MATHS

BOOKS - FULL MARKS MATHS (TAMIL ENGLISH)

SAMPLE PAPER 4

Part I

1. The number of relations on a set containing 3 elements is . . . . . .

A. 9

B. 81

C. 512

D. 1024

Answer:

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2. If $n[(A \times B) \cap (A \times C)] = 12$ and $n(B \cap C) = 2$ then n(A) is .....

A. 2

B. 3

C. 4

D. 6

Answer:

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3. If $|x-3| \geq 5$ then x belongs to. . . . . .

A. $[-2, 8]$

B. $(-2, 8)$

C. $[-2, \infty]$

D. $(-\infty, -2] U [8, \infty)$

Answer:

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4. The number of solutions of $x^2 + |x - 1| = 1$ is

A. 1

B. 0

C. 2

D. 3

Answer:

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5. If $a, 8, b$ are in A.P and $a, 4, b$ are in G.P and a, x, b are in H.P then x = ...

A. 1

B. 0

C. 2

D. 3

Answer:

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6. If 10 lines are drawn in a plane such that no two of them are parallel and no three are concurrent , then total number of points of intersection are . . . . . .

A. 45

B. 40

C. 10 !

D. 2^{10}

Answer:

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7. The value of $e^{2\log x} = \ldots\ldots\ldots\ldots$

A. 2x

B. x^2

C. $\sqrt{x}$

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

Answer:

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8. The n^{th} term of the sequence 1,2,4,7,11 ..... is .....

A. $n^3 + 3n^2 + 2n$

B. $n^3 - 3n^2 + 3n$

C. $\frac{n(n+1)(n+2)}{3}$

D. $\frac{n^2 - n + 2}{2}$

Answer:

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9. The last term in the expansion $\left(2+\sqrt{3}\right)^{8}$ is . . . . . .

A. 81

B. 27

C. 9

D. 3

Answer:

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10. A line perpendicular to the line $5x - y = 0$ forms a triangle with the coordinate axes . If the area of the triangle is 5 sq. Units, then its equation is . . . . . .

A. $x + 5y \pm 5\sqrt{2} = 0$

B. $x - 5y \pm 5\sqrt{2} = 0$

C. $5x + y \pm 5\sqrt{2} = 0$

D. $5x - y + 5\sqrt{2} = 0$

Answer:

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11. A factor of the determinant $\begin{vmatrix} x & -6 & -1 \\ 2 & -3x & x-3 \\ -3 & 2x & x+2 \end{vmatrix}$ is

. . . . . .

A. $x+3$

B. $2x-1$

C. $x-2$

D. $x-3$

Answer:

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12. If $\lambda\vec{i} + 2\lambda\vec{j} + 2\lambda\vec{k}$ is a unit vector then the value of λ is .....

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

B. $\frac{1}{4}$

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

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

Answer:

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13. One of the diagonals of parallelogram ABCD with $\vec{a}$ and $\vec{b}$ are adjacent sides is $\vec{a} + \vec{b}$. The other

diagonal BD is . . . . . .

A. $\vec{a} - \vec{b}$

B. $\vec{b} - \vec{a}$

C. $\vec{a} + \vec{b}$

D. $\frac{\vec{a} + \vec{b}}{2}$

Answer:

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14. If (1,2,4)and $(2, -3\lambda, -3)$ are the intial and terminal points of the vetcor $\vec{i} + 5\vec{j} - 7\vec{k}$ then the value of λ. . . . . .

A. $\frac{7}{3}$

B. $-\frac{7}{3}$

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

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

Answer:

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15. If $y = mx + c$ and $f(0) = f'(0) = 1$, then $f(2)$ is

A. 1

B. 2

C. 3

D. 4

Answer:

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16. The derivative of $\left(x+\frac{1}{x}\right)^2$ w.r.to . X is . . . . . .

A. $2x-\frac{2}{x^3}$

B. $2x+\frac{2}{x^3}$

C. $2\left(x+\frac{1}{x}\right)$

D. 0

Answer:

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17. If $f(x) = \begin{matrix} ax^2 - b, & -1 < x < 1 \\ \frac{1}{|x|}, & \text{elsewhere} \end{matrix}$ is differentiable at x = 1 , then . . . . . .

A. $a = \frac{1}{2}, b = \frac{-3}{2}$

B. $a = \frac{-1}{2}, b = \frac{3}{2}$

C. $a = -\frac{1}{2}, b = \frac{3}{2}$

D. $a = -\frac{1}{2}, b = -\frac{3}{2}$

Answer: $a = \frac{1}{2} b = \frac{3}{2}$

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18. $\int \sin 7x \cos 5x dx = \ldots\ldots\ldots$

A. $\frac{1}{2}\left[\frac{\cos 12x}{2} + \frac{\cos 2x}{2}\right]c$

B. $-\frac{1}{2}\left[\frac{\cos 12x}{2} + \frac{\cos 2x}{2}\right] + c$

C. $-\frac{1}{2}\left[\frac{\cos 6x}{6} + \cos x\right] + c$

D. $-\frac{1}{2}\left[\frac{\sin 12x}{2} + \frac{\sin 2x}{2}\right] + c$

Answer:

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19. $\int \frac{1}{e^x} dx = \ldots\ldots\ldots$

A. $\log e^x + c$

B. $x + c$

C. $\frac{1}{e^x} + c$

D. $\frac{-1}{e^x} + c$

Answer:

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20. 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 is . . . . . .

A. $\frac{19}{23}$

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

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

D. $\frac{13}{34}$

Answer:

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Part Ii

1. Prove that the relation " friendship " is not an equivalence relation on the set of all people in Chennai.

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

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4. Expand $(2x+3)^5$ with the help of binomial theorem

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5. If $\lambda = -2$, determine the value of

$$\begin{vmatrix} 0 & 2\lambda & 1 \\ \lambda^2 & 0 & 3\lambda^2+1 \\ -1 & 6\lambda-1 & 0 \end{vmatrix}$$

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6. Compute $\lim_{x \to 1} \frac{\sqrt{x}-1}{x-1}$

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7. Differentiate the following . $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$

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8. Integrate $\frac{1}{(x+1)^2 - 25}$

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9. Given that $P(A) = 0.52, P(B) = 0.43$ and $P(A \cap B) = 0.24$ find $p(A \cap \overline{B})$

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10. Show that $4x^2 + 4xy + y^2 - 6x - 3y - 4 = 0$ represents a pair of parallel lines.

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Part Iii

1. If A and B are two sets so that $n(B-A)=2n(A-B)=4n(A\cap B)$ and if $n(A\cup B)=14$ then find n(P(A))

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2. Resolve $\frac{1}{x^2-a^2}$ into partial fraction .

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3. Count the number of positive integers greater than 7000 less than 8000 which are divisible by 5 provided are that no digits are repeated .

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4. Find the $\sqrt[3]{126}$ approximately to two decimal places .

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5. Find the equation of the line through the intersection of the lines $3x + 2y + 5 = 0$ and $3x - 4y + 6 = 0$ and the point (1,1)

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6. Show that $\begin{vmatrix} b+c & bc & b^2c^2 \\ c+a & ca & c^2a^2 \\ a+b & ab & a^2b^2 \end{vmatrix} = 0$

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7. Evaluate $\lim_{x \to 2} \frac{x-2}{x^2-x-2}$

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8. Differentiate $\frac{e^{3x}}{1+e^x}$ with respect to x

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9. Differentiate : $e^x(\tan x + \log \sec x)$

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10. The position vectors of the vertices of a triangle are $\vec{i} + 2\vec{j} + 3\vec{k}, 3\vec{i} - 4\vec{j} + 5\vec{k}$ and $-2\vec{i} + 3\vec{j} - 7\vec{k}$

Find the perimeter of a triangle .

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Part Iv

1. If $f: R \to R$ is defined by $f(x) = 3x - 5$, prove that f is a bijection and find its inverse .

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2. (a) Find the values of k so that the equation $x^2 = 2x(1 + 3k) + 7(3 + 2k) = 0$ has real and equal roots.

(b) If the roots of the equation $(q - r)x^2 + (r - p)x + (p - q) = 0$ are equal then show that p,q and r are in A. P .

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3. (a) Find the sum of all 4 digit numbers that can be formed using the digits 1,2,3,4 and 5 repetition not allowed ?

(b) Three vectors $\vec{a}, \vec{b}$ and $\vec{c}$ are such that $|\vec{a}| = 2, |\vec{b}| = 3, |\vec{c}| = 4$ and $\vec{a} + \vec{b} + \vec{c} = 0$

Find $4\vec{a} . \vec{b} + 3\vec{b} . \vec{c} + 3\vec{c} . \vec{a}$

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4. Intergrate the following $\frac{\sqrt{x}}{1+\sqrt{x}} dx$

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5. If $y = Ae^{6x} + Be^{-x}$ prove that $\frac{d^2y}{dx^2} - 5\frac{dy}{dx} - 6y = 0$

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6. (a) Evaluate : $\lim_{x \to 0} \frac{\sqrt{x^2+1}-1}{\sqrt{x^2+16}-4}$

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