MATHS

BOOKS - FULL MARKS MATHS (TAMIL ENGLISH)

MODEL TEST PAPER

Part I

1. If n $((A \times B) \cap (A \times C)) = 8 \text{and} n(B \cup C) = 2,$ then n (A) is

A. 6

B. 4

C. 8

D. 16

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: C

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3. If $\log_{\sqrt{x}} 0.25 = 4$, then the value of x is

A. 0.5

B. 2.5

C. 1.5

D. 1.25

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. Let $f_4(x) = \frac{1}{k}\left[\sin^k + \cos^k x\right]$ where x $\in \mathbb{R}$ and $k \geq$ 1.

then $f_4(x) - f_6(x) =$

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

B. $\frac{1}{12}$

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

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

Answer:

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6. The number of five digit telephone numbers having at least one of their digits repeated is

A. 90000

B. 10000

C. 30240

D. 69760

Answer:

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7. If ${}^{n}p_{r} = 840, {}^{n}C_{r} = 35$ then n = ...

A. 7

B. 6

C. 5

D. 4

Answer:

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8. The sequence $\frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}+\sqrt{2}}, \frac{1}{\sqrt{3}+2\sqrt{2}}$ form an ..... .

A. A.P

B. G.P

C. H.P

D. AGP

Answer:

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9. The co-efficient of the terms independent of x in the expansion of $\left(2x + \frac{1}{3x}\right)^6$ is ..... .

A. $\frac{160}{27}$

B. `160/9'

C. $\frac{80}{3}$

D. $\frac{80}{9}$

Answer:

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10. The coordinates of the four verties of a quadrilateral are (-2,3),(-1,2),(1,2) and (2,4) taken in order. The equation of the line passing through the vertex $(-1, 2)$ and dividing the quadrilateral in the equal areas is..... .

A. $x + 1 = 0$

B. $x + y = 1$

C. $x + y = 1$

D. $x + y + 3 = 0$

Answer: C

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11. If A is a square matrix, then which of the following is not symmetric ?

A. $A + A^T$

B. AA^T

C. $A^T A$

D. $A - A^T$

Answer:

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12. If ABCD is a parallelogram, then $\overrightarrow{AB} + \overrightarrow{AD} + \overrightarrow{CB} + \overrightarrow{CD}$ is equal to

A. $2\left(\overline{AB}+\overline{AD}\right)$

B. $4\overline{AC}$

C. $4\overline{BD}$

D. $\bar{0}$

Answer:

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13. If (1,2,4) and (2,-3λ, -3) are the initial and terminal points of the vector $\hat{i}+5\hat{j}-7\hat{k}$, then value of λ is equal to

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

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

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

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

Answer:

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14. $\lim_{x \to 0} \frac{8^x - 4^x - 2^x + 1^x}{x^2} =$

A. $2 \log 2$

B. $2(\log 2)^2$

C. $\log 2$

D. $3 \log 2$

Answer:

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15. $\lim_{x \to 1} \frac{e^x - e}{x - 1} = \ldots\ldots\ldots\ldots$

A. 1

B. e

C. ∞

D. 0

Answer: B

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16. 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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17. If $f(x) = \frac{1-\cos x}{1+\cos x}$ then $f\left(\frac{\pi}{2}\right) =$ .....

A. 2

B. 3

C. 4

D. 1

Answer:

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

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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19. A latter is taken at random from the letters of the word "ASSISTANT" and another letter is taken at ronadom from the lettters of the word $\mathrm{STATISTICS}$. The probability that the selected letters are the same is ..... .

A. $\frac{7}{45}$

B. $\frac{17}{90}$

C. $\frac{29}{90}$

D. $\frac{19}{90}$

Answer: D

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Part Ii

1. Find the value of $\cos 36^\circ$

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2. If $\frac{1}{7!} + \frac{1}{9!} = \frac{x}{10!}$, find x

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3. 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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4. Show that $\begin{vmatrix} x+2a & y+2b & z+2c \\ x & y & z \\ a & b & c \end{vmatrix} = 0.$

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5. Evaluate $\lim_{x \to -2} \left(x^3 - 3x + 6\right)\left(-x^2 + 15\right)$

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6. For $x^2 + y^2 = 1$ find $\frac{dy}{dx}$

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7. e^{8-7x}

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8. Given P(Z)=0.52 P (B)=0.43 and $P(A \cap B) = 0.24$ find $P(\overline{A} \cap \overline{B})$

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9. Find the angle between the vectors $2\vec{i} + \vec{j} - \vec{k}$ and $\vec{i} + 2\vec{j} + \vec{k}$

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Part Iii

1. Solve $2|x + 1| - 6 \leq 7$ and graph the solution set in a number line.

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2. Solve the equations for which solution lies in the interval $0^\circ < \theta < 360^\circ$.

$\sin^4 x = \sin^2 x$

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3. There are 5 bulbs in a room. Each one of them can be operated independently. Then the no. of ways in which the room is illuminated I is:

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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 passing, through the point (5,2) and perpendiular to the line joining the points (2,3) and (3,-1).


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6. Prove that the line segments joining the midpoints of the adjacent sides of a quadrilateral form a parallelogram.


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7. Find $\lim_{x \to 0} \dfrac{\sqrt{t^2+9}-3}{t^2}$

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8. Given $y = \cos^{-1}\left(\dfrac{1-x^2}{1+x^2}\right)$ find $\dfrac{dy}{dx}$

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9. Evaluate $\int \dfrac{(x-1)^2}{x^3+x} dx$

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10. Solve $2|x + 1| - 6 \leq 7$ and graph the solution set in a number line.

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11. Solve the equations for which solution lies in the interval $0^\circ < \theta < 360^\circ$.

$\sin^4 x = \sin^2 x$

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12. There are 10 bulbs in a room. Each one of them can be operated indipendently. Find the number of ways in

which the room can be illuminated I is.

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

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14. Using factor theorem prove that

$$\begin{vmatrix} x+1 & 3 & 5 \\ 2 & x+2 & 5 \\ 2 & 3 & x+4 \end{vmatrix} = (x-1)^2(x+9)$$

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15. Prove that the line segments joining the midpoints of the adjacent sides of a quadrilateral form a parallelogram.

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18. Evaluate $\int \frac{(x-1)^2}{x^3+x} dx$

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Part Iv

1. Find the range of the function $\frac{1}{2\cos x - 1}$.

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2. If the equations $x^2 - ax + b = 0$ and $x^2 - ex + f = 0$ have one root in common and if the

second equation has equal roots, then prove that ae = 2 (b + f).

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3. Using binomial theorem, prove that $6^n - 5n$always leaves remainder 1 when divided by 25.

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4. If $.^{n+2}C_8 : {}^{(n-2)}P_4 = 57:16$, find the value of n.

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5. Show that the points (1, 3), (2, 1) and $\left(\frac{1}{2}, 4\right)$ are collinear, by using

concept of slope

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6. The sum of the distance of a moving point from the points (4,0) and (-4,0) is always 10 units. Find the equation to the locus of the moving point.

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7. Verify the property A(B+C) = AB+AC, when the matrices A,B, and C are given by

$$A = \begin{bmatrix} 2 & 0 & -3 \\ 1 & 4 & 5 \end{bmatrix}, B = \begin{bmatrix} 3 & 1 \\ -1 & 0 \\ 4 & 2 \end{bmatrix}, \text{ and } C = \begin{bmatrix} 4 & 7 \\ 2 & 1 \\ 1 & -1 \end{bmatrix}$$

.

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8. Show that the vector $\vec{i} - 2\vec{j} + 3\vec{k}$, $-2\vec{i} + 3\vec{j} - 4\vec{k}$ and $-\vec{j} + 2\vec{k}$ are coplanar.

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9. Evaluate $\int \frac{\cos 2x}{(\sin x + \cos x)^2} dx.$

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10. Evaluate $\int \sin^{-1} x dx.$

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11. Evaluate $\lim_{x \to \frac{\pi}{4}} \frac{4\sqrt{2} - (\cos x + \sin x)^5}{1 - \sin 2x}$

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12. Suppose the chances of hitting a target by a person X is 3 times in 4 shots, by Y is 4 times in 5 shots, and by Z is 2 times in 3 shots. They fire simultaneously exactly one time. What is the probability that the target is damaged by exactly 2 hits ?

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13. Find the range of the function $\frac{1}{2\cos x - 1}$.

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15. Prove that

$$\cos\theta + \cos\left(\frac{2\pi}{3} - \theta\right) + \cos\left(\frac{2\pi}{3} + \theta\right) = 0$$

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16. Using Binomial theorem, prove that $6^n - 5n$ always leaves remainder 1 when divided by 25 for all positive interger n .

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20. Verify the property A(B+C) = AB+AC, when the matrices A,B, and C are given by

$$A = \begin{bmatrix} 2 & 0 & -3 \\ 1 & 4 & 5 \end{bmatrix}, B = \begin{bmatrix} 3 & 1 \\ -1 & 0 \\ 4 & 2 \end{bmatrix}, \text{ and } C = \begin{bmatrix} 4 & 7 \\ 2 & 1 \\ 1 & -1 \end{bmatrix}$$

.

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21. Show that the vector $\vec{i} - 2\vec{j} + 3\vec{k}$, $-2\vec{i} + 3\vec{j} - 4\vec{k}$ and $-\vec{j} + 2\vec{k}$ are coplanar.

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22. Evaluate $\int \frac{\cos 2x}{(\sin x + \cos x)^2} dx$.

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23. Evaluate $\int \sin^{-1} x dx$.

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24. Evaluate : $\lim_{x \to \frac{\pi}{4}} \frac{4\sqrt{2} - (\cos x + \sin x)^5}{1 - \sin 2x}$

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A. 6

B. 4

C. 8

D. 16

Answer:

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

A. B

B. ϕ

C. A

D. none of these

Answer:

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3. If $\log_{\sqrt{x}} 0.25 = 4$ then the value of x is ..... .

A. 0.5

B. 2.5

C. 1.5

D. 1.25

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. Let $f_4(x) = \frac{1}{k}\left[\sin^k + \cos^k x\right]$ where x $\in \mathbb{R}$ and $k \geq$ 1.

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Answer:

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B. 10000

C. 30240

D. 69760

Answer:

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7. If ${}^{n}p_{r} = 840, {}^{n}C_{r} = 35$ then n = ...

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D. 4

Answer:

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8. $\frac{1}{\sqrt{2}+\sqrt{3}}+\frac{1}{\sqrt{3}+\sqrt{4}}$

A. A.P

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9. The coordinates of the four verties of a quadrilateral are (-2,3),(-1,2),(1,2) and (2,4) taken in order. The equation of the line passing through the vertex $(-1, 2)$ and dividing the quadrilateral in the equal areas is..... .

A. $x + 1 = 0$

B. $x + y = 1$

C. $x + y = 1$

D. $x + y + 3 = 0$

Answer: C

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10. Which of the following lines has the greatest y intercept ?

A. $2x + 2y = 4$

B. $x + 2y = 3$

C. $4x + 5y = 6$

D. $3x + 4y = 5$

Answer:

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11. If ABCD is a parallelogram, then $\overrightarrow{AB} + \overrightarrow{AD} + \overrightarrow{CB} + \overrightarrow{CD}$ is equal to

A. $2\left(\overline{AB} + \overline{AD}\right)$

B. $4\overline{AC}$

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Answer:

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12. If (1,2,4) and (2,-3λ, -3) are the initial and terminal points of the vector $\hat{i}+5\hat{j}-7\hat{k}$, then value of λ is equal to

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

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

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

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

Answer:

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A. $2 \log 2$

B. $2(\log 2)^2$

C. $\log 2$

D. $3 \log 2$

Answer:

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14. $\text{Lim}_{x \to 1} \frac{e^x - e}{x - 1} = \ldots\ldots\ldots\ldots$

A. 1

B. e

C. ∞

D. 0

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. If $f(x) = \frac{1 - \cos x}{1 + \cos x}$ then $f\left(\frac{\pi}{2}\right) = \ldots\ldots\ldots\ldots$

A. 2

B. 3

C. 4

D. 1

Answer:

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

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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18. A letter is taken at random from the letters of the word 'ASSISTANT' and another letter is taken at random

from the letters of the word 'STATISTICS'. The probability that the selected letters are the same is

A. $\frac{7}{45}$

B. $\frac{17}{90}$

C. $\frac{29}{90}$

D. $\frac{19}{90}$

Answer:

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