MATHS

BOOKS - FULL MARKS MATHS (TAMIL ENGLISH)

SAMPLE PAPER 09

Part I

1. If $n(A) = 2$ and $n(B \cup C) = 3$ then $n[(A \times B) \cup (A \times C)]$ is ..... .

A. 2^3

B. 3^2

C. 6

D. 5

Answer:

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2. For any two sets A and B , $A \cap (A \cup B)$= .....

A. B

B. ϕ

C. A

D. none of these

Answer:

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3.

$\cos 1^\circ + \cos 2^\circ + \cos 3^\circ + \cos 4^\circ + \ldots\ldots\ldots\ldots \cos 179^\circ$

= ..... .

A. 0

B. 1

C. -1

D. 89

Answer:

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4. The value of $\log_{27} 9$ is ..... .

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

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

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

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

Answer:

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5. In 3 fingers the number of ways 4 rings can be worn in ..... Ways .

A. $4^3 - 1$

B. 3^4

C. 68

D. 64

Answer:

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6. Everybody in a room shakes hands with everybody else. The total number of shake hands is 66. The number of

persons in the room is ..... .

A. 11

B. 12

C. 10

D. 6

Answer:

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7. The HM of two positive numbers whose AM and GM are 16, 8 respectively is

A. 10

B. 6

C. 5

D. 4

Answer:

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8. The value of x, for which the matrix A = $\begin{bmatrix} e^{x-2} & e^{7+x} \\ e^{2+x} & e^{2x+3} \end{bmatrix}$ is singular is

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9. If $\left|\vec{a}+\vec{b}\right|=60, \left|\vec{a}-\vec{b}\right|=40$ and $\left|\vec{b}\right|=46$, then $\left|\vec{a}\right|$ is

A. 42

B. 12

C. 22

D. 32

Answer:

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10. Given $\vec{a} = 2\hat{i} + \hat{j} - 8\hat{k}$ and $\vec{b} = \hat{i} + 3\hat{j} - 4\hat{k}$ then $\left|\vec{a} + \vec{b}\right|$ = ...

A. 13

B. $\frac{13}{3}$

C. $\frac{4}{13}$

D. $\frac{3}{13}$

Answer:

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11. If $f(x) = \begin{cases} kx & \text{for } . x \leq 2 \\ 3 & \text{for } x > 2 \end{cases}$ is continuous at x=2 then the value of k is ..... .

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

B. 0

C. 1

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

Answer:

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12. If $f: R \to R$ is defined by $f(x) = |x-3| + |x-4|$ for $x \in R$ then $\lim_{x \to 3^-} f(x)$ is equal to ..... .

A. -2

B. -1

C. 0

D. 1

Answer:

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13. $\lim_{x \to \infty} \left(\frac{x^2 + 5x + 3}{x^2 + x + 3} \right)^x$ is

A. e^4

B. e^2

C. e^3

D. 1

Answer:

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14. $\int \frac{e^x\left(x^2 \tan^{-1} x + \tan^{-1} x + 1\right)}{x^2+1} dx$ is

A. $e^x \tan^{-1}(x+1) + c$

B. $\tan^{-1}(e^x) + c$

C. $e^x \frac{\left(\tan^{-1} x\right)^2}{2} + c$

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

Answer:

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15. $\int \frac{\sec x}{\sqrt{\cos 2x}} dx$ is

A. $\tan^{-1}(\sin x) + c$

B. $2\sin^{-1}(\tan x) + c$

C. $\tan^{-1}(\cos x) + c$

D. $\sin^{-1}(\tan x) + c$

Answer:

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16. $\int \frac{e^{6\log x} - e^{5\log x}}{e^{4\log x} - e^{3\log x}} dx$

A. $x + c$

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

C. $\frac{3}{x^3} + c$

D. $\frac{1}{x^2} + c$

Answer:

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17. It is given that the events A and B are such that $P(A) = \frac{1}{4}, P(A/B) = \frac{1}{2}$ and $P(B/A) = \frac{2}{3}$. Then P(B) is

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

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

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

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

Answer:

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Part Ii

1. In the set Z of integers define mRn if $m - n$ is a multiple of 12. Prove the R is an equivalence relation.

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

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3. Find the value of $\sin\left(22\frac{1}{2}\right)^{\circ}$

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4. The number of bacteria in a certain culture doubles every hour. If there were 30 bacteria present in the culture originally, how many bacteria will be present at the end of 2^{nd} hour, 4^{th} hour and n^{th} hour?

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5. If $(a, a+b, a+b+c)$ is one set of direction ratios of the line joining $(1, 0, 0)$ and $(0, 1, 0)$ then find a set of values of a, b, c.

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6. Find $\frac{dy}{dx}$ for y $= \left(x^2 + 4x + 6\right)^5$

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7. A bag contains 5 white and 7 black balls,3 balls are drawn at random.Find the probability that (i)all are white,(ii)one white and two black.

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8. If $(k, 2), (2, 4)$ and $(3, 2)$ are vertices of the triangle of area 4 square units then determine the value of k.

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Part Iii

1. Prove that $\frac{\sin 4x + \sin 2x}{\cos 4x + \cos 2x} = \tan 3x.$

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2. A polygon has 90 diagonals . Find the number of its sides ?

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3. If n is an odd positive integer, prove that the coefficients of the middle terms in the expansion of $(x+y)^n$ are equal.

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4. Find the equation of the line passing through the point (1,5) and also divides the co-ordinate axes in the ratio 3:10

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5. If G is the centroid of a triangle ABC, prove that $\overrightarrow{GA} + \overrightarrow{GB} + \overrightarrow{GC} = \overrightarrow{0}$.

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6. Find $\frac{dy}{dx}$ for $y = \sqrt{1 + 2\tan x}$

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7. Evaluate $\int \frac{\sqrt{x}}{1 + \sqrt{x}} dx$

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8. Find the relation between a and b if $\lim_{x \to 3} f(x)$ exists where $f(x) = \begin{cases} ax + b & \text{if } x > 3 \\ 3ax - 4b + 1 & \text{if } x < 3 \end{cases}$

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Part Iv

1. From the curve $y = |x|$, draw $(i) y = |x - 1| + 1$

$(ii) y = |x + 1| - 1$ $(iii) y = |x + 2| + 3$

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2. Resolve into partial fraction $\frac{x+4}{(x^2-4)(x+1)}$

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3. Count the number of positive integers greater than 6000 and less than 7000 which are divisible by 5, provided that no digits are repeated?

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4. If ${}^nP_r = {}^nP_{r-1}$ and ${}^nC_r = {}^nC_{r-1}$, find the values of n and r.

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5. Differentiate the following s(t) = $\sqrt[3]{\frac{t^3+1}{t^3-1}}$

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6. If $y = A\cos 4x + B\sin 4x$, A and B are constants then show that $y_2 + 16y = 0$

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7. Find the sum up to the 17^{th} term of the series $\frac{1^3}{1} + \frac{1^3+2^3}{1+3} + \frac{1^3+2^3+3^3}{1+3+5} + \ldots$

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8. Find matrix C if A $= \begin{bmatrix} 3 & 7 \\ 2 & 5 \end{bmatrix}, B = \begin{bmatrix} -3 & 2 \\ 4 & -1 \end{bmatrix}$ and 5C+ 2B =A

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9. The probability that a new railway bridge will get an award for its design is 0.48 , the probability that it will get an award for the efficient use of materials is 0.36 , and that it will get both awards is 0.2 . What is the probability , that

(i) it will get at least one of the two awards

(ii) it will get only one of the awards.

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

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11. Evaluate: $I = \int \cot^{-1}\left(\frac{1-x^2}{2x}\right) dx$

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