MATHS

BOOKS - FULL MARKS MATHS (TAMIL ENGLISH)

SAMPLEPAPER - 15 (UNSOLVED)

Part I I Choose The Correct Answer Answer All The Questions

---

1. For non empty set A and B if $A \subset B$ then $(A \times B) \cap (B \times A)$ is equal to . . . . .

A. $A \cap B$

B. $A \times A$

C. $B \times B$

D. none of these

> ▶ **Watch Video Solution**

---

2. If $f(x) = \dfrac{x+1}{x-1}$ is a real function , $x \neq 1$, then $f[f(2)]$ is .
. . .

A. 1

B. 2

C. 3

D. 4

Answer: C

> ▶ **Watch Video Solution**

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: A::B

▶ **Watch Video Solution**

---

4. If $\sin\alpha + \cos\alpha = b$ then $\sin 2\alpha$ is equal to . . . . .

    A. $b^2 - 1$ if $b \leq \sqrt{2}$

B. $b^2 - 1$ if $b > \sqrt{2}$

C. $b^2 - 1$ if $b \geq 1$

D. $b^2 - 1$ if $b \geq \sqrt{2}$

Answer: A::B

▶ **Watch Video Solution**

5. If $.^n C_{12} =^n C_8$ then n = ...

A. 12

B. 6

C. 4

D. 20

Answer: B::D

6. In $.^{2n} C_3 :.^n C_3 = 11 : 1$ then n is

A. 5

B. 6

C. 7

D. 8

Answer: B

7. Which of the following point lie on the locus of

$$3x^2 + 3y^2 - 8x - 12y + 17 = 0$$

A. (0,0)

B. (-2,3)

C. (1,2)

D. (0,-1)

Answer: A::B::C

▶ **Watch Video Solution**

---

8. If $^nC_{10} > {}^nC_r$ for all possible r, then a value of n is

A. 10

B. 21

C. 19

D. 20

Answer: B::D

9. The y-intercept of the straight line passing through (1,3) and perpendicular to 2x-3y+1=0 is

A. $\dfrac{3}{2}$

B. $\dfrac{9}{2}$

C. $\dfrac{2}{3}$

D. $\dfrac{2}{9}$

Answer: B

---

10. The equation of the line with slope 2 and the length of the perpendicular from the origin equal to $\sqrt{5}$ is

A. $+2y = \sqrt{5}$

B. $2x + y = \sqrt{5}$

C. 2x + y = 5

D. x + 2y - 5 = 5

Answer: B::C

11. If the points $(x - 2), (5, 2), (8, 8)$ are collinear then x is equal to . . . .

   A. $- 3$

   B. $\dfrac{1}{3}$

   C. 1

   D. 3

Answer: C::D

▶ **Watch Video Solution**

---

12. A number is selected from the set $\{1, 2, 3, . . , 20\}$. The probability That the selected number is divisible by 3 or 4 is

   A. $\dfrac{2}{5}$

B. $\dfrac{1}{8}$

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

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

Answer: A::B::C

▶ **Watch Video Solution**

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

A. 1

B. 2

C. 3

D. 0

Answer: D

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: A::B::D

15. $\lim\limits_{n \to \infty} \left(\dfrac{1}{n^2} + \dfrac{2}{n^2} + \dfrac{3}{n^2} + \ldots + \dfrac{n}{n^2} \right)$ is ....

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

B. 0

C. 1

D. ∞

Answer: A::B

▶ Watch Video Solution

16. If $f(x) = \begin{cases} x - 5 & \text{if} & x \leq 1 \\ 4x^2 - 9 & \text{if} & 1 < x < 2 \\ 3x + 1 & \text{if} & x \geq 2 \end{cases}$, then the right hand derivative of f(x) at x = 2 is .....

A. 0

B. 2

C. 3

D. 4

Answer: C

▶ **Watch Video Solution**

17. If $\int f'(x)e^{x^2}dx = (x-1)e^{x^2} + c$ then f (x) is .....

A. $2x^3 - \dfrac{x^2}{2} + x + c$

B. $\dfrac{x^3}{2} + 3x^2 + 4x + c$

C. $x^3 + 4x^2 + 6x + c$

D. $\dfrac{2x^3}{3} - x^2 + x + c$

18. $\int e^{-4x} \cos x \, dx$ is . . . . .

A. $\dfrac{e^{-4x}}{17} [4 \cos x - \sin x] + c$

B. $\dfrac{e^{-4x}}{17} [-4 \cos x + \sin x] + c$

C. $\dfrac{e^{-4x}}{17} [4 \cos x + \sin x] + c$

D. $\dfrac{e^{-4x}}{17} [-4 \cos x - \sin x] + c$

Answer: A::B::C::D

19. The gradient (slope) of a curve at any point (x,y) is $\dfrac{x^2 - 4}{x^2}$. If the curve passes through the point (2,7) , then the equation of the curve is. . . .

A. $y = x + \dfrac{4}{x} + 3$

B. $y = x + \dfrac{4}{x} + 4$

C. $y = x^2 + 3x = 4$

D. $y = x^2 - 3x + 6$

Answer: A::C::D

▶ **Watch Video Solution**

20. If A and B are two events such that $P(\overline{A}) = \dfrac{3}{10}$ and $P(A \cap \overline{B}) = \dfrac{1}{2}$ then $P(A \cap B)$ is . . . .

. .

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

B. $\dfrac{1}{3}$

C. $\dfrac{1}{4}$

D. $\dfrac{1}{5}$

Answer: A::D

▶ **Watch Video Solution**

1. Let A and B be two sets such that n (A) = 3 and n(B) =2. If (x,1) (y,2) (z,1) are in $A \times B$, find A and B, where x,y,z are

distinct elements.

2. Find the radius of the spherical tank whose volume is $\dfrac{32\pi}{3}$

units

3. If . $^{n+2}P_4 = 42 \times .\,^n P_2$ find n .

4. Evaluate : 10^{-4}

5. If O is origin and R is a variable point on $y^2 = 4x$, then find the equation of the locus of the mid-point of the line segment OR.

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

7. Find the range of the following functions given by $f(x) = \dfrac{1}{3 - \sin 3x}$

8. Draw the function $f'(x)$ if $f(x) = 2x^2 - 5x + 3$

9. Evaluate $\int 3\cot^3 x\,dx$

10. In a box containing 10 bulbs, 2 are defective. What is the probability that among 5 bulbs chosen at random , none is defective ?

1. The owner of a small restaurant can prepare a particular meal at a cost of Rupees 100. he estimates that if the menu price of the meal is x rupees, then the number of customers who will order that meal at that price in an evening is givenby the function d(x) = 200 - x. Express his revenue, total cost and profit on this meal as functions of x .

▶ **Watch Video Solution**

2. If one root of the equation $2x^2 - ax + 64 = 0$ is twice that of the other then find the value of a.

▶ **Watch Video Solution**

3. Prove that $\cos(A + B)\cos(A - B) = \cos^2 B - \sin^2 A$

> ▶ Watch Video Solution

4. 4 boys and 4 girls form a line with the boys and girls alternating . Find the number of ways of making this line .

> ▶ Watch Video Solution

5. Determine the matrices A and B if they satisfy $2A + B + \begin{bmatrix} 6 & -6 & 0 \\ -4 & 2 & 1 \end{bmatrix} = 0$ and $A - 2B = \begin{bmatrix} 3 & 2 & 8 \\ -2 & 1 & -7 \end{bmatrix}$

> ▶ Watch Video Solution

6. Show that the points (4, - 3, 1), (2, -4, 5) and (1, -1, 0) form a

right angled triangle .

7. Evaluate $\lim\limits_{x \to \infty} \left(\dfrac{x^3}{2x^3 - 1} - \dfrac{x^2}{2x - 1} \right)$

8. Evaluate $\int \tan x \sqrt{\sec x}\, dx$

9. The probability of an event A occurring is 0.5 and B occurring is 0.3 . If A and B are mutually exculusive events , then find the probability of

(i) $P(A \cup B)$, (ii) $P(A \cap \overline{B})$

▶ **Watch Video Solution**

10. Find the sum of the first 20 terms of the arithmetic progression having the sum of first ten terms as 52 and the sum of the first 15 terms as 77.

▶ **Watch Video Solution**

Part Iv Iv Answer All The Questions

1. If α and β are the roots of the quadratic equation $x^2 + \sqrt{2}x + 3 = 0$ form a quadratic equation with roots $\dfrac{1}{\alpha}$ and $\dfrac{1}{\beta}$

> ▶ Watch Video Solution

2. Show that $\dfrac{(\cos\theta - \cos 3\theta)(\sin 8\theta + \sin 2\theta)}{(\sin 5\theta - \sin\theta)(\cos 4\theta - \cos 6\theta)} = 1$

> ▶ Watch Video Solution

3. A function f is defined as follows :

$$f(x) = \begin{cases} 0 & \text{for} & x < 0 \\ x & \text{for} & 0 \le x < 1 \\ -x^2 + 4x - 2 & \text{for} & 1 \le x < 3 \\ 4 - x & \text{for} & x \ge 3 \end{cases}$$

Is the function continuous ?

4. Find the value of k, if the following equation represents a pair of straight lines . Further find wheter these lines are parallel or intersecting

$$12x^2 + 7xy - 12y^2 - x + 7y + k = 0$$

5. show that the vectors

$3\hat{i} - 2\hat{j} + \hat{k}, \hat{i} - 3\hat{j} + 5\hat{k}$ and $2\hat{i} + \hat{j} - 4\hat{k}$ form a right angled triangle

6. Find $\dfrac{dy}{dx}$ for $xy + xe^{-y} + ye^x = x^2$

7. A year is selected at random. What is the probability that

(i) it contains 53 Sunday , (ii) it is a leap year which contains

53 Sunday