MATHS

BOOKS - OMEGA PUBLICATION

PUNJAB BOARD - MATHEMATICS 2019

Series B Mcq

1. If $f(x) = \begin{cases} \frac{x^2-9}{x-3} & x \neq 3 \\ m & x = 3 \end{cases}$ is continuous at x = 3 , then value of m is :

A. 3

B. 6

C. 2

D. 1

Answer:

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2. If $y = \log(\tan x)$, then $\frac{dy}{dx}$ is:

A. $\frac{1}{\tan x}$

B. $\frac{\sec^2 x}{\tan x}$

C. $\sec^2 x$

D. 0

Answer:

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3. Evaluate the following integrals:

$$\int_0^{\pi/2} \frac{\sin^{3/2} x}{\sin^{3/2} x + \cos^{3/2} x} dx$$

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

B. 0

C. 1

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

Answer:

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4. Degree of differentiate equation $\frac{d^2y}{dx^2} + \left(\frac{dy}{dx}\right)^2 + y = 0$ is :

A. 3

B. 2

C. 1

D. 0

Answer:

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5. If $\vec{a} = 2\hat{i} + 3\hat{j} - \hat{k}$, then $\left|\vec{a}\right|$ is :

A. $\sqrt{15}$

B. $\sqrt{14}$

C. 14

D. 15

Answer:

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6. Direction ratios of normal to plane which is parallel to the plane $3x + y - z = 11$ are :

A. $< 3, 1, -1 >$

B. $< 0, 1, 1 >$

C. $< -3, 1, -1 >$

D. $< 1, 1, 0 >$

Answer:

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7. If E and F are independent events, $P(E) = \frac{1}{2}$ and $P(F) = \frac{1}{3}$ then $P(E \cap F)$ is :

A. $\frac{1}{6}$

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

C. 0

D. $\frac{1}{6}$

Answer:

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8. If $f(x) = \log x$ and $g(x) = e^x$ then $fog(x)$ is :

A. e^x

B. x

C. log x

D. 1

Answer:

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9. If A is a square matrix of order 3×3 and $|A| = 5$ then $|Adj.\ A|$ is :

A. 5

B. 125

C. 15

D. 25

Answer:

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10. The Principal value of $\sin^{-1}\left(\frac{1}{2}\right)$ is

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

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12. If $y = \log(\tan x)$, then $\frac{dy}{dx}$ is:

A. $\frac{1}{\tan x}$

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C. $\sec^2 x$

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13. Evaluate the following integrals:

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Series B

1. Evaluate $\int \tan x \, dx$.

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2. Solve the differentiate equation $\frac{dy}{dx} = \frac{1}{1+x^2}, y(0) = 3.$

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4. Find the angle between the given lines $\frac{x-1}{3} = \frac{3-y}{-1} = \frac{3z+1}{6}$ and plane 3x-5y+ 2z= 10.

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6. If $A = \begin{bmatrix} 2 & 1 \\ 3 & -5 \end{bmatrix}$ and $f(x) = x^2 - 2x + 3$, then find f(A).

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Series C Mcq

1. Degree of differentiate equation $\frac{d^2y}{dx^2} + \left(\frac{dy}{dx}\right)^3 + y = 0$ is :

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

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Series C

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41. Find the particular solution of differential equations : $\left[x\sin^2\left(\frac{y}{x}\right)-y\right]dx+xdy=0, y(1)=\frac{\pi}{4}.$

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42. If $f(x) = \left(3 - x^3\right)\frac{1}{3}$, then find fof(x). Also, find f^{-1}.

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43. Check whether relation $R = \left\{(x, y) : x \leq y^2, x, y \in R\right\}$, defined on set of real numbers R, is reflexive, symmetric and transitive.

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44. For any two vectors $\vec{a}$ and $\vec{b}$, prove that $\left|\vec{a} + \vec{b}\right| \leq \left|\vec{a}\right| + \left|\vec{b}\right|$. Also write the name of this inequality.

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45. If $y = (\cos x)^x + (x)^{\cos x}$ then find $\frac{dy}{dx}$.

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46. Verify Rolle's theorem for the function : $y = x^3 - 2x^2 - 3x$ in the interval [- 1, 3].

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47. Bag I contains 5 red and 3 black balls and bag 11 contains 6 red and 5 black balls. One bag is chosen at random and a ball is drawn from it, which is found to be black. Find the probability that it is drawn from bag I.

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48. Prove that : $\sin^{-1}\left(\frac{3}{5}\right) + \cos^{-1}\left(\frac{5}{\sqrt{26}}\right) = \tan^{-1}\left(\frac{19}{17}\right)$

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49. If area of $\triangle ABC$ is 12 square units and vertices are A (x, 2), B (4, -1) and C (- 3, 7), then find the value of x.

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50. Find the equation of tangent to the curve $y = 3x^2 - 2x + 5$ which is parallel to the line $4x - y = 10$.

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51. Find the image of point (3,-1,2) in line $\frac{x+1}{3} = \frac{y-3}{4} = \frac{z+2}{5}$

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52. Find the shortest distance between the lies :

$\vec{r_1} = \hat{i} + 2\hat{j} - 3\hat{k} + \lambda\left(3\hat{i} - 4\hat{j} - \hat{k}\right), \vec{r_2} = 2\hat{i} - \hat{j} + \hat{k} + \mu\left(\hat{i} + \hat{j} + 5\hat{k}\right)$

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53. Maximise $z = 22x + 44y$ subject to the constraints

$x + y \geq 3, 3x + 8y \leq 24, x - y \geq 0, x, y \geq 0$

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54. Maximise and Minimise

$z = 3x + 2y - 3$ subject to the constraints:

$x + y \geq 4, x + y \leq 12, , x \leq 9, y \leq 9, x, y \geq 0$

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55. Solve the following system of linear equations by matrix method :

$4x + 3y + z = 10, 3x - y + 2z = 8, x - 2y - 3z - 10.$

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56. Using elementary transformations, find the inverse of matrix

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

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57. An open box is to be made of a square sheet of tin with side 20 cm, by cutting off small squares from each comer and folding the flaps. Find the side of small square, which is to be cut off, so that volume of box is maximum.

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58. Find the height of right circular cylinder of maximum volume that can be inscribed in a sphere of radius $10\sqrt{3}$ cm.

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