2$ in the interval $\left[-2, \frac{9}{2}\right]$ is

A. 8

B. 9

C. 6

D. 10

Answer:

Watch Video Solution

Section C

1. In a sphere of radius r, a right circular cone of height h having maximum curved surface area is inscribed. The expression for the square of curved surface of cone is

A. $2\pi^2 rh\left(2rh + h^2\right)$

B. $\pi^2 hr\left(2rh + h^2\right)$

C. $2\pi^2 r\left(2rh^2 - h^3\right)$

D. $2\pi^2 r^2\left(2rh - h^2\right)$

Answer:

Watch Video Solution

2. The corner points of the feasible region determined by a set of constraints (linear inequlities) are P(0,5), Q (3,5), R(5,0) and S(4,1) and the objective function is Z = ax + 2 by

where $a, b > 0$. The condition on a and b such that the maximum Z occurs at Q and S is .

A. $a - 5b = 0$

B. $a - 3b = 0$

C. $a - 2b = 0$

D. $a - 8b = 0$

Answer:

Watch Video Solution

3. If curves $y^2 = 4x$ and $xy = c$ cut at right angles , then the value of c is .

A. $4\sqrt{2}$

B. 8

C. $2\sqrt{2}$

D. $-4\sqrt{2}$

Answer:

Watch Video Solution

4. The inverse of the matrix X = $\begin{bmatrix} 2 & 0 & 0 \\ 0 & 3 & 0 \\ 0 & 0 & 4 \end{bmatrix}$

A. $24\begin{bmatrix} 1/2 & 0 & 0 \\ 0 & 1/3 & 0 \\ 0 & 0 & 1/4 \end{bmatrix}$

B. $-\frac{1}{24}\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

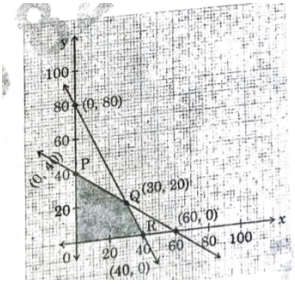
C. $\frac{1}{24}\begin{bmatrix} 2 & 0 & 0 \\ 0 & 3 & 0 \\ 0 & 0 & 4 \end{bmatrix}$

D. $\begin{bmatrix} 1/2 & 0 & 0 \\ 0 & 1/3 & 0 \\ 0 & 0 & 1/4 \end{bmatrix}$

Answer:

Watch Video Solution

5. For an L.P.P. the objective function is $Z = 4x + 3y$ and the feasible region determined by a set of constrains (linear inequations) is shown in the graph.



Which one of the following statements is true ?

A. Maximum value of Z is at R

B. Maximum value of Z is at Q .

C. Value of Z at R is less than the value at P

D. Value of Z at Q is the less than the value of at R .

Answer:

Watch Video Solution

6. In a residential society composing of 100 houses. there were children between the ages of 10-15 years They were inspired by their teachers to start composting to ensure that

biodegradable waste is recycled. For this purpose, instead of each child doing it for only his/her house, child convinced the Residents welfare association to do it as a society initiative. For thus they identified a square area in the local park Local authorities charged amount of ₹ 50 per square metre for space so that there is no misuse of the space and Resident welfare association takes it seriously. Association hired a labourer for digging out 250 m^3 and he charged ₹ $400(\text{depth})^2$ Association will like to have minimum cost.

Based on this information, answer the any of the following questions.

Let side of square plot is x m and its depth is h metres, then cost c for the pit is

A. $\frac{50}{h} + 400h^2$

B. $\frac{12500}{h} + 400h^2$

C. $\frac{250}{h} + h^2$

D. $\frac{250}{h} + 400h^2$

Answer:

Watch Video Solution

7. In a residential society composing of 100 houses. there were children between the ages of 10-15 years They were inspired by their teachers to start composting to ensure that biodegradable waste is recycled. For this purpose, instead of each child doing it for only his/her house, child convinced the Residents welfare association to do it as a society

initiative. For thus they identified a square area in the local park Local authorities charged amount of ₹ 50 per square metre for space so that there is no misuse of the space and Resident welfare association takes it seriously. Association hired a labourer for digging out 250 m^3 and he charged ₹ $400(\text{depth})^2$ Association will like to have minimum cost.

Based on this information, answer the any of the following questions.

Value of h (in m) for which $\frac{de}{dh} = 0$ is

A. 1.5

B. 2

C. 2.5

D. 3

Answer:

Watch Video Solution

8. In a residential society composing of 100 houses. there were children between the ages of 10-15 years They were inspired by their teachers to start composting to ensure that biodegradable waste is recycled. For this purpose, instead of each child doing it for only his/her house, child convinced the Residents welfare association to do it as a society initiative. For thus they identified a square area in the local park Local authorities charged amount of ₹ 50 per square metre for space so that there is no misuse of the space

and Resident welfare association takes it seriously. Association hired a labourer for digging out 250 m^3 and he charged ₹ $400(\text{depth})^2$ Association will like to have minimum cost.

Based on this information, answer the any of the following questions.

$\frac{d^2c}{dh^2}$ is given by

A. $\frac{25000}{h^3} + 800$

B. $\frac{500}{h^3} + 800$

C. $\frac{100}{h^3} + 800$

D. $\frac{500}{h^3} + 2$

Answer:

Watch Video Solution

9. In a residential society composing of 100 houses. there were children between the ages of 10-15 years They were inspired by their teachers to start composting to ensure that

biodegradable waste is recycled. For this purpose, instead of each child doing it for only his/her house, child convinced the Residents welfare association to do it as a society initiative. For thus they identified a square area in the local park Local authorities charged amount of ₹ 50 per square metre for space so that there is no misuse of the space and Resident welfare association takes it seriously. Association hired a labourer for digging out 250 m^3 and he charged ₹ $400(\text{depth})^2$ Association will like to have minimum cost.

Based on this information, answer the any of the following questions.

Value of x (in m) for minimum cost is

A. 5

B. 10

C. $5\sqrt{5}$

D. 10

Answer:

Watch Video Solution

10. In a residential society composing of 100 houses. there were children between the ages of 10-15 years They were inspired by their teachers to start composting to ensure that biodegradable waste is recycled. For this purpose, instead of each child doing it for only his/her house, child convinced the Residents welfare association to do it as a society initiative. For thus they identified a square area in the local park Local authorities

charged amount of ₹ 50 per square metre for space so that there is no misuse of the space and Resident welfare association takes it seriously. Association hired a labourer for digging out 250 m^3 and he charged ₹ $400(\text{depth})^2$ Association will like to have minimum cost.

Based on this information, answer the any of the following questions.

Total minimum cost of digging the pit (in %) is

A. 4100

B. 7500

C. 7850

D. 3220

Answer:

 Watch Video Solution