# MATHS

## BOOKS - OMEGA PUBLICATION

## PUNJAB BOARD-MATHEMATICS 2018

Series A

**1.** If * is a binary operation is defined by $a * b = a^2 + b^2$ then 3*5 is equal to

A. 34

B. 9

C. 8

D. 25

**Answer:**

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**2.** $\cos^{-1} x = y$ then

A. $\frac{-\pi}{2} \leq y \leq \frac{\pi}{2}$

B. $-\pi \leq y \leq \pi$

C. $0 \leq y \leq \frac{\pi}{2}$

D. $0 \leq y \leq 0$

**Answer:**

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**3.** If A is a matrix of order $3 \times 3$ and $|A| = 10$ then $|adj.\ A|$ is

A. 0

B. 10

C. 100

D. 1000

**Answer:**

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**4.** If $y = \sin\left(\sin^{-1} x + \cos^{-1} x\right), x \in [-1, 1]$, then $\frac{dy}{dx}$ is:

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

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

C. $0$

D. $1$

**Answer:**

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5. $f(x) = \begin{cases} \frac{\sin x}{x} & x \neq 0 \\ k-1 & x = 0 \end{cases}$ is continuous at x = 0, then k is :

A. 2

B. 0

C. $-1$

D. 1

**Answer:**

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6. $\int e^x \left(\log x + \frac{1}{x}\right) dx$ is equal to :

A. $e^x + C$

B. $e^x \log x + c$

C. $\frac{e^x}{x} + c$

D. $\log x + c$

**Answer:**

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7. Integrating factor of differential equation : $\frac{dy}{dx} + y = 3$ is :

A. x

B. e

C. $e^x$

D. $\log x$

**Answer:**

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**8.** This ineqality $\left|\vec{a}.\ \vec{b}\right| \leq \left|\vec{a}\right|\left|\vec{b}\right|$ is called

A. Cauchy Schwartz inequality

B. Triangle inequality

C. Roll's Theorem

D. Lagrange's Mean value theorem

**Answer:**

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**9.** Distance between plane $3x + 4y - 20 = 0$ and point (0, 0, - 7) is :

A. 4 units

B. 3 units

C. 2 units

D. 4unit

**Answer:**

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**10.** If P (E) denotes probability of occurrence of event E, then :

A. $P(E) \in [-1, 1]$

B. $P(E) \in (1, \infty)$

C. $P(E) \in (0, 1)$

D. $P(E) \in [0, 1]$

**Answer:**

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**11.** If matrix $A = [a_ij]_3 \times 2$ and $a_ij = (3i - 2j)^2$, then find matrix A.

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**12.** Check whether Lagrange 's mean value theorem is applicable on : $f(x) = \sin x + \cos x \in \int erval\left[0, \frac{\pi}{2}\right]$

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**13.** By using the properties of definte, prove that

$$\int_0^{\pi/2} \frac{\sin^3 x}{\sin^3 x + \cos^3 x} dx = \frac{\pi}{4}$$

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**14.** Evaluate : $\int \frac{7dx}{x(x^2-1)}$.

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**15.** Find particular solution of differential equation $\frac{dy}{dx} = \frac{1+y^2}{1+x^2}$,given that y=1 when x=0.

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**16.** From differential equation representing the family of lines making equal intercepts on the co-ordinate axes.

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**17.** Find the angle between the plane $2x + 3y - 5z = 10$ and the line passing through the points (2, 3, - 1) and (1, 2, 1).

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**18.** If $P(A) = \frac{7}{13}, P(B) = \frac{9}{13}$ and $P(AuB) = \frac{12}{13}$ then find $P\left(\frac{A}{B}\right)$.

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**19.** Prove that function $f: R \to R, f(x) = \frac{3x - 2}{7}$ in one-one and onto. Also find $f^{-1}$.

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**20.** Prove that :

$$\sin^{-1}\left(\frac{5}{13}\right)+\cos^{-1}\left(\frac{4}{5}\right)=\frac{1}{2}\sin^{-1}\left(\frac{3696}{4225}\right).$$

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**21.** Express $\begin{bmatrix}2 & 5 & -1\\ 3 & 1 & 5\\ 7 & 6 & 9\end{bmatrix}$ as a sum of symmetric and skew-symmetric matrices.

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**22.** If x,y,z are different and $\Delta = \begin{vmatrix} x & x^2 & 1+x^3 \\ y & y^2 & 1+y^3 \\ z & z^2 & 1+z^3 \end{vmatrix} = 0$, show that xyz=-1

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**23.** If $y = x^{\tan x} + (\tan x)^x$, then find $\frac{dy}{dx}$.

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**24.** Using differentials find approximate value of $(0.37)^{\frac{1}{2}}$

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**25.** Evaluate : $\int \frac{x^2+1}{x^4+1} dx.$

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**26.** Evaluate $\int \frac{dx}{x^3-1}$

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**27.** Find the area of the region bounded by the elipse $\frac{x^2}{9} + \frac{y^2}{4} = 1$

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**28.** Find the particular solution of differential equations :

$$\left[x \sin^2\left(\frac{y}{x}\right) - y\right] dx + x dy = 0, y(1) = \frac{\pi}{4}.$$

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**29.** Find the particular solution of differential equation : $\tan x \frac{dy}{dx} + y = 2x \tan x + x^2, x \neq 0,$ given that y=0 when $x = \frac{\pi}{2}.$

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**30.** If $\vec{a} = 2\hat{i} - 3\hat{j} + 4\hat{k}$ and $\vec{b} = 5\hat{i} + \hat{j} - \hat{k}$ represents sides of a parallelogram then find both diagonals and a unit vector perpendicular to both diagonals of parallelogram.

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**31.** Two cards are drawn (without replacement) from a well shuffled deck of 52 cards. Find probability distribution table and mean of number of kings.

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

$x - 2y + 3z = -5, 3x + y + z = 8, 2x - y + 2z = 1$

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**33.** Using elementary transformations find the inverse of $\begin{bmatrix} 2 & 4 & 1 \\ 1 & 2 & 3 \\ 1 & -3 & 0 \end{bmatrix}$

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**34.** A window is in the form of rectangle surmounted by a semi-circular opening. The perimeter of window is 30 m. Find the dimensions of window so that it can admit maximum light through the whole opening.

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**35.** Prove that volume of largest cone, which can be inscribed in a sphere, is $\left(\frac{8}{27}\right)^{th}$ part of volume of sphere.

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**38.** Maximise and minimize $Z = 15x + 30y$ subject to the constraints

$x + y \leq 8$

$2x - y \geq 8$

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**39.** Maximum $Z = 4x + 3y - 7$ subject to the constraints

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Series B

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