



MATHS

BOOKS - FULL MARKS MATHS (TAMIL ENGLISH)

SAMPLE PAPER 11

Part

1. The relation R defined on a set $A = \{0, -1, 1, 2\}$ by xRy if $|x^2 + y^2| \leq 2$, then which one of the following is true?

A. $R = \{(0, 0), (0, -1), (0, 1), (-1, 0), (-1, 1), (1, 2), (1, 0)\}$

B. $R^{-1} = \{(0, 0), (0, -1), (0, 1), (-1, 0), (1, 0)\}$

C. Domain of R is $\{0, -1, 1, 2\}$

D. Range of R is $\{0, -1, 1\}$

Answer:



Watch Video Solution

2. The solution of $5x - 1 < 24$ and $5x + 1 > -24$ is

- A. (4, 5)
- B. (- 5, - 4)
- C. (- 5, 5)
- D. (- 5, 4)

Answer:



Watch Video Solution

3. If 3 is the logarithm of 343, then the base is

- A. (4,5)
- B. (-5,-4)
- C. (-5,5)

D. $(-5,4)$

Answer:



[Watch Video Solution](#)

4. A wheel is spinning at 2 radians/second. How many seconds will it take to make 10 complete rotations?

A. 10π seconds

B. 20π seconds

C. 5π seconds

D. 15π seconds

Answer:



[Watch Video Solution](#)

5. In an examination there are three multiple choice questions and each question has 5 choices Number of ways in which a student can fail to get all answer correct is

A. 125

B. 124

C. 64

D. 63

Answer:



[Watch Video Solution](#)

6. Equation of the straight line forms an isosceles triangle with coordinate axes in the I-quadrant with perimeter $4 + 2\sqrt{2}$ is

A. $x + y + 2 = 0$

B. $x + y - 2 = 0$

$$C. x + y - \sqrt{2} = 0$$

$$D. x + y + \sqrt{2} = 0$$

Answer:



Watch Video Solution

7. The value of the determinant of $A = \begin{bmatrix} 0 & a & -b \\ -a & 0 & c \\ b & -c & 0 \end{bmatrix}$ is

A. $-2abc$

B. abc

C. 0

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

Answer:



Watch Video Solution

8. The unit vector parallel to the resultant of the vectors

$$\hat{i} + \hat{j} - \hat{k} \quad \text{and} \quad \hat{i} - 2\hat{j} + \hat{k}$$

A. $\frac{\vec{i} - \vec{j} + \vec{k}}{\sqrt{5}}$

B. $\frac{2\vec{i} + \vec{j}}{\sqrt{5}}$

C. $\frac{2\vec{i} - \vec{j} + \vec{k}}{\sqrt{5}}$

D. $\frac{2\vec{i} - \vec{j}}{\sqrt{5}}$

Answer:



[Watch Video Solution](#)

9. The value of $[7 \ 3 \ 2] \begin{bmatrix} 4 \\ -1 \\ 6 \end{bmatrix}$ is

A. [43]

B. [37]

C. [30]

D. [43]

Answer:



[Watch Video Solution](#)

10. A factor of the determinant $\begin{vmatrix} x+a & b & c \\ a & x+b & c \\ a & b & x+c \end{vmatrix}$ is

A. x

B. $x+b$

C. $x+a+b+c$

D. $x+c$

Answer:



[Watch Video Solution](#)

11.

if

$$\vec{a} = \hat{i} + \hat{j} + \hat{k}, \vec{b} = 2\hat{i} + x\hat{j} + \hat{k}, \vec{c} = \hat{i} - \hat{j} + 4\hat{k} \text{ and } \vec{a} \cdot (\vec{b} \times \vec{c})$$

, then x=

A. 5

B. 7

C. 26

D. 10

Answer:



[Watch Video Solution](#)

12. The function $f(x) = \begin{cases} 2 & x \leq 1 \\ x & x > 1 \end{cases}$ is not differentiable at

A. x=0

B. x=1

C. x=-1

D. $x=2$

Answer:



[Watch Video Solution](#)

13. If \vec{a} and \vec{b} are two vectors of magnitude 2 and inclined at an angle 60° then the angle between \vec{a} and $\vec{a} + \vec{b}$ is

A. 30°

B. 60°

C. 45°

D. 90°

Answer:



[Watch Video Solution](#)

14. If $pv = 81$ then $\frac{dp}{dv}$ at $v = 3$ is

A. 9

B. -9

C. 2

D. -2

Answer:



[Watch Video Solution](#)

15. $\int \tan x dx =$

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](#)

16. Let A and B be two events such that $P(\overline{A \cup B}) = \frac{1}{6}$, $P(A \cap B) = \frac{1}{4}$ and $P\overline{A} = \frac{1}{4}$, where \overline{A} stands for complement of event A . then , events A and B are

- A. Equally likely but not independent
- B. Independent but not equally likely
- C. Independent and equally likely
- D. Mutually inclusive and dependent

Answer:



[Watch Video Solution](#)

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

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

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

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

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

Answer:



[Watch Video Solution](#)

18. Solve $\left| \frac{2}{x-5} \right| > 1, x \neq 5$



[Watch Video Solution](#)

19. Solve: $\sin \theta - \cos \theta = -\sqrt{2}$



[Watch Video Solution](#)

 Watch Video Solution

20. Suppose one girl or one boy has to be selected for a competition from a class comprising 17 boys and 29 girls. In how many different ways can this selection be made?

 Watch Video Solution

21. Find the combined equation of the straight lines whose separate equations are $x - 2y - 3 = 0$ and $x + y + 5 = 0$

 Watch Video Solution

22. Find the value of x if
$$\begin{vmatrix} x - 1 & x & x - 2 \\ 0 & x - 2 & x - 3 \\ 0 & 0 & x - 3 \end{vmatrix} = 0$$

 Watch Video Solution

23. Find the angle between \vec{a} and \vec{b} if $|\vec{a} \times \vec{b}| = |\vec{a} \cdot \vec{b}|$.

 [Watch Video Solution](#)

24. Find the positive integer n so that $\lim_{x \rightarrow 3} \frac{x^n - 3^n}{x - 3} = 27$

 [Watch Video Solution](#)

25. Find $\frac{dy}{dx}$ where $y = \frac{\tan x}{x}$

 [Watch Video Solution](#)

26. Integrate $\frac{8}{\sqrt{1 - (4x)^2}} + \frac{27}{\sqrt{1 - 9x^2}} - \frac{15}{1 + 25x^2}$ with respect to x .

 [Watch Video Solution](#)

27. Given $n(A) = 7$, $n(B) = 8$ and $n(A \cup B) = 10$ find $n[(A \cap B)]$.



Watch Video Solution

28. Solve: $-x^2 + 3x - 2 \geq 0$



Watch Video Solution

29. Prove that $\sin A + \sin(120^\circ + A) + \sin(240^\circ + A) = 0$.



Watch Video Solution

30. Find the number of ways of arranging the letters of the word RAMANUJAN so that the relative positions of vowels and consonants are not changed.



Watch Video Solution

31. Find the last two digits of the number 7^{400}

 [Watch Video Solution](#)

32. If $A = \begin{bmatrix} 1 & a \\ 0 & 1 \end{bmatrix}$ compute A^4 .

 [Watch Video Solution](#)

33. Solve: $2X + Y + \begin{bmatrix} -2 & 1 & 3 \\ 5 & -7 & 3 \\ 4 & 5 & 4 \end{bmatrix} = 0, X - Y = \begin{bmatrix} 4 & 7 & 0 \\ -1 & 2 & -6 \\ -2 & 8 & -5 \end{bmatrix}$.

 [Watch Video Solution](#)

34. Compute $\lim_{x \rightarrow 1} \frac{x^m - 1}{x^n - 1}$.

 [Watch Video Solution](#)

35. Differentiate $(2x + 1)^5(x^3 - x + 1)^4$ with respect to x .



Watch Video Solution

36. Evaluate $\int x^2 \log 2x dx$



Watch Video Solution

37. In a survey of 5000 persons in a town, it was found that 45% of the persons know language A, 25% know language B, 10% know language C, 5% know languages A and B, 4% know Languages B and C, and 4% know languages A and C. If 3% of the persons know all the three Languages find the number of persons who know only Language A.



Watch Video Solution

38. Find the range of the function $f(x) = \frac{1}{2 + \sin 3x}$.





Watch Video Solution

39. (a) Solve $(2x + 1)^2 - (3x + 2)^2 = 0$

(b) If α and β are the roots of the equation $3x^2 - 4x + 1 = 0$ form the equation whose roots are $\frac{\alpha^2}{\beta^2}$ and $\frac{\beta^2}{\alpha^2}$.



Watch Video Solution

40. Evaluate: $\int \frac{\cos x}{\cos(x - a)} dx$.



Watch Video Solution

41. Differentiate $s(t) = \sqrt[4]{\frac{t^3 + 1}{t^3 - 1}}$ with respect to t .



Watch Video Solution

42. Find the equation of the straight lines passing through (8,3) and having intercepts whose sum is 1.

 [Watch Video Solution](#)

43. Population of a city in the years 2005 and 2010 are 1,35,000 and 1,45,000 respectively. Find the approximate population in the year 2015. (assuming that the growth of population is constant).

 [Watch Video Solution](#)

44. Evaluate: $\lim_{x \rightarrow \infty} x \left[3^{\frac{1}{x}} + 1 - \cos\left(\frac{1}{x}\right) - e^{\frac{1}{x}} \right]$.

 [Watch Video Solution](#)