



MATHS

BOOKS - FULL MARKS MATHS (TAMIL ENGLISH)

SAMPLE PAPER - 13

Part I

1. If $g = \{(1, 1), (2, 3), (3, 5), (4, 7)\}$ is a function given by $g(x) = \alpha x + \beta$ then the values of α and β are

A. $(-1, 2)$

B. $(2, -1)$

C. $(-1, -2)$

D. $(1, 2)$

Answer:



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2. In an A.P., the first terms is 1 and the the common difference is 4. How many terms of the A.P. must be taken for their sum to be equal to 120?

A. 6

B. 7

C. 8

D. 9

Answer:



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3. The value of

$$(1^3 + 2^3 + 3^3 + \dots + 15^3) - (1 + 2 + 3 + \dots + 15)$$

is

A. 14400

B. 14200

C. 14280

D. 14520

Answer:



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4. Graph of a linear polynomial is a

A. straight line

B. circle

C. parabola

D. hyperbola

Answer:



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5. Transpose of a columns matrix is

- A. unit matrix
- B. diagonal matrix
- C. column matrix
- D. row matrix

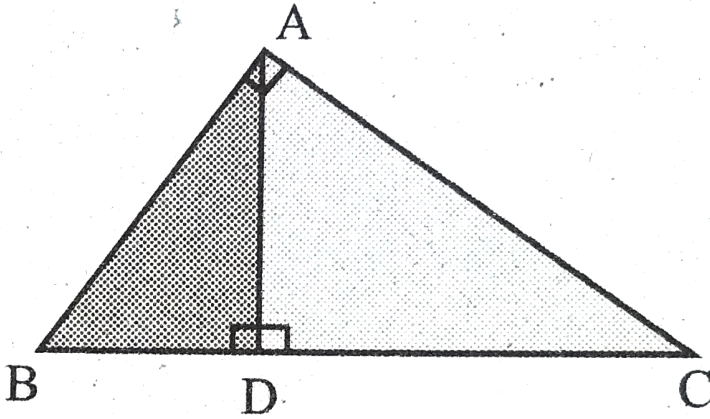
Answer:



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6. In the adjacent figure

$\angle BAC = 90^\circ$ and $AD \perp BC$ then



A. $BD \cdot CD = BC^2$

B. $AB \cdot AC = BC^2$

C. $BD \cdot CD = AD^2$

D. $AB \cdot AC = AD^2$

Answer:



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7. If A is a point on the Y-axis whose ordinate is 8 and B is a point on the X-axis whose abscissae is 5 then the equation of the line AB is ____.

A. $8x + 5y = 40$

B. $8x - 5y = 40$

C. $x = 8$

D. $y = 5$

Answer:



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8. $\tan \theta \operatorname{cosec}^2 \theta - \tan \theta$ is equal to

A. $\sec \theta$

B. $\cot^2 \theta$

C. $\sin \theta$

D. $\cot \theta$

Answer:



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9. In a hollow cylinder, the sum of the external and internal radii is 14 cm and the width is 4 cm. If its height is 20 cm, the volume of the material in it is

A. $560\pi cm^3$

B. $1120\pi cm^3$

C. 56π

D. 360π

Answer:



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10. A purse contains 10 notes of Rs. 2000, 15 notes of Rs. 500, and 25 notes of Rs. 200. One note is drawn at random. What is the probability that the note is either a Rs. 500 note or Rs. 200 note ?

A. $\frac{1}{5}$

B. $\frac{3}{10}$

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

D. $\frac{4}{5}$

Answer:



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11. Variance of first 20 natural numbers is

A. 32.25

B. 44.25

C. 33.25

D. 30

Answer:



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12. If x , $2x + 2$, $3x + 3$ are in G.P. then $5x$, $10x + 10$, $15x + 5$ form

A. An A.P

B. a G.P.

C. a constant sequence

D. neither A.P nor G.P.

Answer:

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13. Simplify the identity $\frac{\sin \theta}{\operatorname{cosec} \theta} + \frac{\cos \theta}{\sec \theta}$ the result is

A. 2

B. -2

C. 1

D. -1

Answer:



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14. The standard deviation of a collection data is $5\sqrt{5}$

.If each value is multiplied by 3 then the new variance

of the new data is

A. $15\sqrt{5}$

B. $2\sqrt{6}$

C. 1125

D. 225

Answer:



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Part II

1. Let $f = \{(x, y) \mid x, y \in N \text{ and } y = 2x\}$ be a relation on N . Find the domain, co-domain and range.

Is this relation a function?



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2. Find the value of k , such that $f \circ g = g \circ f$

$$f(x) = 2x - k, g(x) = 4x + 5$$



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3. Find the remainders when 70004 and 778 is divided by 7.



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4. The sum of the squares of the first n natural numbers is 285, while the sum of their cubes is 2025. Find the values of n .



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5. Solve $2x^2 - 2\sqrt{6}x + 3 = 0$



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6. Find the square root of the following rational expressions.

$$\frac{7x^2 + 2\sqrt{14}x + 2}{x^2 - \frac{1}{2}x + \frac{1}{16}}$$



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7. Solve for x, y, $\begin{bmatrix} x^2 \\ y^2 \end{bmatrix} + 2\begin{bmatrix} -2x \\ -y \end{bmatrix} = \begin{bmatrix} 5 \\ 8 \end{bmatrix}$

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8. In a $\triangle ABC$, AD is the bisector of $\angle A$ meeting side BC at D, if $AB=10$ cm, $AC=14$ cm and $BC=6$ cm, find BD and DC.

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9. If the straight lines $12y = -(p+3)x + 12$, $12x - 7y = 16$ are perpendicular then find 'p'.



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10. A kite is flying at a height of 60 m above the ground. The string attached to the kite is tied at the ground it makes an angle of 60° . Assuming that the string is straight, find the length of the string .
($\sqrt{3} = 1.732$)



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11. The standard deviation of some temperature data in degree celsius ($^\circ C$) is 5. If the data were converted

into degree Fahrenheit ($^{\circ}F$) then what is the variance ?

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12. Let $A = \{1, 2, 3, 4, 5\}$, $B = N$ and $f: A \rightarrow B$ be defined by $f(x) = x^2$. Find the range of f . Identify the type of function.

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13. Three dies are thrown together. Find the probability of getting a total of at least 6.

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14. If the radius of a sphere is doubled, what is the ratio of the volume of the first sphere to that of second.

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Part Iii

1. If the function f is defined by

$$f(x) = \{(x + 2, \text{ if } x > 1), (2 \text{ if } -1 \leq x \leq 1)$$

$\}, (x - 1 \text{ if } -3 < x < -1) : \}$ find the values of

$f(-1.5)$



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2. Find x if $g \circ f(x) = f \circ g(x)$, given $f(x) = 3x + 1$ and $g(x) = x + 3$.



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3. Find the remainder when 2^{81} is divided by 17.



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4. Find the sum to n terms of the series

$3 + 33 + 333 + \dots$ to n terms.



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5. Solve :

$$\frac{1}{2x} + \frac{1}{4y} - \frac{1}{3z} = \frac{1}{4}, \frac{1}{x} = \frac{1}{3y}, \frac{1}{x} - \frac{1}{5y} + \frac{4}{z} = 2\frac{2}{15}$$



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6. A girl is twice as old as her sister. Five years hence, the product of their ages (in years) will be 375. Find their present ages.



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7. $A = \begin{bmatrix} 3 & 0 \\ 4 & 5 \end{bmatrix}$, $B = \begin{bmatrix} 6 & 3 \\ 8 & 5 \end{bmatrix}$, $C = \begin{bmatrix} 3 & 6 \\ 1 & 1 \end{bmatrix}$ find the matrix D , such that $CD - AB = 0$.



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8. Find the equation of a straight line through the point of intersection of the lines $8x + 3y = 18$, $4x + 5y = 9$ and bisecting the line segment joining the points $(5, -4)$ and $(-7, 6)$.



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9. Prove that

$$\frac{\sin A}{\sec A + \tan A - 1} + \frac{\cos A}{\operatorname{cosec} A + \cot A - 1} = 1$$

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10. A solid right circular cone of diameter 14 cm and height 8 cm is melted to form a hollow sphere. If the external diameter of the sphere is 10 cm, find the internal diameter.

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11. The probability that a student will pass the final examination in both English and Tamil is 0.5 and the probability of passing neither is 0.1 . If the probability of passing the English examination is 0.75, what is the probability of passing the Tamil examination ?



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12. A trader bought a number of articles for Rs 1200. Ten were damaged and he sold each of the rest at Rs 2 more than what he paid for it, thus clearing a profit of Rs 60 on the whole transaction. Find the number of articles he bought.

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13. Find the equation of the straight lines each passing through the points $(6, -2)$ and whose sum of the intercepts is 5.

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14. The mean and the standard deviation of a group of 20 items was found to be 40 and 15 respectively. While checking it was found that an item 43 was wrongly written as 53 Calculate the correct mean and standard deviation.



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Part Iv

1. Take a point which is 11 cm away from the centre of a circle of radius 4 cm and draw the two tangents to the circle from that point.

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2. Draw the graph of $y = x^2 - 6x + 9$ and hence solve $x^2 - 6x + 9 = 0$.

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3. Draw the graph of $y = x^2 + 2x + 5$ and discuss the nature of solution.



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