

MATHS

BOOKS - SURA MATHS (TAMIL ENGLISH)

SURAS MODEL QUESTION PAPER-2019

Part I

1. If there are 1024 relations from a set $A = \{1, 2, 3, 4, 5\}$ to a set B, then the number of elements in B is

A. 3

B. 2

C. 4

D. 8

Answer: B



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2. $f(x) = (x + 1)^3 - (x - 1)^3$ represents a functions which is

A. linear

B. cubic

C. reciprocal

D. quadratic

Answer: D



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3. If 6 times of 6th term of an A.P. is equal to 7 times term, then the 13th term of the A.P. is

A. 0

B. 6

C. 7

D. 13

Answer: A



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4. Let $A = \{1, 2, 3, 4\}$ and $B = \{a, b, c\}$. Which of the following is a relation from A to B.

A. $\{(1, b), (1, c), (3, a), (4, b)\}$

B. $\{(1, a), (b, 4), (c, 3)\}$

C. $\{(1, a), (a, 1), (2, b), (b, 2)\}$

D. $\{(a, 4), (b, 3), (c, 2)\}$

Answer: A



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5. The values of a and b if $4x^4 - 24x^3 + 76x^2 + ax + b$ is a perfect square are

A. 100, 120

B. 10, 12

C. $-120, 100$

D. 12, 10

Answer: C



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6. If $r(x) = 0$ when $f(x)$ is divided by $g(x)$ then $g(x)$ is called ___ of the polynomials.

- A. Divided
- B. quotient
- C. remainder
- D. GCD

Answer: D



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7.

If

$\triangle ABC, DE \parallel BC, AB = 3.6m, AC = 2.4cm$ and $AD = 2.1cm$

then the length of $AE =$

A. 1.4 cm

B. 1.8 cm

C. 1.2 cm

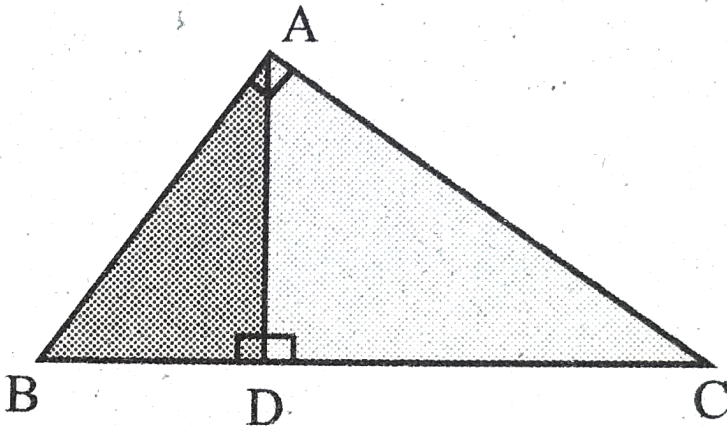
D. 1.05 cm

Answer: A



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8. 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: C



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9. If $(5, 7)$, $(3, p)$ and $(6, 6)$ are collinear, then the value of p is

A. 3

B. 6

C. 9

D. 12

Answer: C



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10. When proving that quadrilateral is a trapezium it is necessary to show ____.

A. Two sides are parallel

B. Two parallel and two non-parallel sides

C. Opposite sides are parallel

D. All sides are of equal length

Answer: B



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11. The sum of the all the observations divided by number of observation is___.

A. mean

B. mean error

C. vaiance

D. standard deviation

Answer: A



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12. The angle of depression of the top and bottom of 20m tall building from the top of a multistoried building are 30° and 60° respectively. The height of the multi storied building and the distance between two building (in meters) is ___.

A. 20, $10\sqrt{3}$

B. 30, $5\sqrt{3}$

C. 20, 10

D. 30, $10\sqrt{3}$

Answer: D



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13. 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. $5600\pi cm^3$

B. $11200\pi cm^3$

C. $56\pi cm^3$

D. $3600\pi cm^3$

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. A Relation R is given by the set $\{(x, y) \mid y = x + 3, x \in \{0, 1, 2, 4, 5\}\}$. Determine its domain and range.

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2. Let $f = \{(-1, 3), (0, -1), (2, -9)\}$ be linear function from Z into Z . Find $f(x)$.

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3. Find all positive integers which when divided by 3 leaves remainder 2.

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4. Find the a_8 and a_{15} whose n th term is

$$a_n = \begin{cases} \frac{n^2-1}{n+3}, & n \text{ is even}, n \in \mathbb{N} \\ \frac{n^2}{2n+1}, & n \text{ is odd}, n \in \mathbb{N} \end{cases}$$

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5. Find the LCM of each pair of the following polynomials

$$a^2 + 4a - 12, a^2 - 5a + 6 \text{ whose GCD is } a-2$$

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

$$\frac{121(a+b)^8(x+y)^8(b-c)^8}{81(b-c)^4(a-b)^{12}(b-c)^4}$$

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7. In $\triangle ABC$, D and E are points on the sides AB and AC respectively such that $DE \parallel BC$. If $\frac{AD}{DB} = \frac{3}{4}$ and $AC = 15\text{cm}$ find AE.

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8. A man goes 18 m due east and then 24 m due north. Find the distance of his current position from the starting point ?

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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 equation of the line whose intercepts on the x and y axes are given below.

$$4, -6$$

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11. Prove the below identities

$$\cot \theta + \tan \theta = \sec \theta \operatorname{cosec} \theta$$

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12. If the ratio of radii of two spheres is 4 : 7 , find the ratio of their volumes.

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13. Find the range and coefficient of range of the following data.

(i) 63,89,98,125,79,108,117,68

(ii) 43.5,13.6,18.9,38.4,61.4,29.8

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14. If $P(A) = \frac{2}{3}$, $P(B) = \frac{2}{5}$, $P(A \cup B) = \frac{13}{15}$ then find $P(A \cap B)$.

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1. In each of the following cases state whether the functions is bijective or not. Justify your answer:

$$f: \mathbb{R} \rightarrow \mathbb{R} \text{ defined by } f(x) = 2x + 1$$

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2. In each of the following cases state whether the functions is bijective or not. Justify your answer:

$$f: \mathbb{R} \rightarrow \mathbb{R} \text{ defined by } f(x) = 3 - 4x^2$$

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3. Let $A, B, C \in \mathbb{N}$ and a function $f: A \rightarrow B$ be defined by $f(x) = 2x + 1$ and $g: B \rightarrow C$ be defined by $g(x) = x^2$. Find the

range of fog and gof.



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4. If d is the Highest Common Factor of 32 and 60, find x and y satisfying $d = 32x + 60y$.



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5. Find the middle term(s) of an A.P. 9, 15, 21, 27, ..., 183



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6. Find the GCD for each pair of the following polynomials

$12(x^4 - x^3)$, $8(x^4 - 3x^3 + 2x^2)$ whose LCM is $24^3(x - 1)(x - 2)$



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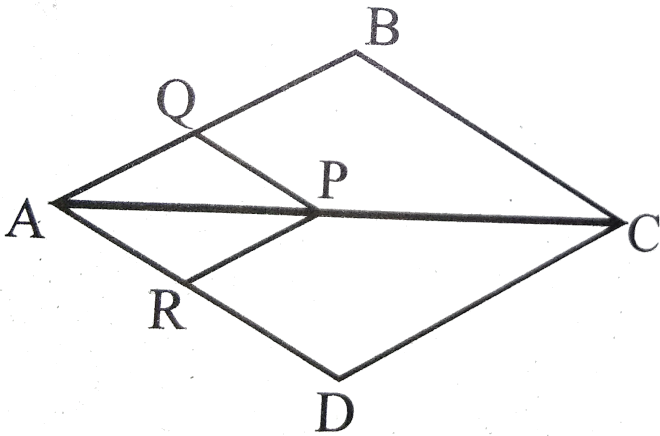
7. Solve the following quadratic equation by completing the square method

$$9x^2 - 12x + 4 = 0$$

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8. In fig. if $PQ \parallel BC$ and $PR \parallel CD$ prove that

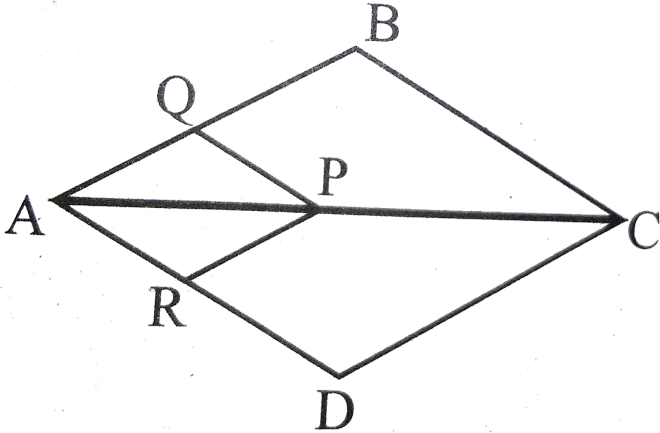
$$(i) \frac{AR}{AD} = \frac{AQ}{AB} \quad (ii) \frac{QB}{AQ} = \frac{DR}{AR}.$$



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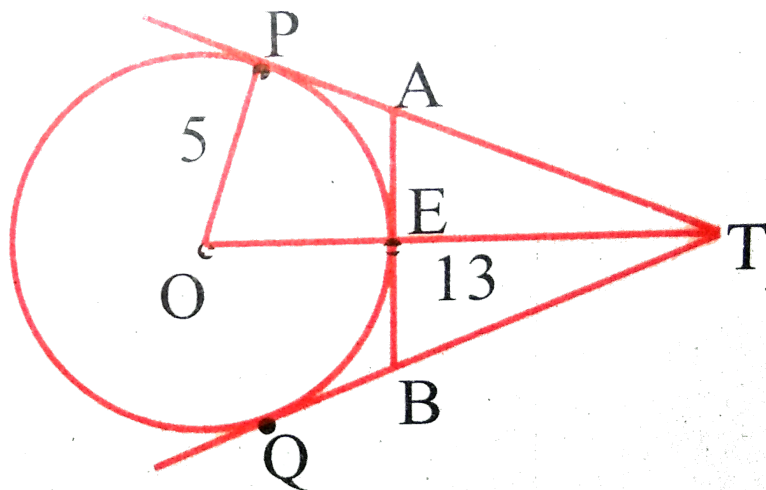
$$(i) \frac{AR}{AD} = \frac{AQ}{AB} \quad (ii) \frac{QB}{AQ} = \frac{DR}{AR}.$$



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10. In figure, O is the centre of the circle with radius 5 cm. T is a point such that $OT=13$ cm and OT intersects the circle E, if AB is the

tangent of the circle at E, find the length of AB.



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11. The line through the point $(-2, 6)$ and $(4, 8)$ perpendicular to the line through the points $(8, 12)$ and $(x, 24)$. Find the value of x .

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12. A flag pole 'h' metres is on the top of the hemispherical dome of radius 'r' metres. A man is standing 7m away from the dome. Seeing the top of the pole at an angle 45° and moving 5 m away from the dome and seeing the bottom of the pole at angle 30° . Find radius of the dome.



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14. An aeroplane at an altitude of 1800m finds that two boats are sailing towards it in the same direction. The angles of depression of the boats as observed from the aeroplane are 60° and 30° respectively. Find the distance between the two boats. ($\sqrt{3} = 1.732$).

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15. 4 person live in a conical tent whose slant height is 19 cm. If each person require 22cm^2 of the floor area, then find the height of the tent.

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16. A wall clock strikes the bell once at 1 o' clock, 2 times at 2 o' clock, 3 times at 3 o' clock and so on. How many times will it strike in a

particular day. Find the standard deviation of the number of strikes the bell make a day.



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17. In a town of 8000 people, 1300 are over 50 years and 3000 are females. It is known that 30% of the females are over 50 years. What is the probability that a chosen individual from the town is either a female or over 50 years ?



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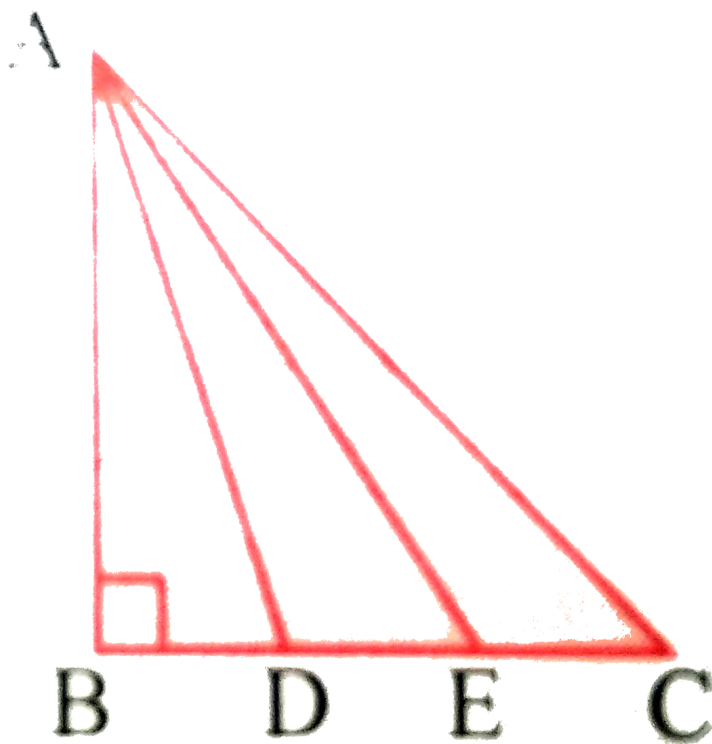
Part Iv

1. Construct a $\triangle PQR$ in which the base $PQ=4.5$ cm, $\angle R = 45^\circ$ and the median from R to RG is 6cm.



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2. In the adjacent figure, ABC is a right angled triangle with right angle at B and points D, E trisect BC. Prove that $8AE^2 = 3AC^2 + 5AD^2$.



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3. A boat takes 1.6 hours longer to go 36kms up a river than down the river. If the speed of the water current is 4 km per hr, what is the speed of the boat in still water?



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