# MATHS

## BOOKS - MARVEL MATHS (HINGLISH)

## QUESTION PAPER 2016

**Question**

**1.** Let $X \sim B(n, p)$, if

$E(X) = 5, \text{Var}(X) = 2.5$ then $p(X < 1) =$

A. $\left(\frac{1}{2}\right)^{11}$

B. $\left(\frac{1}{2}\right)^{10}$

C. $\left(\frac{1}{2}\right)^{6}$

D. $\left(\frac{1}{2}\right)^{9}$

**Answer: B**

Watch Video Solution

**2.** Derivative of $\tan^{-1}\left(\frac{x}{\sqrt{1-x^2}}\right)$ with respect $\sin^{-1}(3x-4x^3)$ is

A. $\frac{1}{\sqrt{1-x^2}}$

B. $\frac{3}{\sqrt{1-x^2}}$

C. $3$

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

**Answer: D**

Watch Video Solution

**3.** Form the differential equation of the family of circles touching the y-axis at origin.

A. $\left(X^2+y^2\right)\frac{dy}{dx}-2xy=0$

B. $x^2-y^2+2xy\frac{dy}{dx}=0$

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

D. $\left(x^2+y^2\right)\frac{dy}{dx}+2xy=0$

**Answer: B**

Watch Video Solution

**4.** IF $A=\begin{bmatrix}1&1&0\\2&1&5\\1&2&1\end{bmatrix}$, then $a_{11}A_{21}+a_{12}A_{22}+a_{13}A_{23}$ =

A. $1$

B. $0$

C. $-1$

D. $2$

**Answer: B**

Watch Video Solution

**5.** If rolle's theorem for $f(x) = e^x(\sin x - \cos x)$ is verified on $\left[\frac{\pi}{4}, 5\frac{\pi}{4}\right]$, then the value of c is

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

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

C. $3\frac{\pi}{4}$

D. $\pi$

**Answer: D**

Watch Video Solution

6. The joint equation of lines passing through the origin and trisecting the first quadrant is

A. $x^2 + \sqrt{3}xy - y^2 = 0$

B. $x^2 + \sqrt{3}xy - y^2 = 0$

C. $\sqrt{3}x^2 - 4xy + \sqrt{3}y^2 = 0$

D. $3x^2 - y^2 = 0$

**Answer: C**

Watch Video Solution

7. IF $2\tan^{-1}(\cos x) = \tan^{-1}(2\text{cosec}x)$ then sin x cos x=

A. $2\sqrt{2}$

B. $\sqrt{2}$

C. $\dfrac{1}{\sqrt{2}}$

D. $\dfrac{1}{2}$

**Answer: D**

Watch Video Solution

**8.** Direction cosines of the line $\dfrac{x+2}{2} = \dfrac{2y-5}{3}, z = -1$ are

A. $\dfrac{4}{5}, \dfrac{3}{5}, 0$

B. $\dfrac{3}{5}, \dfrac{4}{5}, \dfrac{1}{5}$

C. $-\dfrac{3}{5}, \dfrac{4}{5}, 0$

D. $\dfrac{4}{5}, -\dfrac{2}{5}, \dfrac{1}{5}$

**Answer: A**

Watch Video Solution

**9.** $\int \frac{1}{\sqrt{8+2x-x^2}} dx =$

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

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

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

D. $\sin^{-1}\left(\frac{x-1}{3}\right)+C$

**Answer: D**

Watch Video Solution

**10.** The approximate value of $f(X) = x^3 + 5x^2 - 7x + 9$ at x= 1.1 is

A. $8.6$

B. $8.5$

C. $8.4$

D. $8.3$

**Answer: A**

Watch Video Solution

**11.** IF r.v X : waiting time in minutes for bus and p.d.f of X is given by

$$f(x) = \begin{cases} \frac{1}{5} & 0 \le x \le 5 \\ 0 & \text{otherwise} \end{cases},$$

then probabaility of waiting time not more than 4 minutes is

A. $0.3$

B. $0.8$

C. $0.2$

D. $0.5$

**Answer: B**

Watch Video Solution

**12.** In $\Delta ABC$, $(a-b)^2\cos^2\left(\frac{c}{2}\right)+(a+b)^2\sin^2\frac{c}{2}$ =

A. $b^2$

B. $c^2$

C. $a^2$

D. $a^2+b^2+c^2$

**Answer: B**

Watch Video Solution

**13.** Derivative of $\log(\sec\theta+\tan\theta)$ with respect to $\sec\theta$ at $\theta=\frac{\pi}{4}$ is

A. 0

B. 1

C. $\frac{1}{\sqrt{2}}$

D. $\sqrt{2}$

**Answer: B**

Watch Video Solution

**14.** The joint eqution of biscestors of angles between lines x=5 and y=3 is

A. $(x-5)(y-3)=0$

B. $x^2-y^2-10x+6y+16=0$

C. $xy=0$

D. $xy-5x-3y+15=0$

**Answer: B**

Watch Video Solution

**15.** The point on the curve $6y = x^3 + 2$ at which y- co ordinate is changing 8 times as fast as $x -$ co -ordinate is

A. $(4, 11)$

B. $(4, -11)$

C. $(-4, 11)$

D. $(-4, -11)$

**Answer: A**

Watch Video Solution

**16.** IF the function f(x) defined by

$f(x) = x\sin\frac{1}{x}$ for $x \neq 0$

$= K$ for $x = 0$

is continuous at $x = 0$, then k=

A. 0

B. 1

C. $-1$

D. $\frac{1}{2}$

**Answer: A**

Watch Video Solution

**17.** If $y=e^{m\sin^{-1}x}$ and $(1-x^2)\left(\frac{dy}{dx}\right)^2=Ay^2$. then A =

A. $m$

B. $-m$

C. $m^2$

D. $-m^2$

**Answer: C**

Watch Video Solution

18. $\int\left(\frac{4e^x - 25}{2e^x - 5}\right)dx = Ax + B\frac{\log}{2e^x} - \frac{5}{+c}$ then

A. $A = 5, B = 3$

B. $A = 5, B = -3$

C. $A = -5, B = 3$

D. $A = -5, B = -3$

**Answer: B**

Watch Video Solution

19. $\frac{\tan^{-1}\left(\sqrt{3}\right) - \sec^{-1}(-2)}{\operatorname{cosec}^{-1}\left(-\sqrt{2}\right) + \cos^{-1}\left(-\frac{1}{2}\right)} =$

A. $\frac{4}{5}$

B. $-\frac{4}{5}$

C. $\frac{3}{5}$

D. $0$

**Answer: B**

Watch Video Solution

**20.** For what value of k , the function defined by

$f(x) = \frac{\log(1+2x)\sin x^0}{x^2}$ for $x \neq 0$

$= K$ for $x = 0$

is continuous at $x = 0$?

A. $2$

B. $\frac{1}{2}$

C. $\frac{\pi}{90}$

D. $\frac{90}{\pi}$

**Answer: C**

Watch Video Solution

**21.** If $\log_{10}\left(\frac{x^2-y^2}{x^2+y^2}\right)=2$, then $\frac{dy}{dx}=$

A. $-\frac{99}{101y}$

B. $\frac{99x}{101y}$

C. $-\frac{99y}{101x}$

D. $\frac{99y}{101x}$

**Answer: A**

Watch Video Solution

**22.** $\int_{-\pi/2}^{\pi/2}\log\left(\frac{2-\sin x}{2+\sin x}\right)dx=$

A. $1$

B. $3$

C. $2$

D. $0$

**Answer: D**

Watch Video Solution

23. $\int\left(\frac{(x^2+2)a^{(x+\tan^{-1}x)}}{x^2+1}\right)dx =$

A. $\log a.\ a^{x+\tan^{-1}x}+c$

B. $\frac{(x+\tan^{-1}x)}{\log a}+c$

C. $\frac{a^{x+\tan^{-1}}x}{\log a}+c$

D. $\log a(x+\tan^{-1}x)+c$

**Answer: C**

Watch Video Solution

**24.** The degree and order of the differential equation $\left[1+\left(\frac{dy}{dx}\right)^3\right]^{7/3}=7\left(\frac{d^2y}{dx^2}\right)$ respectively are

A. 3 and 7

B. 3and 2

C. 7 and 3

D. 2 and 3

**Answer: B**

Watch Video Solution

**25.** The acute angle between the line

$$\bar{r} = \left(\hat{i} + 2\hat{j} + \hat{k}\right) + \lambda\left(\hat{i} + \hat{j} + \hat{k}\right)$$

and the plane $\bar{r}\left(2\hat{i} - \hat{j} + \hat{k}\right) = 5$

A. $\cos^{-1}\left(\frac{\sqrt{2}}{3}\right)$

B. $\sin^{-1}\left(\frac{\sqrt{2}}{3}\right)$

C. $\tan^{-1}\left(\frac{\sqrt{2}}{3}\right)$

D. $\sin^{-1}\left(\frac{\sqrt{2}}{\sqrt{3}}\right)$

**Answer: B**

Watch Video Solution

**26.** The area of the region bounded by the curve $y = 2x - x^2$ and x - axis is

A. $\frac{2}{3}$ sq , units

B. $\frac{4}{3}$ sq,units

C. $\frac{5}{3}$ sq , units

D. $\frac{8}{3}$ sq. units

**Answer: B**

Watch Video Solution

**27.** If $\int \frac{f(x)}{\log(\sin x)} dx = \log[\log \sin x] + c,$ then $f(x) =$

A. $\cot x$

B. $\tan x$

C. $\sec x$

D. cosecx

**Answer: A**

Watch Video Solution

28. If A and B are feet of perpendiculars drawn from point $Q(a, b, c)$ to the planes YZ and ZX, then equation of plane through the point A,B and O is

A. $\frac{x}{a} + \frac{y}{b} - \frac{z}{c} = 0$

B. $\frac{x}{a} - \frac{y}{b} + \frac{z}{c} = 0$

C. $\frac{x}{a} - \frac{y}{b} - \frac{z}{c} = 0$

D. $\frac{x}{a} + \frac{y}{b} + \frac{z}{C} = 0$

**Answer: A**

Watch Video Solution

**29.** IF

$\bar{a} = \hat{i} + \hat{j} + 2\hat{k}, \bar{b} = 2\hat{i} - \hat{j} + \hat{k}$ and $\bar{c} = 3\hat{i} - \hat{k}$ and $\bar{c} = m\bar{a} + n\bar{b}$

then $m + n =$

A. 0

B. 1

C. 2

D. $-1$

**Answer: C**

Watch Video Solution

30. $\int_0^{\pi/2}\left(\frac{\sqrt[n]{\sec x}}{\sqrt[n]{\sec x}+\sqrt[n]{\operatorname{cosec} x}}\right)dx =$

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

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

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

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

**Answer: C**

Watch Video Solution

31. The particular solution of the differential equation $y(1+\log x)\dfrac{dx}{dy}-x\log x=0$ when $x=e, y=e^2$ is

A. $y=ex\log x$

B. $ey=x\log x$

C. $xy=e\log x$

D. $y\log x=ex$

**Answer: A**

Watch Video Solution

**32.** M and N are mid-point of the diagnols AC and BD respectivley of quadrilateral ABCD, then $\overline{AB}+\overline{AD}+\overline{CB}+\overline{CD}$=

A. $2\overline{MN}$

B. $2\overline{NM}$

C. $4\overline{MN}$

D. $4\overline{NM}$

**Answer: C**

Watch Video Solution

**33.** IF $\sin x$ is the integerating factor (I.F ) of the linear differential equation $\frac{dy}{dx}+py=Q$ then P is

A. $\log\sin x$

B. $\cos x$

C. $\tan x$

D. $\cot x$

**Answer: D**

Watch Video Solution

**34.** Which of the following equation does not represent a pair of lines ?

A. $x^2 - x = 0$

B. $xy - x = 0$

C. $y^2 - x + 1 = 0$

D. $xy + x + y + 1 = 0$

**Answer: C**

Watch Video Solution

**35.** Probability of guessing correctly atleast 7 out of 10 answers in a 'True' or 'False' test is equal to

A. $\frac{11}{64}$

B. $\frac{11}{32}$

C. $\frac{11}{16}$

D. $\frac{27}{32}$

**Answer: A**

Watch Video Solution

**36.** Principal solutions of the equation $\sin 2x + \cos 2x = 0$ . Where $\pi < x < 2\pi$ are

A. $7\frac{\pi}{8}, 11\frac{\pi}{8}$

B. $9\frac{\pi}{8}, 13\frac{\pi}{8}$

C. $11\frac{\pi}{8}, 15\frac{\pi}{8}$

D. $15\frac{\pi}{8}, 19\frac{\pi}{8}$

**Answer: C**

Watch Video Solution

**37.** If line joining points A and B having position vectors $6\bar{a} - 4\bar{b} + 4\bar{c}$ and $-4\bar{c}$ respectively, and the line joining the points C and D having position vectors $-\bar{a} - 2\bar{b} - 3\bar{c}$ and $\bar{a} + 2\bar{b} - 5\bar{c}$ intersect, then their point of intersection is (A) B (B) C (C) D (D) A

A. B

B. C

C. D

D. A

**Answer: A**

Watch Video Solution

**38.** If $A = \begin{bmatrix} 2 & 2 \\ -3 & 2 \end{bmatrix}, B = \begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix}$ then $\left(B^{-1}A^{-1}\right)^{-1}$ is equal to

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

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

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

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

**Answer: A**

Watch Video Solution

**39.** If p: Every square is a rectangle

q: Every rhombus is a kite truth values of $p \rightarrow q$ and $p \leftrightarrow q$ are ____ and ___ respectively .

A. F,F

B. T,F

C. F,T

D. T,T

**Answer: D**

Watch Video Solution

**40.** IF $G(\bar{g}), H(\bar{h})$ and $p(\bar{p})$ are centroid orthocenter and circumenter of a triangle and $x\bar{p} + y\bar{h} + z\bar{g} = \bar{0}$ then (x,y,z)=

A. $1, 1-2$

B. $2, 1, \ -3$

C. $1, 3, \ -4$

D. $2, 3, \ -5$

**Answer: B**

Watch Video Solution

**41.** Which of the following quantified statement is ture ?

A. The square of every real number is positive

B. there exists a real number whose square is negative

C. there exists a real number whose square is not positive

D. Every real number is rational

**Answer: C**

Watch Video Solution

**42.** The general solution of the equation $\tan^2 x = 1$ is

A. $n\pi + \frac{\pi}{4}$

B. $n\pi - \frac{\pi}{4}$

C. $n\pi \pm \frac{\pi}{4}$

D. $2n\pi \pm \frac{\pi}{4}$

**Answer: C**

Watch Video Solution

**43.** Direction rations of the line which is perpendicular to the lines with direction ratios $-1, 2, 2$ and $0, 2, 1$ are

A. $1, 1, 2$

B. $2, \ -1, 2$

C. $-2, 1, 2$

D. $2, 1, \ -2$

**Answer: B**

Watch Video Solution

**44.** If matrix $A = \begin{bmatrix} 1 & 2 \\ 4 & 3 \end{bmatrix}$ such that $AX = I$ then x=

A. $\frac{1}{5}\begin{bmatrix} 1 & 3 \\ 2 & -1 \end{bmatrix}$

B. $\frac{1}{5}\begin{bmatrix} 4 & 2 \\ 4 & -1 \end{bmatrix}$

C. $\frac{1}{5}\begin{bmatrix} -3 & 2 \\ 4 & -1 \end{bmatrix}$

D. $\frac{1}{5}\begin{bmatrix} -1 & 2 \\ -1 & 4 \end{bmatrix}$

**Answer: C**

Watch Video Solution

**45.** IF

$\bar{a} = \hat{i} + \hat{j} + \hat{k}, \bar{b} = 2\hat{i} + \lambda\hat{j} + \hat{k}, \bar{c} = \hat{i} - \hat{j} + 4\hat{k}$ and $\bar{a}.\left(\bar{b} \times \bar{c}\right) = 10$

then $\lambda$ is equal to

A. 6

B. 7

C. 9

D. 10

**Answer: A**

Watch Video Solution

**46.** If $r.vX\text{~}B\left(n = 5, P = \frac{1}{3}\right)$ then $P(2 < X < 4) =$

A. $\frac{80}{243}$

B. $\frac{40}{243}$

C. $\frac{40}{343}$

D. $\frac{80}{343}$

**Answer: B**

Watch Video Solution

**47.** The objective function $Z = x_1 + x_2$, subject to $x_1 + x_2 \leq 10, \ -2x_1 + 3x_2 \leq 15, x x_1 \leq 6, x_1, x_2 \geq 0$ has maximum value _______ of the feasible region .

A. At only one point

B. At only one points

C. At every point of the segment joining two points

D. At every points of the line joining two points

**Answer: C**

Watch Video Solution