

MATHS

BOOKS - DISHA PUBLICATION MATHS (HINGLISH)

JEE MAIN - 2019 (HELD ON: 9TH APRIL 2019(MORNING SHIFT))



1. Slope of a line passing through P(2,3) and intersecting the line, x + y = 7 at a distance of 4 units from P, is

A.
$$\frac{1-\sqrt{5}}{1+\sqrt{5}}$$

B. $\frac{1-\sqrt{7}}{1+\sqrt{7}}$
C. $\frac{\sqrt{7}-1}{\sqrt{7}+1}$
D. $\frac{\sqrt{5}-1}{\sqrt{5}+1}$

Answer: B



2. If the standard deviation of the numbers -1, 0, 1, k is

 $\sqrt{5}~~{
m where}~~k>0$ is equal to

A.
$$2\sqrt{6}$$

B. $2\sqrt{\frac{10}{3}}$

$$\mathsf{C.}\,4\sqrt{\frac{5}{3}}$$

D. $\sqrt{6}$

Answer: A



3. If f(x) is a non-zero polynomial of degree four, having loca extreme points at x=-1,0,1 then the set $S=\{x\in R\colon f(x)=f(0)\}$ contains exactly

A. four irrational numbers.

B. four rational numbers.

C. two irrational and two rational numbers.

D. two irrational and one rational number.

Answer: D

4. The integral
$$\int \sec^{2/3} x \csc^{4/3} x \, dx$$
 is equal to (here

C is a constant of integration)

A.
$$-3 an^{-1/3}x+C$$

$$\mathsf{B.} - \frac{3}{4} \mathrm{tan}^{-4/3} \, x + C$$

$$\mathsf{C}.-3\cot^{-1/3}x+C$$

D.
$$3 an^{-1/3}x+C$$

(Here C is a constant of integration)

Answer: A



5. Four persons can hit a target correctly with probabilities $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$ and $\frac{1}{8}$ respectively. If all hit at the target would be hit, is

A.
$$\frac{25}{192}$$

B. $\frac{7}{32}$
C. $\frac{1}{192}$
D. $\frac{25}{32}$

Answer: D



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6. If the line $\frac{x-1}{2} = \frac{y+1}{3} = \frac{z-2}{4}$ meets the plane, x + 2y + 3z = 15 at a point P, then the distance of P from the origin is A. $\sqrt{5}/2$ B. $2\sqrt{5}$ C.9/2D. 7/2Answer: C

7. If the tangent to the curve, $y = x^3 + ax - b$ at the point (1, -5) is perpendicular to the line, -x + y + 4 = 0, then which one of the following points lies on the curve ?

A. (-2,1)

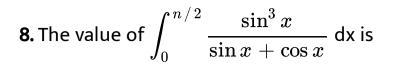
B. (-2,2)

C. (2,-1)

D. (2, -2)

Answer: D





A.
$$rac{\pi-2}{8}$$

B. $rac{\pi-1}{4}$
C. $rac{\pi-2}{4}$
D. $rac{\pi-1}{2}$

Answer: B



9. The value of $\cos^2 10^\circ - \cos 10^\circ \cos 50^\circ + \cos^2 50^\circ$ is

A.
$$rac{3}{4}+\cos 20^\circ$$

B. 3/4

$$\mathsf{C}.\,\frac{3}{2}(1+\cos 20^\circ)$$

D.
$$3/2$$

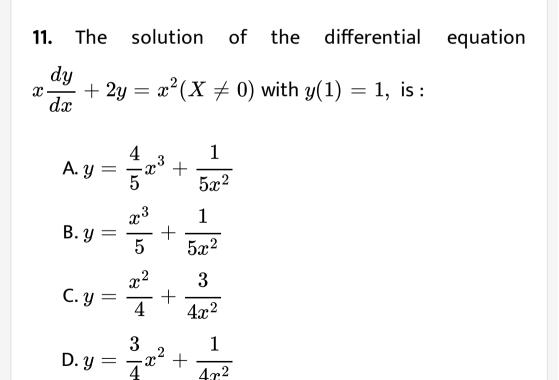
Answer: B

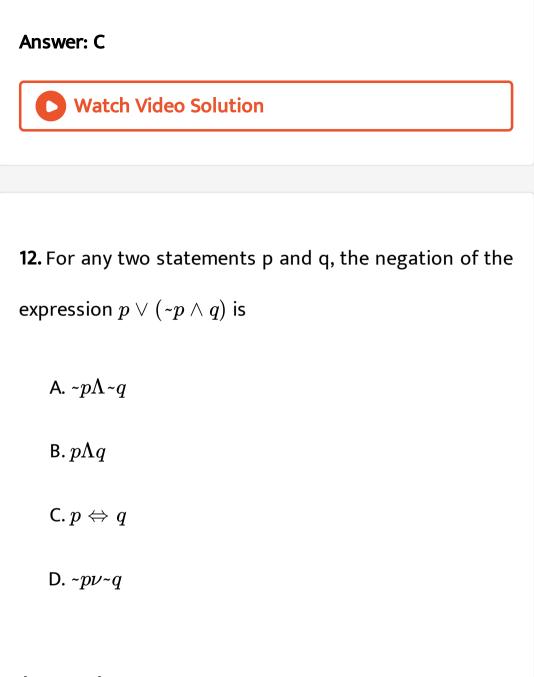
10. If the line
$$y = mx + 7\sqrt{3}$$
 is normal to the hyperbola $\frac{x^2}{24} - \frac{y^2}{18} = 1$, then a value of m is :
A. $\frac{\sqrt{5}}{2}$
B. $\frac{\sqrt{15}}{2}$
C. $\frac{2}{\sqrt{5}}$

D. $\frac{3}{\sqrt{5}}$

Answer: C

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Answer: A

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13. All the points in the set
$$S=iggl\{rac{lpha+i}{lpha-i}\!:\!lpha\in Riggr\}iggl(i=\sqrt{-1}iggr) lie$$
 on a

A. straight line whose slope is 1

B. circle whose radius is 1.

C. circle whose radius is 2.

D. straight line whose slope is -1.

Answer: B



14. If the fourth term in the binomial expansin of $\left(rac{2}{x}+x^{\log_6 x}
ight)^6(x>0)$ is $20 imes 8^7$, then the value of x is

A. 8^3

 $\mathsf{B.8}^2$

C. 8

 $D.8^{-2}$

Answer: B

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15. If the function f defined on
$$\left(\frac{\pi}{6}, \frac{\pi}{3}\right)$$
 by $\begin{cases} \frac{\sqrt{2}\cos x - 1}{\cot x - 1} & , x \neq \frac{\pi}{4} \\ & \text{ is continuous,} \end{cases}$
k, $x = \frac{\pi}{4}$

then k is equal to

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

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

Answer: B



16. If the function $f\colon R-\{1,\ -1\} o A$ definded by $f(x)=rac{x^2}{1-x^2},$ is surjective, then A is equal to

A. R-{-1}

- $\mathsf{B}.\left[0,\infty\right)$
- C. R-[-1,0)
- D. R-(-1,0)

Answer: C



17. A plane passing through the points (0, -1, 0) and (0, 0,

1) and making an angle
$$rac{\pi}{4}$$
 with the plane $y-z+5=0$

, also passes through the point

A.
$$\left(-\sqrt{2}, 1, -4\right)$$

B. $\left(\sqrt{2}, -1, 4\right)$
C. $\left(-\sqrt{2}, -1, -4\right)$
D. $\left(\sqrt{2}, 1, 4\right)$

Answer: D

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18. Let the sum of the first n terms of a non-constant A.P., a_1, a_2, a_3, \ldots be $50n + rac{n(n-7)}{2}A$, where A is a

constant. If d is the common difference of this A.P., then

the ordered pair (d, a_{50}) is equal to

A. (50, 50 + 46A)

B. (50, 50+ 45A)

C. (A, 50 + 45A)

D. (A, 50 + 46A)

Answer: D



19. Let $S = ig\{ heta \in [-2\pi, 2\pi] : 2\cos^2 heta + 3\sin heta = 0 ig\},$

then the sum of the equations elements of S is .

A.
$$\frac{13\pi}{6}$$

B. $\frac{5\pi}{3}$
C. 2π

D. π

Answer: C



20. If one root of the quadratic equation
$$X^2 + px + q = 0$$
 is 2-sqrt(3): $whereP, Q \subset Q$. Then which of the following is true ?

A.
$$p^2 - 4q + 12 = 0$$

B.
$$q^2 - 4p - 16 = 0$$

$$\mathsf{C}.\,q^2 + 4p + 14 = 0$$

D.
$$p^2 - 4q - 12 = 0$$

Answer: D



21. Let $f(x) = 15 - |x - 10|, x \in R$. Then, the set of

all values of x, at which the function, g(x) = f(f(x)) is

not differentiable, is

A. {5, 10, 15}

B. {10, 15}

C. {5, 10, 15, 20}

D. {10}

Answer: A



22. Let S be the set of all values of x for which the tangent to the curve $y = f(x) = x^3 - x^2 - 2x$ at (x, y) is parallel to the line segment joining the points (1, f(1)) and (-1, f(-1)), then S is equal to

A.
$$\left\{\frac{1}{3}, 1\right\}$$

B. $\left\{-\frac{1}{3}, -1\right\}$

$$\mathsf{C}.\left\{\frac{1}{3},\ -1\right\}$$
$$\mathsf{D}.\left\{-\frac{1}{3},1\right\}$$

Answer: D



23. If a tangent to the circle $x^2 + y^2 = 1$ intersects the coordinate axes at distinct points P and Q, then the locus of the mid-point of PQ is :

A.
$$x^2 + y^2 - 4x^2y^2 = 0$$

B. $x^2 + y^2 - 2xy = 0$
C. $x^2 + y^2 - 16x^2y^2 = 0$

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

Answer: A

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24. Let
$$\overrightarrow{\alpha} = 3\hat{i} + \hat{j}$$
 and $\beta = 2\hat{i} - \hat{j} + 3\hat{k}$. If $\overrightarrow{\beta} = \overrightarrow{\beta}_1 - \overrightarrow{\beta}_2$, where $\overrightarrow{\beta}_1$ is parallel to $\overrightarrow{\alpha}$ and $\overrightarrow{\beta}_2$ is perpendicular to $\overrightarrow{\alpha}$, then $\overrightarrow{\beta}_1 \times \overrightarrow{\beta}_2$ is equal to:

A.
$$-3\hat{i}+9\hat{j}+5\hat{k}$$

B.
$$3\hat{i}-9\hat{j}-5\hat{k}$$

$$egin{array}{l} {\sf C}. \ rac{1}{2} \Big(-3 \hat{i} + 9 \hat{j} + 5 \hat{k} \Big) \ {\sf D}. \ rac{1}{2} \Big(3 \hat{i} - 9 \hat{j} + 5 \hat{k} \Big) \end{array}$$

Answer: C



25. The area (in sq units) of the region $A=ig\{(x,y)\!:\!x^2\leq y\leq x+2ig\}$ is

A.
$$\frac{10}{3}$$

B. $\frac{9}{2}$
C. $\frac{31}{6}$
D. $\frac{13}{6}$

Answer: B

26.

 $\begin{bmatrix} 1 & 1 \\ 0 & 1 \end{bmatrix} \cdot \begin{bmatrix} 1 & 2 \\ 0 & 1 \end{bmatrix} \cdot \begin{bmatrix} 1 & 3 \\ 0 & 1 \end{bmatrix} \cdot \cdot \cdot \begin{bmatrix} 1 & n-1 \\ 0 & 1 \end{bmatrix} = \begin{bmatrix} 1 & 78 \\ 0 & 1 \end{bmatrix}$, then the inverse of $\begin{bmatrix} 1 & n \\ 0 & 1 \end{bmatrix}$ is

If

A.
$$\begin{bmatrix} 1 & 0 \\ 12 & 1 \end{bmatrix}$$

B.
$$\begin{bmatrix} 1 & -13 \\ 0 & 1 \end{bmatrix}$$

C.
$$\begin{bmatrix} 1 & -12 \\ 0 & 1 \end{bmatrix}$$

D.
$$\begin{bmatrix} 1 & 0 \\ 13 & 1 \end{bmatrix}$$

Answer: B

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27. Let
$$\sum_{k=1}^{10} f(a+k) = 16 ig(2^{10} - 1 ig),$$
 where the

function f satisfies f(x+y) = f(x)f(y) for all natural

numbers x, y and f(1) = 2. Then, the natural number 'a' is

A. 2

B. 16

C. 4

D. 3

Answer: D



28. A committee of 11 members is to be formed from 8 males and 5 m=females. If m is the number of ways the committee is formed with at least 6 males and n is the number of ways the committee is formed with atleast 3 females, then

A. m+ n = 68

B. m =n=78

C. n=m-8

D. m=n=68

Answer: B



29. Let α and β be the roots of the equation $x^2 + x + 1 = 0.$ Then, for $y \neq 0$ in R. $egin{bmatrix} y+1 & lpha & eta \ lpha & y+eta & 1 \ eta & 1 & y+lpha \end{bmatrix}$ is A. $y ig(y^2-1ig)$ B. $y(y^2 - 3)$ $\mathsf{C}. y^3$ D. $y^3 - 1$

Answer: C



30. One extremity of a focal chord of $y^2 = 16x$ is A(1,4). Then the length of the focal chord at A is

A. 20

B. 22

C. 24

D. 20

Answer: A

