MATHS

BOOKS - CBSE COMPLEMENTARY MATERIAL

MATHS (HINGLISH)

PRACTICE PAPER III

Section A

1. Given $A = \begin{bmatrix} 1 & 0 \\ 0 & -1 \end{bmatrix}$ and $B = \begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$

Write the value of AB.

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2. Write the degree of the differential equation $\frac{d^2y}{dx^2} + x\left(\frac{dy}{dx}\right)^2 = 2x^2 \log\left(\frac{d^2y}{dx^2}\right)$.

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3. Find the angle between the line $\vec{r} = \left(2\hat{i} - \hat{j} + 3\hat{k}\right) + \lambda\left(3\hat{i} - \hat{j} + 2\hat{k}\right)$ and the plane $\vec{r}.\left(\hat{i} + \hat{j} + \hat{k}\right) = 3$.

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4. Find the co-ordinates of the point, where the line $\left(\frac{x+2}{1}\right) = \left(\frac{y-5}{3}\right) = \left(\frac{x+1}{5}\right)$ cuts the yz-

plane.

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5. If $y = \sin^{-1} x + \cos^{-1} x$, then $\frac{dy}{dx} =$

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6. If $f(x) = x + 1$, then write the value of $\frac{d}{dx}(fof)(x)$.

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7. If A is a square martin of order 3 with |A|=4. Then write all value of |-2A|.

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8. If event A and B are mutually exclusive and exhaustive events and $P(A) = \frac{1}{3}P(B)$ then Find P (A)

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9. In which quadrant the bounded region for in equations x+y $\leq$ 1 and x-y $\leq$ 1 is situated?

A. I,II

B. I,III

C. II,III

D. All four quadrants.

Answer:

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10. Write the derivative of e^x wrt. $\sqrt{x}$

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11. Find the differential equation representing the family of curves $y = a.\, e^{2x} + 5$, where a is an arbitrary constant.

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12. Write the maximum value of $f(x) = \frac{\log x}{x}$, if it exists.

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13. Evaluate : $\int \frac{1 + \cos x}{x + \sin x} dx.$

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14. Evaluate $\int_2^3 3^x dx$

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15. Find the integrating factor of $x\frac{dy}{dy} + 2y = x\cos x$

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16. Write the value of $\left(\hat{k}X\hat{j}\right).\left(\hat{i}+\hat{j}+\hat{k}\right)$

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17. Evaluate : $\int_{-\frac{\pi}{3}}^{\frac{\pi}{3}} \sin^3 x dx$

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18. Evaluate: $\int \frac{2x}{(x^2+1)(x^2+3)} dx$

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19. Slope of tangent of the curve $y = x^2 + x + 1$ at x=1 is ___

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20. $\cos^{-1}\left(\frac{\sin x + \cos x}{\sqrt{2}}\right), \frac{\pi}{4} < x < \frac{5\pi}{4}$

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Section B

1. If $A = \begin{bmatrix} 4 & 2 \\ -1 & 1 \end{bmatrix}$, show that (A-2 I) A-3 I) =0

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2. Check whether the relation R in R defined by $R = \{(a, b) : a \leq b^3\}$ is reflexive, symmetric or transitive.

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3. Show that the function $f: R \to R$ given by $f(x) = \cos x$ for all $x \in R$, is neither one-one nor onto.

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4. Find $\int \frac{\sin^3 x + \cos^3 x}{\sin^2 x \cos^2 x} dx.$

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5. Evaluate: $\int \frac{x-3}{(x-1)^3} e^x dx$

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6. $\int \frac{\sec^2 x}{\sqrt{\tan^2 x + 4}} dx$

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7. Find the volume of a cuboid whose edges are given by $-3\hat{i} + 7\hat{j} + 5\hat{k}$, $-5\hat{i} + 7\hat{j} - 3\hat{k}$ and $-7\hat{i} - 5\hat{j} - 3\hat{k}$

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8. Find the probability distribution of X; the number of heads in two tosses of a coin (or a simultaneous toss of two coins).

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Section C

1. If $\tan^{-1} x - \cot^{-1} x = \tan^{-1}\left(\frac{1}{\sqrt{3}}\right)$, x > 0 find the value of x and hence find the value of $\sec^{-1}\left(\frac{2}{x}\right)$

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2. The scalar product of the vector $\hat{i}+\hat{j}+\hat{k}$ with a unit vedctor along the sum of the vectors $2\hat{i}+3\hat{j}-5\hat{k}$ and $\lambda\hat{i}+2\hat{j}+3\hat{k}$ is equal to one. Find the value of lamda.

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3. If $(\sin x)^2 = x + y$ find $\frac{dy}{dx}$

Find $\frac{dy}{dx}$ if $y = \sin^{-1}\left[\frac{2^{x+1}}{1+4^x}\right]$

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4. If $A = \begin{bmatrix} 1 & 3 & 4 \\ 2 & 1 & 2 \\ 5 & 1 & 1 \end{bmatrix}$, find A^{-1}

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5. If $y = e^x(\sin x + \cos x)$, prove that $\frac{d^2y}{dx^2} - 2\frac{dy}{dx} = 2y = 0$

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6. Minimize $z = 6x + 3y$ subject to the constraints $4x + y \geq 80, x + 5y > 115, 3x + 2y \leq 150, x \geq 0, y \geq 0$

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7. Corner poins of the feasible region determned by the system of linear constrainsts are (0,3), (1,1), and (3,0). Let Z=px+qy. Where $p, q < 0$ Condition on p and q, so that the minimum f Z occurs at (3,0) and (1,1) is

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8. If A and B are two events such that $P(A) = \frac{1}{4}$, $P(B) = \frac{1}{2}$ and $P(A \cap B) = \frac{1}{8}$, find P (not A and not B).

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Section D

1. Using matrices, solve the following system of linear equations: $3x - 2y + 3z = 8 \quad 2x + y - z = 1$

$4x - 3y + 2z = 4$

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2. Find the vector and cartesian equations of the plane passing through the points (2,2,-1), (3,4,2) and (7,06) also find the vector equation of a plane passing through (4,3,1) and parallel to the plane obtained above.

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3. Find the equation of the line passing through (2,1,-2) and (5,3,4) and of the plane passing through (2,0,3) , (1,1,5) and (3,2,4) . Also find their point of intersection.

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4. Using integration find the area of the triangle whose vertices are A (1,0) ,B(2,2) and C (3,1)

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5. The area of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ is

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6. Show that the right circular cylinder, open at the top, and of given surface area and maximum volume is such that its height is equal to the radius of the base.

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