

MATHS

BOOKS - FULL MARKS MATHS (TAMIL ENGLISH)

SAMPLE PAPER 13

Part

1.

lf

 $A = \{(x,y) : y = \sin x, x \in R\} ext{ and } B = \{(x,y) : y = \cos x, x \in R\}$

then $A\cap B$ contains

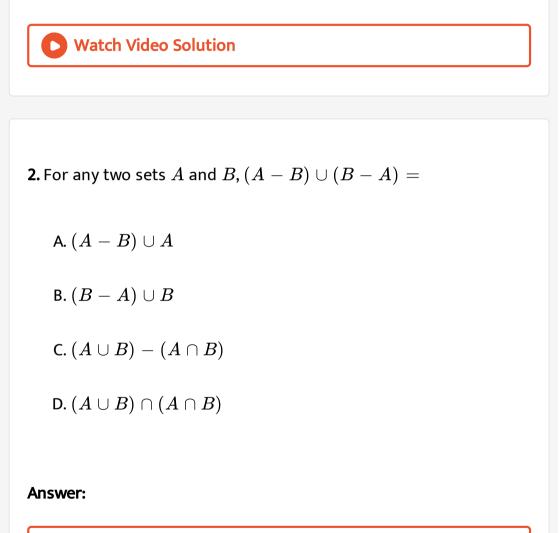
A. no element

B. infinitely many elements

C. only one element

D. cannot be determined

Answer:



3. If $|x+2| \leq 9$, then x belongs to

A. $(-\infty, -7)$ B. [-11, 7]C. $(-\infty, -7) \cup [11, \infty)$ D. (-11, 7)

Answer:



4. The value of $2\log 10 + 3\log 2$ is

A. log80

B. log800

C. log60

D. log400

Answer:



5. Sum of first 'n' terms of the series $\sqrt{2} + \sqrt{8} + \sqrt{18} + \dots$ is ____.

A.
$$\frac{n(n+1)}{2}$$

B. $2n(n+1)$
C. $\frac{n(n+1)}{\sqrt{2}}$
D. 1

Answer:

6. The coefficient of x^6 in $(2+2x)^{10}$ is

A. $10C_6$

B. 2^{6}

C. ${}^{16}C_62^6$

D. ${}^{10}C_62^{10}$

Answer:

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7. If ${}^{n}C_{10} > {}^{n}C_{r}$ for all possible r, then a value of n is

A. 10

B. 21

C. 19



8. The point on the line 2x-3y=5 is equidistance from (1,2) and (3,4)

is

A. (7,3)

B. (4,1)

C. (1,-1)

D. (3,4)

Answer:

9. The equation of the locus of the point whose distance from yaxis is half the distance from origin is

A.
$$x^2 + 3y^2 = 0$$

B. $x^2 - 3y^2 = 0$
C. $3x^2 + y^2 = 0$
D. $3x^2 - y^2 = 0$

Answer:

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10. A root of the equation
$$\begin{vmatrix} 3-x & -6 & 3 \\ -6 & 3-x & 3 \\ 3 & 3 & -6-x \end{vmatrix} = 0$$
 is

A. 6

B. 3

C. 0

D.-6

Answer:

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11. If
$$\vec{a} = \hat{i} + 2\hat{j} + 2\hat{k}$$
, $\left|\vec{b}\right| = 5$ and the angle between \vec{a} and \vec{b} is $\frac{\pi}{6}$, then the area of the triangle formed by these two vectors as two sides is

A.
$$\frac{7}{4}$$

B. $\frac{15}{4}$
C. $\frac{3}{4}$
D. $\frac{17}{4}$

Answer:



12. If
$$\overrightarrow{a} = \hat{i} + \hat{j} + \hat{k}$$
, $\overrightarrow{b} = 2\hat{i} + x\hat{j} + \hat{k}$, $\overrightarrow{c} = \hat{i} - \hat{j} + 4\hat{k}$ and
 $\overrightarrow{a} \cdot (\overrightarrow{b} \times \overrightarrow{c}) = 70$, then x is equal to
A. 5
B. 7
C. 26
D. 10

13. If
$$\lim_{x \to 0} \frac{\sin 3x}{\tan kx} = 5$$
 then the value of k is

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

B. $\frac{3}{11}$
C. 15
D. $\frac{3}{5}$

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14. Find
$$Rf(0)$$
 for $f(x)=|x|$ is

A. x

B. 0

 $\mathsf{C}.-x$

D. 1



15.
$$\int \tan^{-1} \sqrt{\frac{1-\cos 2x}{1+\cos 2x}} dx$$
 is
A. $x^2 + c$
B. $2x^2 + c$
C. $x^2/2 + c$
D. $-x^2/2 + c$

Answer:

16.
$$\int \! rac{1}{\sqrt{3+4x}} dx =$$

A.
$$\frac{1}{2}\sqrt{3+4x} + c$$

B. $\frac{1}{2}\log\sqrt{3+4x} + c$
C. $2\sqrt{3+4x} + c$
D. $-\frac{1}{2}\sqrt{3+4x} + c$



17. Two items are chosen from a lot containing twelve items of which four are defective. Then the probability that atleast one of the item is defective

A.
$$\frac{19}{33}$$

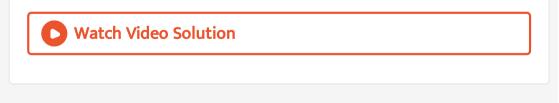
B. $\frac{17}{33}$
C. $\frac{23}{33}$

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18. If n(A) = 10 and $n(A \cap B) = 3$, find $n((A \cap B)' \cap A)$.

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19. Are there two distinct irrational numbers such that their difference is a rational number? Justify.



20. Find the value of $\tan 105^{\,\circ}.$



21. Write the first 6 terms of the sequence whose n^{th} term is given

by
$$t_n=rac{3n-2}{3^{n-1}}$$

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22. Show that the points
$$\left(0,\ -rac{3}{2}
ight), \left(1,\ -1
ight)$$
 and $\left(2,\ -rac{1}{2}
ight)$

are collinear.

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23. Find x and y if
$$\begin{pmatrix} 3x+4y & x-2y \\ 5 & -3 \end{pmatrix} = \begin{pmatrix} 2 & 4 \\ 5 & -3 \end{pmatrix}$$
.

Given

$$\overrightarrow{a}=2\hat{i}+2\hat{j}+3\hat{k}, \ \overrightarrow{b}=-\hat{i}+2\hat{j}+\hat{k} \ ext{and} \ \overrightarrow{c}=3\hat{i}+\hat{j} \quad ext{such}$$

that $\overrightarrow{a} + \lambda \overrightarrow{b}$ is perpendicular to \overrightarrow{c} , then find the value of λ .

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25. Find the relation between a and b if $\lim_{x \to 3} f(x)$ exists where $f(x) = \begin{cases} ax + 1 & \text{if } x \leq 3 \\ bx + 3 & \text{if } x > 3 \end{cases}$ Watch Video Solution

26. Find the derivative of $t^3 \cos t$ with respect to t.

27. There are 15 candidates for an examination. 7 candidates are appearing for mathematics examination while the remaning 8 are appearing for different subjects. In how many ways can they be seated in a row so that no two mathematics candidates are together?



28. Find the largest possible domain for the real valued function f defined by $f(x) = \sqrt{x^2 - 5x + 6}$.

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29. Resolve into partial fractions $rac{3x+7}{x^2-3x+2}$.

30. Iff
$${}^5P_r = {}^6P_{r-1}$$
 find r.



31. Show that
$$\begin{vmatrix} x & a & a \\ a & x & a \\ a & a & x \end{vmatrix} = (x+2a)(x-a)^2$$

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32. Find the unit vectors perpendicular to each of the vectors $\overrightarrow{a} + \overrightarrow{b}$ and $\overrightarrow{a} - \overrightarrow{b}$, where $\overrightarrow{a} = \hat{i} + \hat{j} + \hat{k}$ and $\overrightarrow{b} = \hat{i} + 2\hat{j} + 3\hat{k}$.

33. Evaluate $\lim_{x o 3} rac{x^2 - 9}{x - 3}$ if it exists by finding $f(3^-)$ and $f(3^+)$



34. Prove that the equations to the straight lines through the origin each of which makes an angle α with the straight line y = x is $x^2 - 2xy \sec 2\alpha + y^2 = 0$.

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35. Evalute
$$\int rac{1}{\sqrt{x+3}-\sqrt{x-4}} dx$$
 .

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36. Prove that $\cos 5\theta = 16\cos^5 \theta - 20\cos^3 \theta + 5\cos \theta$.



37. Let A={1,2,3,4} and B={a,b,c,d}. Give a function from A
ightarrow B for

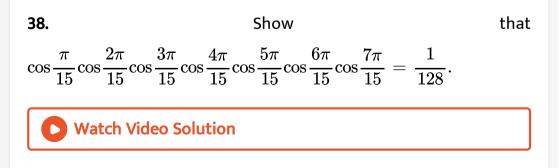
each of the following:

(i) neither one-to-one nor onto.

(ii) not one-to-one but onto.

(iii) one-to-one but not onto.

(iv) one-to-one and onto



39. If x, y, z are respectively p^{th}, q^{th} and r^{th} terms of a G.P show that $x^{q-r} imes y^{r-p} imes z^{p-q} = 1.$

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40. Three vectors
$$\overrightarrow{a}, \overrightarrow{b}$$
 and \overrightarrow{c} are such that $\left|\overrightarrow{a}\right| = 2, \left|\overrightarrow{b}\right| = 3, \left|\overrightarrow{c}\right| = 4$ and $\overrightarrow{a} + \overrightarrow{b} + \overrightarrow{c} = 0$ find $4\overrightarrow{a} \cdot \overrightarrow{b} + 3\overrightarrow{b} \cdot \overrightarrow{c} + 3\overrightarrow{c} \cdot \overrightarrow{a}$.



41. Suppose the chances of hitting a target by a person X is 3 times in 4 shots, by Y is 4 times in 5 shots, and by Z is 2 times in 3 shots. They fire simultaneously exactly one time. what is the probability that the target is damaged by exactly 2 hits.

42. Evaluate
$$\lim_{x
ightarrow\infty}~\left(rac{x^2-2x+1}{x^2-4x+2}
ight)^x$$

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43. (a) If
$$y = \cos(m \sin^{-1} x)$$
 prove that $(1-x^2)y_3 - 3xy_2 + (m^2-1)y_1 = 0$
(b) Find y '' if $x^4 + y^4 = 16$.