MATHS

BOOKS - XII BOARD PREVIOUS YEAR PAPER ENGLISH

SAMPLE PAPER 2019

Section A

1. If A is any square matrix of order 3×3 such that |A|=3, then the value of |adjA| is ?

A. 3

B. $\frac{1}{3}$

C. 9

D. 27

Answer: C

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2. Suppose P and Q are two different matrices of order $3 \times n$ and $n \times p$, then the order of the matrix $P \times Q$ is ?

A. $3 \times p$

B. $p \times 3$

C. $n \times n$

D. 3×3

Answer: A

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3. If $\left(2\hat{i} + 6\hat{j} + 27\hat{k}\right) \times \left(\hat{i} + p\hat{j} + q\hat{k}\right) = \vec{0}$, then the values of p and q are ?

A. p=6,q=27

B. $p = 3, q = \frac{27}{2}$

C. $p = 6, q = \frac{27}{2}$

D. $p = 3, q = 27$

Answer: B

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4. If A and B two events such that P(A)=0.2, P(B)=0.4 and $P(A \cup B) = 0.5$, then value of $P(A / B)$ is ?

A. 0.1

B. 0.25

C. 0.5

D. 0.08

Answer: B

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5. The point which does not lie in the half plane

$2x + 3y - 12 \leq 0$ is

A. (1,2)

B. (2,1)

C. (2,3)

D. (-3,2)

Answer: C

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6. If $\sin^{-1}x+\sin^{-1}=\frac{2\pi}{3}$, then $\cos^{-1}x\cos^{-1}y$ is equal to

A. $\frac{2\pi}{3}$

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

C. $\frac{\pi}{2}$

D. π

Answer: B

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7. An urn contains 6 balls of which two are red and four are black. Two balls are drawn at random. Probability that they are of the different colours is

A. $\frac{2}{5}$

B. $\frac{1}{15}$

C. $\frac{8}{15}$

D. $\frac{4}{15}$

Answer: C

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8. $\int \frac{dx}{\sqrt{9-25x^2}}$

A. $\sin^{-1}\left(\frac{5x}{3}\right)+c$

B. $\frac{1}{5}\sin^{-1}\left(\frac{5x}{3}\right)+c$

C. $\frac{1}{6}\log\left(\frac{3+5x}{3-5x}\right)+c$

D. $\frac{1}{30}\log\left(\frac{3+5x}{3-5x}\right)+c$

Answer: B

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9. What is the distance (in units) between the two planes

$3x+5y+7z=3$ and 9x+15y+21z=9` ?

A. 0

B. 3

C. $\frac{6}{\sqrt{83}}$

D. 6

Answer: A

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10. The equation of the line in vector form passing through the point (-1,3,5) and parallel to line $\frac{x-3}{2}=\frac{y-4}{3}, z=2$ is

A. $\overrightarrow{r}=\left(-\hat{i}+3\hat{j}+5\hat{k}\right)+\lambda\left(2\hat{i}+3\hat{j}+\hat{k}\right)$

B. $\overrightarrow{r}=\left(-\hat{i}+3\hat{j}+5\hat{k}\right)+\lambda\left(2\hat{i}+3\hat{j}\right)$

C. $\overrightarrow{r}=\left(2\hat{i}+3\hat{j}-2\hat{k}\right)+\lambda\left(-\hat{i}+3\hat{j}+5\hat{k}\right)$

D. $\overrightarrow{r}=\left(2\hat{i}+3\hat{j}\right)+\lambda\left(-\hat{i}+3\hat{j}+5\hat{k}\right)$

Answer: B

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Fill In The Blanks

1. If f be greatest integer function defined asf(x)=[x] and g be the mdoulus function defined as g(x)=|x|, then the value of g of $\left(-\frac{5}{4}\right)$ is _____

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Fill In The Blanks 14 A

1. If tangent to the curve $y^2+3x-7=0$ at the point (h,k) is parallel to line x-y=4, then value of k is ___ ?

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Fill In The Blanks 14 B

1. For the curve $y = 5x - 2x^3$, if x increases at the rate of 2units/sec, then at x=3 the slope of the curve is changing at ___

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Fill In The Blanks 15 A

1. The magnitude of projection of $\left(2\hat{i} - \hat{j} + \hat{k}\right)$ on $\left(\hat{i} - 2\hat{j} + 2\hat{k}\right)$ is _____

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Fill In The Blanks 15 B

1. Vector of magnitude 5 units and in the direction opposite to $2\hat{i} + 2\hat{j} - 6\hat{k}$ is _____

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Answer The Following Questions

1. Check whether (l+m+n) is a factor of the determinant $\begin{vmatrix} 1+m & m+n & n+1 \\ n & 1 & m \\ 2 & 2 & 2 \end{vmatrix}$ or not. Give reason.

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2. Evaluate

$$\int_{-2}^{2}(x^3+1)dx$$

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3. Find $\int xe^{1+x^2}dx$.

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4. Write the general solution of differential equation

$$\frac{dy}{dx}=e^{x+y}$$

A. $e^{x}+e^{-y}=c$

B. $e^{-x}+e^{-y}=c$

C. $e^{x}+e^{y}=c$

D. none of these

Answer: A

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Answer The Following Questions 18 A

1. Find $\int\frac{3+3\cos x}{x+\sin x}dx.$

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Answer The Following Questions 18 Bs

1. Find $\int(\cos^2 2x - \sin^2 2x)\,dx$

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Section B 21 A

1. Express $\sin^{-1}\left(\frac{\sin x + \cos x}{\sqrt{2}}\right)$, where $-\frac{\pi}{4} < x < \frac{\pi}{4}$, in the simplest form.

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Section B 21 B

1. Let R be the relation in the set Z of integers given by R= {(a,b):2 divides a-b}. Show that the relation R transitive ? Write the equivalence class [0].

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Section B

1. Show that $y = a \cdot e^{2x} + b \cdot e^{-x}$ is a solution of the differential equation $\frac{d^2y}{dx^2} - \frac{dy}{dx} - 2y = 0.$

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2. A particle moves along the curve $x^2 = 2y$. At what point, ordinate increases at the same rate as abscissa increases ?

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3. Find the acute angle between the lines $\frac{x-4}{3} = \frac{y+3}{4} = \frac{z+1}{5}$ and $\frac{x-1}{4} = \frac{y+1}{-3} = \frac{z+10}{5}$

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4. A speaks truth in 80% cases and B speaks truth in 90% cases. In what percentage of cases are they likely to agree with each other in stating the same fact ?

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Section B 24 A

1. For three non-zero vectors $\vec{a}, \vec{b}$ and $\vec{c}$, prove that $\left[\left(\vec{a}-\vec{b}\right)\left(\vec{b}-\vec{c}\right)\left(\vec{c}-\vec{a}\right)\right]=0$

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Section B 24 B

1. If $\vec{a}+\vec{b}+\vec{c}=0$ and $\left|\vec{a}\right|=3, \left|\vec{b}\right|=5, \left|\vec{c}\right|=7$, then find the value of $\vec{a}\cdot\vec{b}+\vec{b}\cdot\vec{c}+\vec{c}\cdot\vec{a}$.

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Section C

1. Let $f: A \to B$ be a function defined as $f(x) = \frac{2x+3}{x-3}$, where A=R-{3} and B=R-{2}. Is the function f one-one and onto ? Is f invertible ? If yes, then find its inverse.

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2. Solve the differential equation

$xdy - ydx = \sqrt{x^2 + y^2}dx.$

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3. Evaluate the following integral: $\int_1^3 |x^2 - 2x| dx$

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4. Two tailors A and B earn Rs. 150 and Rs. 200 per day respectively. A can stich 6 shirts and 4 pants per day, while B can stitch 10 shirts and 4 pants per day. Form a L.P .P to minimize the labour cost to produce (stitch) at least 60 shirts and 32 pants and solve it graphically.

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Section C 28 A

1. If $\sqrt{1-x^2}+\sqrt{1-y^2}=a(x-y)$, then prove that $\frac{dy}{dx}=\sqrt{\frac{1-y^2}{1-x^2}}$

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Section C 28 B

1. If $x=a(\cos 2\theta+2\theta\sin 2\theta)$ and $y=a(\sin 2\theta-2\theta\cos 2\theta)$, find $\frac{d^2y}{dx^2}$ at $\theta=\frac{\pi}{8}$.

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Section C 31 A

1. Two numbers are selected at random (without replacement) from first 7 natural numbers. If X denotes the smaller of the two numbers obtained, find the probability distribution of X. Also, find mean of the distribution.

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Section C 31 B

1. There are three coins. One is a two headed coin (having head on both faces), another is a biased coin that comes up heads 75% of the time and third is an unbiased coin. One of the three coins is chosen at random and tossed, it shows heads, what i

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Section D 33 A

1. Prove that :

$$\begin{vmatrix} (y+z)^2 & x^2 & x^2 \\ y^2 & (x+z)^2 & y^2 \\ z^2 & z^2 & (x+y)^2 \end{vmatrix} = 2xyz(x+y+z)^3$$

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Section D 33 B

1. If $A = \begin{bmatrix} 2 & 3 & 4 \\ 1 & -1 & 0 \\ 0 & 1 & 2 \end{bmatrix}$, find A^{-1}. Hence, solve the system of equations

x-y=3,

2x+3y+4z=17,

y+2z=7

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Section D

1. Using integration, find the area of the region

$$\{(x, y): x^2 + y^2 \leq 1, x + y \geq 1, x \geq 0, y \geq 0\}$$

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2. Find the equation of a plane passing through the points A(2,1,2) and B(4,-2,1) and perpendicular to plane $\vec{r}.\left(\hat{i}-2\hat{k}\right)=5$. Also, find the coordinates of the point, where the line passing through the points (3,4,1) and (5,1,6) crosses the plane thus obtained.

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Section D 35 A

1. A given quantity of metal is to be cast into a half cylinder with a rectangular base and semicircular ends. Show that in order for the total surface area to be minimum, the ratio of the length of the cylinder to the diameter of its semi-circular ends is $\pi : (\pi + 2)$.

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Section D 35 B

1. Show that the triangle of maximum area that can be inscribed in a given circle is an equilateral triangle.

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