MATHS

BOOKS - FULL MARKS MATHS (TAMIL ENGLISH)

SAMPLE PAPER 12

Part

1. If 2 sets A and B have 17 elements in common, then the number of elements common to the set $A \times B$ and $B \times A$ is

A. 2^{17}

B. 17^2

C. 34

D. insufficient data

Answer:

Watch Video Solution

2. If $\frac{1-2x}{3+2x-x^2} = \frac{A}{3-x} + \frac{B}{x+1}$ then the value of A+B is

A. $-\frac{1}{2}$

B. $-\frac{2}{3}$

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

D. $\frac{2}{3}$

Answer:

Watch Video Solution

3. The value of $\left(3^{-6}\right)^{2/3}$ is

A. -81

B. -9

C. $\frac{1}{81}$

D. $\frac{1}{9}$

Answer:

Watch Video Solution

4. The value of $\tan 1^\circ \tan 2^\circ \tan^\circ \ldots \tan 89^\circ =$

A. 0

B. 1

C. 2

D. -1

Answer:

Watch Video Solution

5. In ${}_nC_{12} = {}_nC_8$ then n=

A. 20

B. 30

C. 6

D. 12

Answer: A

Watch Video Solution

6. $\cos 1^\circ + \cos 2^\circ \cos 3^\circ \ldots + \cos 179^\circ$ is

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

B. 1

C. $\sqrt{3}$

D. 0

Answer:

Watch Video Solution

7. The number of 10 digit numbers that can be written by using the digits 2 and 3 is

A. ${}^{10}C_2 + {}^{2}C_2$

B. 2^{10}

C. $2^{10} - 2$

D. $10!$

Answer:

Watch Video Solution

8. The sum of an infinite G.P. is 18. if the first term is 6, the common ratio is

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

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

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

D. $\frac{3}{4}$

Answer:

Watch Video Solution

9. Which one of the following is not true about the matrix $\begin{pmatrix} 1 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 5 \end{pmatrix}$?

A. a scalar matrix

B. a diagonal matrix

C. an upper triangular matrix

D. a lower triangular matrix

Answer:

Watch Video Solution

10. The distance between the lines $y = mx + c_1$ and $y = mx + c_2$ is

A. 0

B. $\frac{c_1 - c_2}{\sqrt{1 + m^2}}$

C. $\frac{|c_1 - c_2|}{\sqrt{1 + m^2}}$

D. $\frac{c_2 - c_1}{\sqrt{1 + m^2}}$

Answer:

Watch Video Solution

11. If $h^2 = ab$ then the angle between the pair of straight lines given by $ax^2 + 2hxy + by^2 = 0$ is

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

B. 0

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

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

Answer:

Watch Video Solution

12. If $\begin{bmatrix} 2 & x & -1 \end{bmatrix} \begin{bmatrix} 0 \\ x \\ 3 \end{bmatrix} = [13]$, then the value of x is

A. 2

B. 5

C. ± 3

D. ± 4

Answer: D

Watch Video Solution

13. $\lim_{x \to 0} \frac{xe^x - \sin x}{x}$ is

A. 1

B. 2

C. 3

D. 0

Answer:

Watch Video Solution

14. If $\Delta = \begin{vmatrix} 1 & 2 & 3 \\ 3 & 1 & 2 \\ 2 & 3 & 1 \end{vmatrix}$ then $\begin{vmatrix} 3 & 1 & 2 \\ 1 & 2 & 3 \\ 2 & 3 & 1 \end{vmatrix}$ is

A. Δ

B. $-\Delta$

C. 3Δ

D. -3Δ

Answer: B

Watch Video Solution

15. $\lim_{n \to 0} \left(\frac{1}{n^2} + \frac{2}{n^2} + \frac{3}{n^2} + \ldots + \frac{n}{n^2} \right)$ is

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

B. 0

C. 1

D. ∞

Answer:

Watch Video Solution

16. The remainder when 38^{15} is divided by 13 is

A. 12

B. 1

C. 11

D. 5

Answer:

Watch Video Solution

17. If $y = f\left(x^2 + 2\right)$ and $f'(3) = 5,$ then $\frac{dy}{dx}$ at x=1 is

A. 5

B. 25

C. 15

D. 10

Answer:

Watch Video Solution

18. $\int \tan x dx =$

A. $\log \cos x + c$

B. $\log \sec x + c$

C. $\sec^2 x + c$

D. $\frac{\tan^2 x}{2} + c$

Answer:

Watch Video Solution

19. A, B and C try to hit a target simultaneously but independently. Their recpective probabilities of hitting the target are $\frac{3}{4}, \frac{1}{2}, \frac{5}{8}$. The probability that the target is hit by A or B but not by C is

A. $\frac{21}{64}$

B. $\frac{7}{32}$

C. $\frac{9}{64}$

D. $\frac{7}{8}$

Answer:

Watch Video Solution

Watch Video Solution

20. If A and B are any two events, then the probability that exactly one of them occur is

A. $P(A \cup \overline{B}) + P(\overline{A} \cup B)$

B. $P(A \cap \overline{B}) + P(\overline{A} \cap B)$

C. $P(A) + P(B) - P(A \cap B)$

D. $P(A) + P(B) + (A \cap B)$

Answer: B

Watch Video Solution

21. Let X = {a, b,c,d}, and R = { (a,a) (b,b) (a,c)}. Write down the minimum number of ordered pairs to be included to R to make it

(i) reflexive (ii) symmetric

(iii) transitive (iv) equivalence.

Watch Video Solution

22. Simplify $\frac{1}{2+\sqrt{3}}+\frac{3}{4-\sqrt{5}}+\frac{6}{7-\sqrt{8}}$.

Watch Video Solution

23. Find the value of $\cot 15^{\circ}$.

Watch Video Solution

Watch Video Solution

24. Find the sum $1+\frac{4}{5}+\frac{7}{25}+\frac{10}{125}+\ldots$

Watch Video Solution

25. Examine whether the matrix $\begin{pmatrix} 1 & 4 & 9 \\ 4 & 9 & 16 \\ 9 & 16 & 25 \end{pmatrix}$ is singular or non-singular.

Watch Video Solution

26. For any two vectors $\vec{a}$ and $\vec{b}$ prove that $\left|\vec{a} \times \vec{b}\right|^2 + \left(\vec{a} \cdot \vec{b}\right)^2 = \left|\vec{a}\right|^2 \left|\vec{b}\right|^2$

Watch Video Solution

27. Find the derivative of $x^{\cos x}$ with respect to x.

Watch Video Solution

28. Evaluate $\int \frac{1}{4 - x^2} dx.$

Watch Video Solution

29. The length of the perpendicular drawn from the origin to a line is 6 and makes an angle of 135° with positive x axis. Find the equation of the line.

Watch Video Solution

30. Prove that $\sin 105^\circ + \cos 105^\circ = \cos 45^\circ$

Watch Video Solution

31. How many triangles can be formed by joining 15 points on the plane, in which no line joining any three points?

Watch Video Solution

32. Find the equation of the locus of a point such that the sum of the squares of the distance from the points (3, 5), (1, -1) is equal to 20.

Watch Video Solution

33. If $A^T = \begin{bmatrix} 4 & 5 \\ -1 & 0 \\ 2 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & -1 & 1 \\ 7 & 5 & -2 \end{bmatrix}$, verify the

$(A + B)^T = A^T + B^T = B^T + A^T$

Watch Video Solution

34. Show that the points whose position vectors are $2\vec{i} + 3\vec{j} - 5\vec{k}, 3\vec{i} + \vec{j} - 2\vec{k}$ and $6\vec{i} - 5\vec{j} + 7\vec{k}$ are collinear.

Watch Video Solution

35. Test the existance of the limit $\lim_{x \to 1} \frac{4|x-1| + x - 1}{|x-1|}, x \neq 1$

Watch Video Solution

36. If $y = \tan^{-1}\left(\frac{1+x}{1-x}\right)$ find y'.

Watch Video Solution

Watch Video Solution

37. Evalute $\int\left(5x^2-4+\frac{7}{x}+\frac{2}{\sqrt{x}}\right)dx$

Watch Video Solution

38. If x^2+ x + 1 is a factor of the polynomial $3x^3+8x^2+8x+a,$ then find the value of a.

Watch Video Solution

39. (a) If $f(x)=\frac{x-1}{x+1}$ then show that.

(i) $f\left(\frac{1}{x}\right)=-f(x)$

(ii) $f\left(-\frac{1}{x}\right) = -\frac{1}{f(x)}$.

(b) Prove that $\cos 20^\circ \cos 40^\circ \cos 80^\circ = 1/8$

Watch Video Solution

40. Determine the region in the plane determined by the inequalities.

$x \leq 3y, x \geq y$

Watch Video Solution

41. If the letters of the word GARDEN are permuted in all possible ways and the strings thus formed are arranged in the dictionary order, then find the ranks

of the words

Q GARDEN

Watch Video Solution

42. If $y = x + \frac{x^2}{2} + \frac{x^3}{3} + \frac{x^4}{4} + \ldots$ then show that $x = y - \frac{y^2}{2!} + \frac{y^3}{3!} - \frac{y^4}{4!} + \ldots$

Watch Video Solution

43. If A_i, B_i, C_i are the cofactors of a_i, b_i, c_i respectively,i=1,2,3 in $\Delta = \begin{vmatrix} a_1 & b_2 & c_1 \\ a_2 & b_2 & c_2 \\ a_3 & b_3 & c_3 \end{vmatrix}$ show that

$$\begin{vmatrix} A_1 & B_1 & C_1 \\ A_2 & B_2 & C_2 \\ A_3 & B_3 & C_3 \end{vmatrix} = \Delta^0$$

Watch Video Solution

44. $\lim_{\alpha \to 0} \frac{\sin(\alpha^n)}{(\sin \alpha)^m}$

Watch Video Solution

45. (a) Find $\frac{dy}{dx}$ where $y = (x^2 + 1)\sqrt[3]{x^2 + 2}$

(b) Evaluate $\int (x + 1)\sqrt{2x + 3}$.

Watch Video Solution