

MATHS

BOOKS - FULL MARKS MATHS (TAMIL ENGLISH)

SAMPLE PAPER - 14 (UNSOLVED)

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, 49, 121 }

Answer:



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2. Euclid's division lemma states that for positive integers a and b , there exist unique integers q and r such that $a = bq + r$, where r must satisfy.

A. $1 < r < b$

B. $0 < r < b$

C. $0 \leq r < b$

D. $0 < r \leq b$

Answer:



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3. The n^{th} term of the sequence $\frac{1}{2}, \frac{3}{4}, \frac{7}{8}, \frac{15}{16}, \dots$ is

A. $\frac{1}{24}$

B. $\frac{1}{27}$

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

D. $\frac{1}{81}$

Answer:



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4. The number of points of intersection of the quadratic polynomial $x^2 + 4x + 4$ with the X axis.

A. 0

B. 1

C. 0 or 1

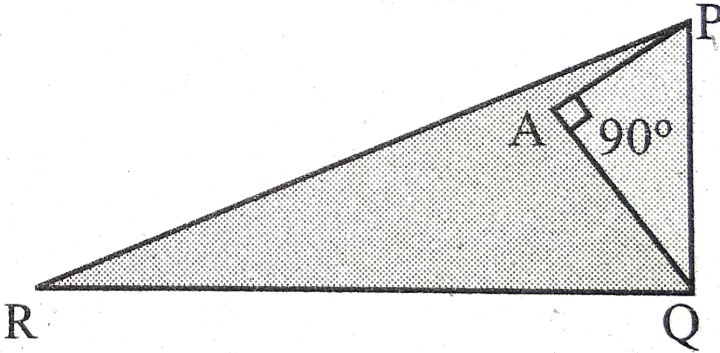
D. 2

Answer:



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5. In the given figure, $PR = 26$ cm, $QR = 24$ cm, $\angle PAQ = 90^\circ$, $PA = 6$ cm and $QA = 8$ cm. Find $\angle PQR$



A. 80°

B. 85°

C. 75°

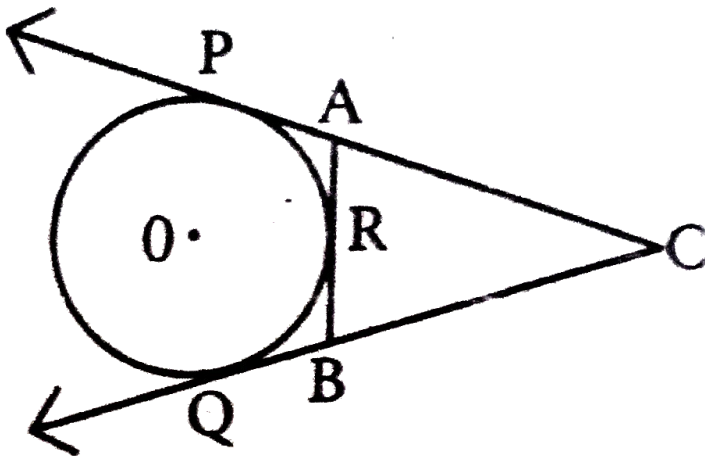
D. 90°

Answer:



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6. In figure CP and CQ are tangents to a circle with centre at O . ARB is another tangent touching the circle at R . If $CP = 11\text{cm}$ and $BC = 7\text{cm}$, then the length of BR is ___.



A. 6 cm

B. 5 cm

C. 8 cm

D. 4 cm

Answer:



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7. The electric pole subtends an angle of 30° at a point on the same level as its foot. At a second point 'b' metres above the first, the depression of the foot of the tower is 60° . The height of the tower (in towers) is equal to

A. $\sqrt{3}b$

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

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

D. $\frac{b}{\sqrt{3}}$

Answer:



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8. If the radius of the base of a cone is tripled and the height is doubled then the volume is

A. made 6 times

B. made 8 times

C. made 12 times

D. unchanged

Answer:



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9. If the standard deviation of x, y, z is p then the standard deviation of $3x + 5, 3y + 5, 3z + 5$ is ___.

A. $3p + 5$

B. $3p$

C. $p + 5$

D. $9p + 15$

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. If $f: A \rightarrow B$ is a bijective function and if $n(A) = 5$, then $n(B)$ is equal to ____.

A. 7

B. 8

C. 5

D. 3

Answer:



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12. The quadratic equation whose roots are $3 + \sqrt{7}$, $3 - \sqrt{7}$ is _____.

A. $x^2 + 6x - 2 = 0$

B. $6x^2 - \sqrt{2x} + 1 = 0$

C. $x^2 - 6x + 2 = 0$

D. $x^2 - 6x - 2 = 0$

Answer:



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13. If the volume of a sphere is $\frac{9}{16}\pi$ cu. Cm then its radius is _____ .

A. $\frac{4}{3}cm$

B. $\frac{3}{4}cm$

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

D. $\frac{2}{3}cm$

Answer:



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Part ii

1. Let $A = \{1, 2, 3, 7\}$ and $B = \{3, 0, -1, 7\}$, which of the following are relation from A to B?

$$R_1 = \{(2, 1), (7, 1)\}$$



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2. Let f be a function from \mathbb{R} to \mathbb{R} defined by $f(x) = 3x - 5$. Find the values of a and b given that $(a, 4)$ and $(1, b)$ belong to f .



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3. Prove that the square of any integer leaves the remainder either 0 or 1 when divided by 4.



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4. How many terms of the series $1^3 + 2^3 + 3^3 + \dots$ should be taken to get the sum 14400?



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5. Find the LCM of the given expressions.

$$2x^2 - 5x - 3, 4x^2 - 36$$



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6. If a polynomial $p(x) = x^2 - 5x - 14$ is divided by another polynomial $q(x)$ we get $\frac{x - 7}{x + 2}$, find $q(x)$.



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7. If $A = \begin{bmatrix} 2 & -2\sqrt{2} \\ \sqrt{2} & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 2\sqrt{2} \\ -\sqrt{2} & 2 \end{bmatrix}$

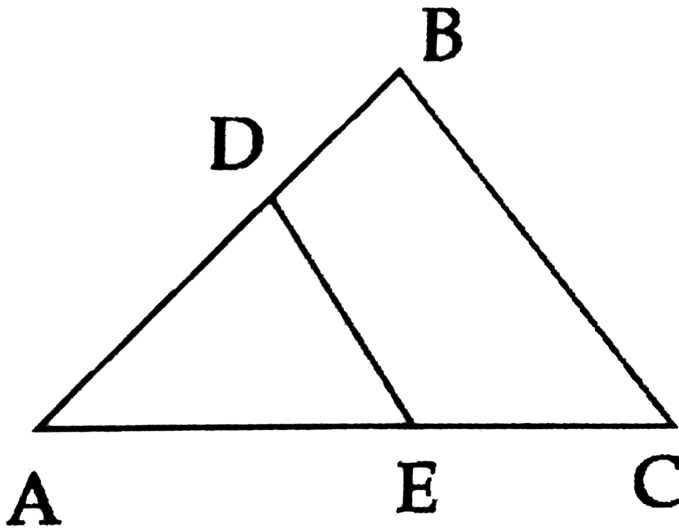
Show that A and B satisfy commutative property with

respect to matrix multiplication.



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8. Point D and E are the points on sides AB and AC such that $AB = 5.6$, $AD = 1.4$, $AC = 7.2$ and $AE = 1.8$. Show that $DE \parallel BC$.



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9. In the each of the following, find the value of 'a' for which the given points are collinear.

$(2, 3)$, $(4, a)$ and $(6, -3)$



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10.

Prove

that

$$\left(\frac{\cos^3 A - \sin^3 A}{\cos A - \sin A} \right) - \left(\frac{\cos^3 A + \sin^3 A}{\cos A + \sin A} \right) = 2 \sin A \cos A$$



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11. The volumes of two cones of same base radius are 3600cm^3 and 5040cm^3 . Find the ratio of heights.



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12. What will be the probability that a non-leap year will have 53 Saturdays?



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13. If $n = 15$, $\bar{x} = 10$ and $\Sigma x^2 = 1530$ then find its standard deviation.



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14. Solve $\sqrt{\frac{x}{4}} + 25\sqrt{\frac{4}{x}} = 10$

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Part ii

1. let $A = \{1, 2, 3, 4\}$ and $B = \{2, 5, 8, 11, 14\}$ be two sets. Let $f : A \rightarrow B$ be a function given by $f(x) = 3x - 1$. Represent this function (i) by arrow diagram (ii) in a table form (iii) as a set of ordered pairs (iv) in a graphical form

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2. If $f(x) = x^2$, $g(x) = 3x$ and $h(x) = x - 2$. Prove that $(f \circ g) \circ h = f \circ (g \circ h)$.



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3. A milk man has 175 litres of cow's milk and 105 litres of buffalow's milk. He wishes to sell the milk by filling the two type of milk is cans of equal capacity. Calculate the following

Capacity of a can.



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4. Find the least positive integer n such that

$$1 + 6 + 6^2 + \dots + 6^n > 5000$$



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5. The sum of thrice the first number, second number and twice the third number is 5. If thrice the second number is subtracted from the sum of first number and, thrice the third we get 2. If the third numbers is subtracted from the sum of twice the first, thrice the second, we get 1. Find the numbers.



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6. Find the values of m and n if the following expression are perfect squares.

$$x^4 - 8x^3 + mx^2 + nx + 16$$



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7. Given $A = \begin{bmatrix} p & 0 \\ 0 & 2 \end{bmatrix}$, $B = \begin{bmatrix} 0 & q \\ 1 & 0 \end{bmatrix}$, $C = \begin{bmatrix} 2 & -2 \\ 2 & 2 \end{bmatrix}$

and If $BA = C^2$, find p and q.



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8. State and prove Pythagoras theorem.



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9. Let $P(11, 7)$, $Q(13.9, 4)$ and $R(9.5, 4)$ be the mid points of the sides AB , BC and AC respectively of $\triangle ABC$. Find the coordinates of the vertices A , B , and C . Hence find

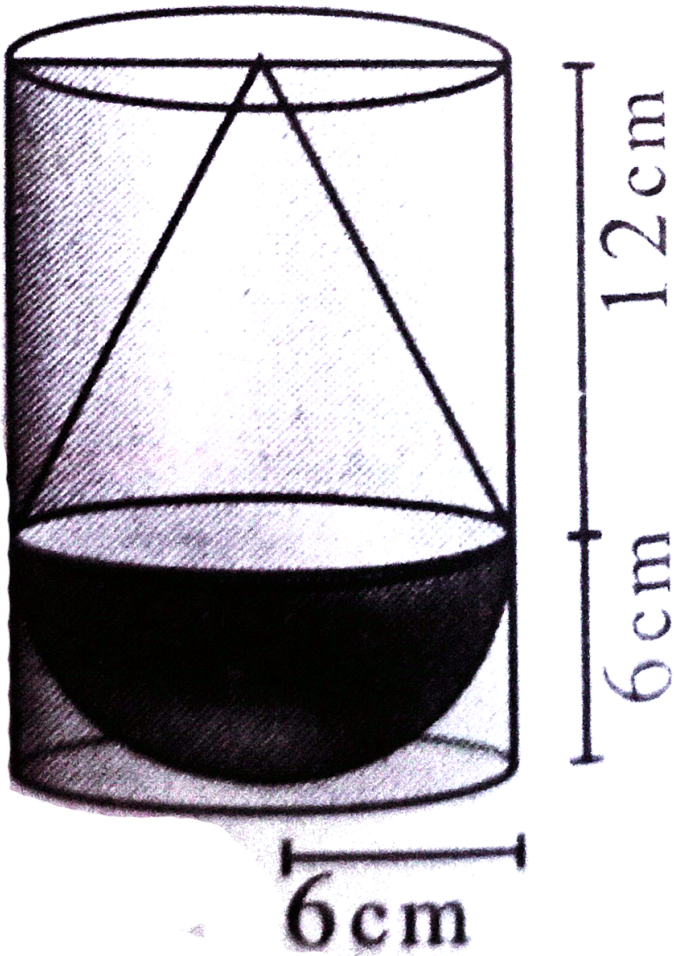
the area of $\triangle ABC$ and compare this with area of $\triangle PQR$.



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10. A solid consisting of a right circular cone of height 12 cm and radius 6 cm standing on a hemisphere of radius 6 cm is placed upright in a right circular cylinder full of water such that it touches the bottom. Find the volume of the water displaced out of the cylinder, if the radius

of the cylinder is 6 cm and height is 18 cm.



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11. The mean and standard deviation of 15 observations are found to be 10 and 5 respectively. On rechecking it was found that one of the observation with value 8 was incorrect. Calculate the correct mean and standard deviation if the correct observation value was 23 ?



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12. If $\sec \theta = x + \frac{1}{4x}$, then $\sec \theta + \tan \theta =$



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13. If the coordinates of two points A and B are (3,4) and (5, -2) respectively. Find the coordinates of any point P if $PA = PB$ and area of $\triangle PAB = 10$ sq. units.



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14. The rain water from a roof of $22m \times 20m$ drains into a cylindrical vessel having diameter of base 2m and height 3.5 m. If the vessel is first full, find the rain fall in cm.



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1. Draw the two tangents from a point which is 5 cm away from the centre of a circle of diameter 6 cm. Also, measure the lengths of the tangents.

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2. Construct a $\triangle ABC$ such that $AB = 5.5\text{cm}$, $\angle C = 25^\circ$ and the altitude from C to AB is 4 cm.

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

$$2x^2 + x - 10 = 0$$



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