



MATHS

BOOKS - SURA MATHS (TAMIL ENGLISH)

COMMON HALFYEARLY EXAMINATION-2019

Part I

1. The range of the relation $r = \{(x, x^2) \mid x \text{ is a prime number less than } 13\}$ is

- A. $\{2, 3, 5, 7\}$
- B. $\{2, 3, 5, 7, 11\}$
- C. $\{4, 9, 25, 49, 121\}$
- D. $\{1, 4, 9, 25, 28, 121\}$

Answer: C



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2. If $f(x) = 2x^2$ and $g(x) = \frac{1}{3x}$. Then fog is

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

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

C. $\frac{2}{9x^2}$

D. $\frac{1}{6x^2}$

Answer: C



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3. If the H.C.F. of 65 and 117 is expressible in the form of $65m - 117$, then the value of m is

A. 4

B. 2

C. 1

D. 3

Answer: B



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4. If the sequence t_1, t_2, t_3, \dots are in A.P. then the sequence $t_6, t_{12}, t_{18}, \dots$ is

A. G.P.

B. A.P.

C. neither A.P. nor G.P.

D. a constant sequence

Answer: B



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5. $\frac{x}{x^2 - 25} - \frac{8}{x^2 + 6x + 5}$ gives

A. $\frac{x^2 - 7x + 40}{(x^2 - 25)(x + 1)}$

B. $\frac{x^2 + 7x + 40}{(x - 5)(x + 5)(x + 1)}$

C. $\frac{x^2 - 7x + 40}{(x^2 - 25)(x + 1)}$

D. $\frac{x^2 + 10}{(x^2 - 25)(x + 1)}$

Answer: C



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6. Find the matrix X if $2X + \begin{bmatrix} 1 & 3 \\ 5 & 7 \end{bmatrix} = \begin{bmatrix} 5 & 7 \\ 9 & 5 \end{bmatrix}$

A. $\begin{bmatrix} -2 & -2 \\ 2 & -1 \end{bmatrix}$

B. $\begin{bmatrix} 2 & 2 \\ 2 & -1 \end{bmatrix}$

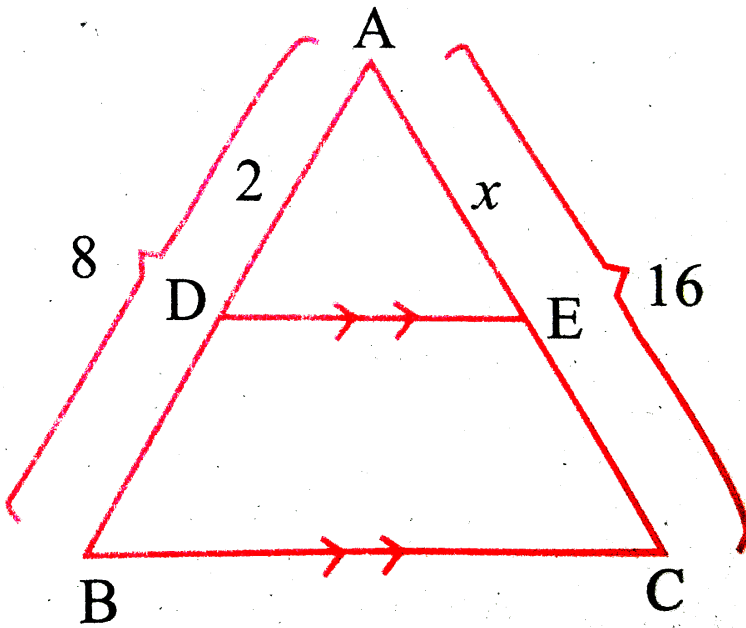
C. $\begin{bmatrix} 1 & 2 \\ 2 & 2 \end{bmatrix}$

D. $\begin{bmatrix} 2 & 1 \\ 2 & 2 \end{bmatrix}$

Answer: B

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7. In the given figure, the value of x is



A. 2

B. 8

C. 4

D. 12

Answer: C



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8. The area of triangle formed by the points $(-5, 0)$, $(0, -5)$ and $(5, 0)$ is

A. 0 sq.units

B. 12 sq.units

C. 5 sq.units

D. None of these

Answer: B



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9. $(2, 1)$ is the points of intersection of two lines

A. $x - y - 3 = 0, 3x - y - 7 = 0$

B. $x + y = 3, 3x + y = 7$

C. $3x + y = 3, x + y = 7$

D. $x + 3y - 3 = 0, x - y - 7 = 0$

Answer: B



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10. $\cos 60^\circ \sin 30^\circ + \cos 30^\circ \sin 60^\circ = \underline{\hspace{1cm}}$.

A. 90°

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

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

D. 1

Answer: D



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11. The height of a right circular cone whose radius is 3 cm and slant height is 5 cm will be

- A. 12 cm
- B. 4 cm
- C. 13 cm
- D. 5 cm

Answer: B



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12. The total surface area of a hemi-sphere is how much times the square of its radius.

A. π

B. 4π

C. 3π

D. 2π

Answer: C



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13. The standard deviation of a data is 5. If each value is multiplied by 2, then the new variance is

A. 3

B. 100

C. 10

D. 225

Answer: B

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14. A page is selected at random from a book. The probability that the digit at units place of the page number chosen is less than 7 is

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

B. $\frac{7}{10}$

C. $\frac{3}{9}$

D. $\frac{7}{9}$

Answer: B

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Part II

1. Let $A = \{1, 2, 3, 4\}$ and $B = N$, Let $f: A \rightarrow B$ be defined by $f(x) = x^3$ then,

Find the range of f .

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2. Let $A = \{1, 2, 3, 4\}$ and $B = N$. Let $f: A \rightarrow B$ to defined by $f(x) = x^3$ then, identify the type of function

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3. a and b are two positive integers such that $a^b \times b^a = 800$. Find the a and b .

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4. Show that the sequence described by $a_n = \frac{1}{3}n + \frac{1}{6}$ is an A.P.

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5. Find the sum of $1 + 3 + 5 + \dots + 55$



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6. If α and β are the roots of $x^2 + 6x - 4 = 0$, find the values of $(\alpha - \beta)^2$.



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7. If $A = \begin{bmatrix} 5 & 2 & 2 \\ -\sqrt{17} & 0.7 & \frac{5}{2} \\ 8 & 3 & 1 \end{bmatrix}$ then verify $(A^T)^T = A$.



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8. The line through the points $(-2, a)$ and $(9, 3)$ has slope $\frac{-1}{2}$. Find the value of a .



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9. Find the area of the triangle formed by the points.

$(1, -1), (-4, 6), (-3, -5)$



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10. Find the angle of elevation of the top of a tower from a point on the ground, which is 30 m away the foot of a tower of height $10\sqrt{3}$ m.



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11. The volume of a solid right circular cone is 11088cm^3 . If its height is 2 cm then find the radius of the cone.



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12. An aluminium sphere of radius 15 cm is melted to make a cylinder of radius 10 cm. Find the height of the cylinder.



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13. If the range and the smallest value of a set of data are 36.5 and 13.4 respectively, then find the largest value.



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14. A coin is tossed twice. What is the probability of getting exactly one head ?



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Part Iii

1.

Let

$A = \{\xi \in N \mid 1 < x < 4\}$, $B = \{\xi \in W \mid 0 \leq x < 2\}$ and $C = \{\xi \in N \mid x < \dots\}$

. Then verify the $A \times (B \cap C) = (A \times B) \cap (A \times C)$.

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2. Find the value of k , such that $f \circ g = g \circ f$ if $f(x) = 3x + 2$, $g(x) = 6x - k$.

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3. In a Geometric Progression the 4th term is 8 and the 8th term is $\frac{128}{625}$.

Find the Geometric Progression.

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4. Rekha has 15 square colour papers of sizes 10 cm, 11 cm, 12 cm, ..., 24 cm. How many can be decorated with these colour papers?

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5. Solve $x + y + z = 5$; $2x - y + z = 9$; $x - 2y + 3z = 16$.



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6. If $9x^4 + 12x^3 + 28x^2 + ax + b$ is perfect square, find the values of a and b .



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7. Two dice are rolled together. Find the probability of getting a doublet or sum of faces as 4.



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8. Let $A = \begin{bmatrix} 1 & 2 \\ 1 & 3 \end{bmatrix}$, $B = \begin{bmatrix} 4 & 0 \\ 1 & 5 \end{bmatrix}$, $C = \begin{bmatrix} 2 & 0 \\ 1 & 2 \end{bmatrix}$, show that $(A - B)^T = A^T - B^T$.



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9. State and prove Pythagoras theorem.

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10. $A(-3, 0)$, $B(10, -2)$ and $C(12, 3)$ are the vertices of $\triangle ABC$.

Find the equation of an altitude through A.

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11. From a point on the ground, the angles subtended at the top of a 30m high building are 45° and 60° respectively. Find the height of the tower. ($\sqrt{3} = 1.732$).

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12. A doll is made by surmounting a cone on a hemisphere of equal radius. The radius of the hemisphere is 7cm and slant height of the cone

is 11cm. Find the surface area of doll.

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13. If the roots of $(a - b)x^2 + (b - c)x + (c - a) = 0$ are equal, prove that $2a = b + c$.

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Part Iv

1. Construct a triangle similar to a given triangle PQR with its sides equal to $\frac{3}{5}$ of the corresponding sides of the triangle PQR. (Scaler factor $\frac{3}{5} < 1$).

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2. Draw a tangent to the circle from the point P having radius 3.6 cm and centre at O. Point P is at a distance 7.2 cm from the centre.



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3. Graph the following quadratic equations and state their nature of solutions.

$$x^2 - 9x + 20 = 0$$



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