MATHS

BOOKS - FULL MARKS MATHS (TAMIL ENGLISH)

SAMPLE PAPER -19

Sample Paper Unsolved 19

1. If A $= \{(x, y) : y = e^x, x \varepsilon R\}$ and $B = \{(x, y) : y = e^{-x}, x \varepsilon R\}$ then $n(A \cap B)$

is _____

A. Infinity

B. 0

C. 1

D. 2

Answer: C

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2. The value of $(0.32)^{128}$ is _____

A. $\frac{5}{7}$

B. $\frac{7}{5}$

C. 4

D. 2

Answer: B

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3. The maximum value of $4\sin^2 x + 3\cos^2 x + \sin\frac{x}{2} + \cos\frac{x}{2}$ is

A. $4 + \sqrt{2}$

B. $3 + \sqrt{2}$

C. 9

D. 4

Answer: A

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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: A

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5. If $\sin\theta = \frac{24}{25}$ and θ lies in II quadrant, then $\sec\theta + \tan\theta =$ _____

A. -9

B. -5

C. -3

D. -7

Answer: D

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6. There are 10 points in a plane and 4 of them are collinear. The number of straight lines joining any two points is

A. 45

B. 40

C. 39

D. 38

Answer: B

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7. Equation of the straight line that forms are 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: B

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8. The value of the series $\frac{1}{2} + \frac{7}{4} + \frac{13}{8} + \frac{19}{16} +$ ..... is _____

A. 14

B. 7

C. 4

D. 6

Answer: B

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9. The value of $2 + 4 + 6 + ...+ 2n$ is _____

A. $\frac{n(n-1)}{2}$

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

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

D. $n(n+1)$

Answer: D

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10. The value of x for which the matrix $\frac{5}{7}$ is singular is _____

A. 9

B. 8

C. 7

D. 6

Answer: B

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11. What must be the matrix X , is $2X + \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} = \begin{bmatrix} 3 & 8 \\ 7 & 2 \end{bmatrix}$?

A. $\left|\begin{bmatrix} 1 & 3 \\ 2 & -1 \end{bmatrix}\right|$

B. $\left|\begin{bmatrix} 1 & -3 \\ 2 & -1 \end{bmatrix}\right|$

C. $|[(2, 6), (4(-2)]|$

D. $\left|\begin{bmatrix} 2 & -6 \\ 4 & -2 \end{bmatrix}\right|$

Answer: A

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12. The value of $\theta\varepsilon\left(0, \frac{\pi}{2}\right)$ for which the vectors $\vec{a} = (\sin\theta)\hat{i} + (\cos\theta)\hat{j}$ and $\vec{b} = \hat{i} - \sqrt{3}\hat{j} + 2\hat{k}$ are perpendicular is equal to _____

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

B. $\frac{\pi}{6}$

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

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

Answer: A

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13. Find $\lim_{x \to 0} \frac{\sqrt{\cos 2x + 1}}{x} =$ _____

A. 0

B. 1

C. $\sqrt{2}$

D. does not exist

Answer:

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14. A vector $\overrightarrow{OP}$ makes 60° and 45° with the positive direction of the x and y axes repectively. Then the angle between $\overrightarrow{OP}$ and the z axis is _____

A. 45°

B. 60°

C. 90°

D. 30°

Answer: B

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15. Find the value of $\lim_{x \to 3} [x]$= _____

where $[.]$ denotes the greatest integer

A. 2

B. 3

C. does not exist

D. 0

Answer: C

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16. It is given that f'(a) exists,then $\lim_{x \to a} \frac{xf(a) - af(x)}{x - a} is:$

A. $f(a) - af(a)$

B. $f(a)$

C. $-f(a)$

D. $f(a) + af(a)$

Answer: A

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17. $\int \frac{dx}{e^x - 1} dx$ is

A. $\log |e^x| - \log |e^x - 1)| + c$

B. $\log |e^x| + \log|e^x - 1| + c$

C. $\log |e^x - 1| - \log|e^x| + c$

D. $\log |e^x + 1| - \log|e^x| + c$

Answer: C

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18. If $f(x) = \begin{cases} 2a - x, & \text{for} \quad -a < x < a \\ 3x - 2a, & \text{for} \quad x \geq a \end{cases}$

then which of the following is true?

A. f(X) is not differentiable at x=a

B. f(x) is discontinous at x=a

C. f(x) is continuous for all x in R

D. f(x) is differentiable for all $x \geq a$

Answer: A

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19. Let A and B are two events such that $P(\overline{A \cup B}) = \frac{1}{6}, P(A \cap B) = \frac{1}{4}$ and $P(\overline{A}) = \frac{1}{4}$.Then the 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: B

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20. A number is selected from the seet {1,2,3,. . . . . 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: B

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Sample Paper Unsolved 19 Ii

1. Find the general solution of $\sin\theta = -\frac{\sqrt{3}}{2}$

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2. If $.^{15}C_{2r-1} = .^{15}C_{2r+4}$ find r

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3. Compute: 99^4

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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. If D is the midpoint of the side AB of a triagle ABC prove that $\overrightarrow{BC}+\overrightarrow{AC}=-2\overrightarrow{CD}$

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6. Find the points of discontinuity of the function f, where,

$$f(x) = \begin{cases} 4x + 5 & \text{if} \quad x \leq 3 \\ 4x - 5 & \text{if} \quad x > 3 \end{cases}$$

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7. Find $\frac{dy}{dx}$ if $x^2 + y^2 = 1$

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8. Evaluate $\int \frac{1}{\sin^2 x \cos^2 x} dx.$

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9. X speaks truth in 70 percent of cases and Y in 90 percent of cases. What is the probability that they likely to c ontradict each other in stating the same fact?

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Sample Paper Unsolved 19 Iii

1. If the difference of the roots of the equation $2x^2 - (a+1)x + a - 1 = 0$ is equal to their product then prove that a=2

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2. If $\cos\theta + \sin\theta = \sqrt{2}\cos\theta$ then prove that $\cos\theta - \sin\theta = \sqrt{2}\sin\theta$

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3. if the letters of the word FUNNY are permuted in all possible ways and the strings thus formed are arranged in the dictionary order, find the rank of the word FUNNY .

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4. If a,b,c are in geometric progression and if $a^{\frac{1}{x}} = b^{\frac{1}{y}} = c^{\frac{1}{z}}$, then prove that x,y,z are in arithmetic progression.

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5. Find the value of the product $\begin{vmatrix} \log_3 64 & \log_4 3 \\ \log_3 8 & \log_4 9 \end{vmatrix} \times \begin{vmatrix} \log_2 3 & \log_8 3 \\ \log_3 4 & \log_3 4 \end{vmatrix}$

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6. If $\vec{a}$, $\vec{b}$ and $\vec{c}$ are three unit vectors satisfying $\vec{a} - \sqrt{3}\vec{b} + \vec{c} = \vec{0}$ then find the angle between $\vec{a}$ and $\vec{c}$?

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7. Verify the existence of $\lim_{x \to 1} f(x)$, where

$$f(x) = \begin{cases} \frac{|x-1|}{x-1} & \text{for} x \neq 1 \\ 0 & \text{for} x = 1 \end{cases}$$

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8. Evaluate : $\int (x-3)\sqrt{x+2}dx$

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9. Suppose 4 coins are tossed. Find the probability of getting

(i) exactly two heads (ii) at least 2 head (iii) atmost 2 heads

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10. If $f(x) = |x + 100| + x^2$, test whether $f'(100)$ exists.

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Sample Paper Unsolved 19 Iv

1. Expand

$$\left(x^2+\sqrt{1-x^2}\right)^5+\left(x^2-\sqrt{1-x^2}\right)^5$$

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2. Solve: $x^4-7x^3+8x^2+8x-8=0$ given $3-\sqrt{5}$ is a root.

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3. The coordinates of a moving point P are $\left(\frac{a}{2}(co\sec\theta+\sin\theta),\frac{b}{2}(co\sec\theta-\sin\theta)\right)$ where θ is a variable parameter. Show that the equation of the locus of P is $b^2x^2-a^2y^2=a^2b^2$

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4. If $y=\left(\cos^{-1}x\right)^2$ prove that $\left(1-x^2\right)\frac{d^2y}{dx^2}-x\frac{dy}{dx}-2=0$

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5. X speaks the truth in 70 percent of cases, and Y in 90 percent of cases. What is the probabiiity that they likely to contradict each other in stating the same fact ?

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6. Differentiate the following :

$$y = \sin^{-1}\left(\frac{1-x^2}{1+x^2}\right)$$

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