



# MATHS

## BOOKS - V PUBLICATION

### SECOND DEGREE EQUATIONS

#### Question Bank

1. When each side of a square was reduced by 2 metres, the area became. 49 square metres.

What was the length of a side of the original square?



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2. A square ground has 2 metre wide path all around it. The total area of the ground and path is 1225 square metres. What is the area of the ground alone?



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3. The square of a term in the arithmetic sequence '2,5,8, .....', is '2500 .' What is its position?



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4. 2000 rupees was deposited in a scheme in which interest is compounded annually. After two years the amount in the account was 2205 rupees. What is the rate of interest?



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5. One added to the product of two alternative integers gives '169 .' What are the numbers?



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6. The product of the 1st and 3rd terms of an arithmetic sequence with common difference 1 gives '143 .' What are the three terms of that sequence?



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7. 1 added to the product of two consecutive even numbers gives 289. What are the numbers?



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8. 9 added to the product of two consecutive multiples of 6 gives 729 . What are the numbers?



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9. How many terms of the arithmetic sequence '5,7,9, .....', must be added to get '140 ?'



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10. 16 added to the sum of the first few terms of the arithmetic sequence 9, 11, 13, ..... gave 256. How many terms were added?



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**11.** An isosceles triangle has to be made like this

'(##VPU\_TTT\_MAT\_X\_P01\_C04\_E03\_005\_Q01##)'

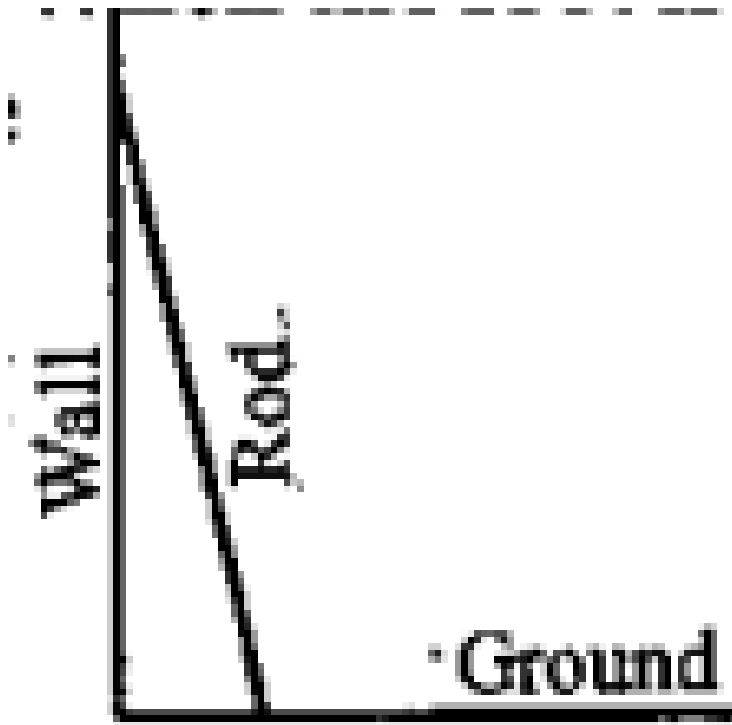
The height should be 2 metres less than the base. What should be the length of its sides?



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**12.** A 2.6 metre long rod leans against a wall, its foot 1 metre from the wall. When the foot is moved a little away from the wall, its upper

end slides the same length down. How much farther is the foot moved?



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**13.** The product of a number and 2 more than that is 168, What are the numbers?



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**14.** Find two numbers with sum 4 and product 2.



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**15.** How many terms of the arithmetic sequence '99,97,95, ....., ' must be added to get 900 ?



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**16.** A rod 28 centimetres long is to be bent to make a rectangle.

i) Can a rectangle of diagonal 8 centimetres be made?

ii) Can a rectangle of diagonal 10 centimetres

be made?

iii) How about a rectangle of diagonal 14 centimetres?

Calculate the lengths of the sides of the rectangles that can be made.



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**17.** In a right angled triangle, one of the perpendicular sides is 5 centimetres longer than the other and its area is 12 square centimetres. What are the lengths of its sides?



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**18.** A rectangle is to be made with perimeter 100 centimetres and area 525 square centimetres. What should be the lengths of its sides?



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**19.** How many terms of the arithmetic sequence 3, 7, 11, ..... must be added to get 300?



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**20.** The length of a rectangle is 10 centimetres more, than its breadth and its area is 144 square centimetres. What are the length and breadth?



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**21.** The perimeter of a rectangle is 28 metres and its diagonal is 10 metres. What are the

lengths of its sides?



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22. The length of a rectangle is  $3m$  more than thrice its breadth, Its diagonal is 1 metre longer than the length.

What are the length and breadth of the rectangle.



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**23.** The sum of a number and its reciprocal is.

$$2\frac{1}{12}.$$

What is the number?



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**24.** There are two taps opening into a tank. If both are opened, the tank would be, full in 12 minutes. The time taken for it to fill with only the small tap open, is 10 minutes more than the time of fill with only the large tap open.

What is the time taken to fill the tank with only the small tap open?



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**25.** The perimeter of a rectangle is 42 metres and its diagonal is 15 metres. What are the lengths of its sides?



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**26.** How many consecutive natural numbers starting from 1 should be added to get 300?



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**27.** What number added to 1 gives its own square?



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**28.** In writing the equation to construct a rectangle of specified perimeter and area, the perimeter, was wrongly written as 24 instead of 42. The length of a side was then computed as 10 metres. What is the area in the problem? What are the lengths of the sides of the rectangle in the correct problem?



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**29.** In copying a second degree equation, the number without 'x' was written as 24 instead of '-24'. The answers found were 4 and 6 . What are the answers of the correct problem?



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**30.** Difference of two natural numbers be 5 and the sum of its square be 97 . Find the numbers.



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**31.** How many sides have a polygon, if the number of diagonals be '90 ?'



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**32.** Total daily wages of the workers in a factory is 3150 rupees. If the number of workers is decreased by '5' and the wages of the remaining is increased by 5 then the total wages become 3250 rupees. What is the wages of a worker?



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**33.** A vehicle is running the first 150 kilometer at the same speed. Then next 200 kilometer running at a speed of 20 kilometer per hour more than the first speed. Total time taken to travel is 5 hours. What is the initial speed of the vehicle?



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**34.** Which positive number of 'x' be taken to get the value zero for the polynomial  $p(x) = x^2 - 4x + 4$

Prove that if we take any number for 'x' the value of the polynomial cant be negative.



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**35.** Let  $a, b, c > 0$ . Then prove that both the roots of the equation

$ax^2 + bx + c = 0$  has negative real parts.





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**36.** The members of the Mathematics club shook hands once with each of the other members. A total of 780 shake hand took place. Find how many members are there in the club?



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**37.** The angles in a polygon is in the arithmetic progression

$172^\circ$ ,  $168^\circ$ ,  $164^\circ$ ... How many sides the polygon has?



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**38.** Anoop was calculating the sum of the consecutive natural numbers from 1. At one stage he got 2485 as the sum. How many natural numbers did Anoop use to get this sum?



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**39.** How many terms of the arithmetic sequence '6,10,14, .....!' should be added to get 720?



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**40.** A man bought same books of same price for 80 rupees. If he had bought four more books in this amount each. book would have cost 1 rupee less.

How many books did he buy?



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**41.** The perimeter of a rectangle is 42 centimetres and its diagonal is 15 centimetres.

Find the dimensions of the rectangle:



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**42.** The length of a rectangular garden is 80 metres and its breadth is 40 metres. A path runs along the boundary of the garden on its

outside. If, the area of the path is 1300 square metres, what is its breadth?



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**43.** When the reciprocal of a number is subtracted from it, we get 1. What is the number?



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**44.** A man requires 9 days less than his son to complete a job. Together, they can finish the job in 20 days. How many days would each require to finish the job alone?



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**45.** The difference of the length of perpendicular sides of a right triangle is 10 centimetres. Its area is 72 square centimetres. Find the length of the perpendicular sides.





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**46.** All the terms of an arithmetic sequence with common difference 4 are positive numbers. The product of two consecutive terms of this sequence is the same as their sum.

- i) If one term is 'x', what is the next term?
- ii) Calculate those terms.



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**47.** If the product of two consecutive odd numbers is 399, find the numbers.



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**48.** Age of Vineetha is twice her sisters age. After 4 years the product of their ages will be '160 .' Find the present ages of both.



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**49.** The sum of a number and its reciprocal is equal to  $(25)/(12)$  . What is the number?



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**50.**  $P(x)$  is a second degree polynomial with

$$P(1) = 0$$

and  $P(-2) = 0$ .

a) Find two first degree factors of  $P(x)$ .

b) Find the polynomial  $P(x)$ .



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**51.** A rope of length 40 metres is cut into two pieces and two squares are made on the floor with them. The sum of the area enclosed is 58 square meter.

a) If the length of one piece is taken as 'x', what is the length of the other piece.

b) What are the lengths of the sides of the squares?

c) Write the given fact about area as an algebraic equation.

d) What is the length of each piece?





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**52.** Write  $P(x) = x^2 - 9x + 20$  as a product of two first degree polynomials. Write also the solutions of the equation  $P(x) = 0$ .



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**53.** From the rectangle ABCD of breadth 1 metre, the largest possible square APQD is cut

off. The remaining rectangle is PBCQ.

a) Taking the length of 'ABCD' as 'x', write the length and breadth of 'PBCQ'.

b) The ratio of length and breadth of the rectangles 'ABCD' and 'PBCQ' are same. Find the length of 'AB'.



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**54.** The length of a rectangle is 6 centimetres more than its breadth. Its area is 1216 square centimetres. Find its length.



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**55.** Consider two fractions having numerator 1 . The denominator of one fraction is 2 more than the denominator of the other. Sum of the fractions is  $\frac{5}{12}$ .

a) Write the above fraction as an algebraic equation.

b) Find the fractions.



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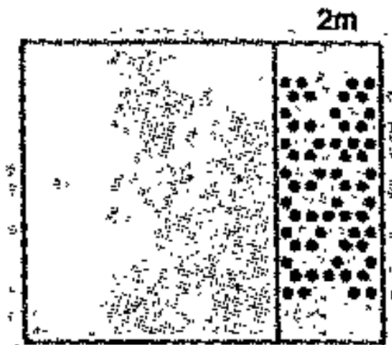
**56.** If  $x$  is a natural number What number is to be added to  $x^2 + 6x$  to get a perfect square?



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**57.** Land is acquired for road widening from a square ground, as shown in the figure. The width of the acquired land is 2 metres. Area of the remaining ground is 440 square metres. What is the shape of the remaining

ground?



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**58.** The sum of a number and its reciprocal is  $5/2$ .

Find the number.



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**59.** In a right triangle one of the perpendicular sides is one less than 2 times the smaller side. Hypotenuse is one more than two times the smaller side.

By taking the smaller side as ' $x$  cm' write the algebraic expression for the other two-sides.

Compute all the 3 sides of the right triangle



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**60.** Can 240 be the sum of consecutive terms of an arithmetic sequence '7,11,15, .....'?



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**61.** In copying a second degree equation the number without 'x' was written as '-30' instead of 30. The answers found were 15 and '-2'. What are the answers of the correct problem?



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