



MATHS

BOOKS - FULL MARKS MATHS (TAMIL ENGLISH)

SOLVED PAPER 10

Part I

1. If

$$n((A \times B) \cap (A \times C)) = 8 \text{ and } n(B \cap C) = 2$$

then $n(A)$

A. 6

B. 4

C. 8

D. 16

Answer:



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2. The value of $\log_3 \frac{1}{81}$ is

A. -2

B. -8

C. -4

D. -9

Answer:



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3. The value of

$\log_3 11 \cdot \log_{11} 13 \cdot \log_{13} 15 \cdot \log_{15} 27 \cdot \log_{27} 81$ is

A. 1

B. 2

C. 3

D. 4

Answer:



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4. Prove that

$$\sin(45^\circ + \theta) - \sin(45^\circ - \theta) = \sqrt{2} \sin \theta$$

A. $2 \cos \theta$

B. 1

C. 0

D. $2 \sin \theta$

Answer:



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5. If $\tan \alpha$ and $\tan \beta$ are the roots of

$x^2 + ax + b = 0$ then $\frac{\sin(\alpha + \beta)}{\sin \alpha \sin \beta}$ is equal to

A. $\frac{b}{a}$

B. $\frac{a}{b}$

C. $-\frac{a}{b}$

D. $-\frac{b}{a}$

Answer:



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6. If ${}^{a^2-a}C_2 = {}^{a^2-a}C_4$ then the value of a is

.....

A. 2

B. 3

C. 4

D. 5

Answer:



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7. If ${}^n P_r = 360$, ${}^n C_r = 15$ then find the value of $n = \dots\dots\dots$

A. 7

B. 6

C. 5

D. 4

Answer:



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8. If $2x^2 + 3xy - cy^2 = 0$ represents a pair of perpendicular lines then $c = \dots\dots\dots$

A. -2

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

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

D. 2

Answer:



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9. The number of terms in the expansion of

$$\left[(a + b)^2 \right]^{18} = \dots\dots\dots .$$

A. 19

B. 18

C. 36

D. 37

Answer:



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10. The point on the line $2x-3y=5$ is equidistance from $(1,2)$ and $(3,4)$ is

A. (7,3)

B. (4,1)

C. (1,-1)

D. (3,4)

Answer:



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11. If $\begin{bmatrix} 3 & -1 & 2 \end{bmatrix} B = \begin{bmatrix} 5 & 6 \end{bmatrix}$ then the order of B is

A. 3×2

B. 2×3

C. 3×1

D. 1×1

Answer:



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12. If $\lim_{x \rightarrow 0} \frac{\sin px}{\tan 3x} = 4$ then the value of p is

..... .

A. 6

B. 9

C. 12

D. 4

Answer:



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13. The differential co-efficient of $\log_a x$ with respect to $\log_x a$ is

A. 1

B. $-(\log_a x)^2$

C. $(\log_x a)^2$

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

Answer:



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14. $\frac{d}{dx} (e^{x+5 \log x})$ is

A. $e^x x^4 (x + 5)$

B. $e^x x(x + 5)$

C. $e^x + \frac{5}{x}$

D. $e^x - \frac{5}{x}$

Answer:



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15. If $f(x) = x \tan^{-1} x$, then $f'(1)$ is

A. $1 + \frac{\pi}{4}$

B. $\frac{1}{2} + \frac{\pi}{4}$

C. $\frac{1}{2} - \frac{\pi}{4}$

D. 2

Answer:



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16. Ten coins are tossed. The probability of getting at least 8 heads is

A. $\frac{7}{64}$

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

C. $\frac{7}{128}$

D. $\frac{7}{16}$

Answer:



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Part II

1. For a set A , $A \times A$ contains 16 elements and two of its elements are $(1,3)$ and $(0,2)$. Find the elements of A .



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



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3. Find the values of p, q, r and s if

$$\begin{bmatrix} p^2 - 1 & 0 & -31 - q^3 \\ 7 & r + 1 & 9 \\ -2 & 8 & s - 1 \end{bmatrix} = \begin{bmatrix} 1 & 0 & -4 \\ 7 & \frac{3}{2} & 9 \\ -2 & 8 & \pi \end{bmatrix}$$



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4. Find $\left| \vec{a} \times \vec{b} \right|$ where
 $\vec{a} = 3\hat{i} + 4\hat{j}$ and $\vec{b} = \hat{i} + \hat{j} + \hat{k}$

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5. At the given point x_0 discover whether the given function is continuous or discontinuous citing the reasons for your answer:

$$x_0 = 1, f(x) = \begin{cases} \frac{x^2 - 1}{x - 1}, & x \neq 1 \\ 2, & x = 1 \end{cases}$$

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6. Evaluate: $\int x e^{-x^2} dx$



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7. $\int \frac{dx}{x \log x}$:



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8. Evaluate $\left[\left((256)^{-\frac{1}{2}} \right)^{-\frac{1}{4}} \right]^3$



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Part iii

1. Find the largest possible domain for the real valued functions f defined by

$$f(x) = \sqrt{x^2 - 5x + 6}$$



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2. Show that $\tan 15^\circ + \tan 75^\circ = 4$



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3. There are 10 bulbs in a room. Each one of them can be operated independently. Find the number of ways in which the room can be illuminated.



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



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$$5. \text{ If } \begin{vmatrix} a & b & a\alpha + b \\ b & c & b\alpha + c \\ a\alpha + b & b\alpha + c & 0 \end{vmatrix} = 0$$

Prove that a, b, c are in G.P. or α is a root of

$$ax^2 + 2bx + c = 0$$



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6. Evaluate $\lim_{x \rightarrow 3} \frac{x^2 - 9}{x - 3}$ if it exists by finding

$f(3^-)$ and $f(3^+)$



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7. Find the derivation of $\tan^{-1}(1 + x^2)$ with respect to $x^2 + x + 1$.



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8. Evaluate : $\int x^5 e^{x^2} dx$



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9. Prove that the line segments joining the midpoints of the adjacent sides of a

quadrilateral form a parallelogram.



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Part IV

1. Graph the functions $f(x) = x^3$ and $g(x) = \sqrt[3]{x}$ on the same coordinate plane. Find $f \circ g$ and graph it on the plane as well. Explain your results.



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2. If $x = -2$ is one root of $x^3 - x^2 - 17x = 22$ then find the other roots of the equation.



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3. If $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$, show that $A^2 - 4A - 5I = 0$



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4. If ${}^{n+1}C_8 : {}^{n-3}P_4 = 57:16$, find the value of n .



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5. Show that the equation

$$4x^2 + 4xy + y^2 - 6x - 3y - 4 = 0$$

represents a pair of parallel lines. Find the distance between them.



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6. $\frac{1}{6x - 7 - x^2}$



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



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8. A firm manufactures PVC pipes in three plants viz, X, Y and Z. The daily production volumes from the three firm X, Y and Z are

respectively 2000 units, 3000 units and 5000 units. It is known from the past experience that 3 % of the output from plant X, 4 % from plant Y and 2 % from plant Z are defective. A pipe is selected at random from a day's total production

(i) find the probability that the selected pipe is defective one.

(ii) If the selected pipe is a defective, then what is the probability that it was produced by plant Y ?



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