

RD SHARMA

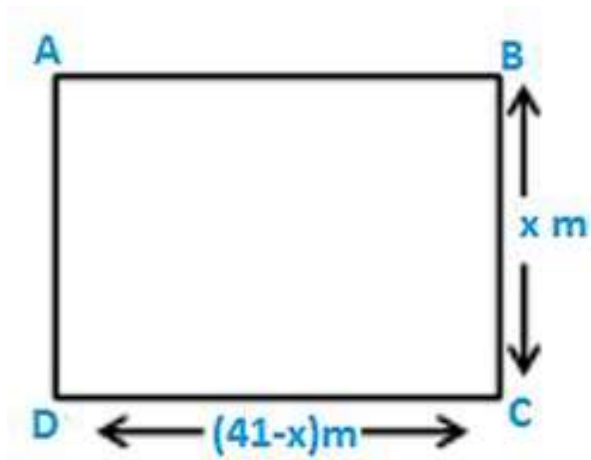
Solutions

Class 10 Maths

Chapter 8

Ex 8.11

Question 1:



The perimeter of the rectangular field is 82m and its area is $400m^2$.find the breadth of the rectangle?

Soln:

Let the breadth of the rectangle be $(x) m$

Given,

$$\text{Perimeter} = 82 m$$

$$\text{Area} = 400 m^2$$

$$\text{Perimeter of a rectangle} = 2(\text{length} + \text{breadth})$$

$$82 = 2(\text{length} + x)$$

$$41 = (\text{length} + x)$$

$$\text{Length} = (41-x) m$$

We know,

$$\text{Area of the rectangle} = \text{length} * \text{breadth}$$

$$400 = (41-x) (x)$$

$$400 = 41x - x^2$$

$$= x^2 - 41x + 400 = 0$$

$$= x^2 - 25x - 16x + 400 = 0$$

$$= x(x-25) - 16(x-25) = 0$$

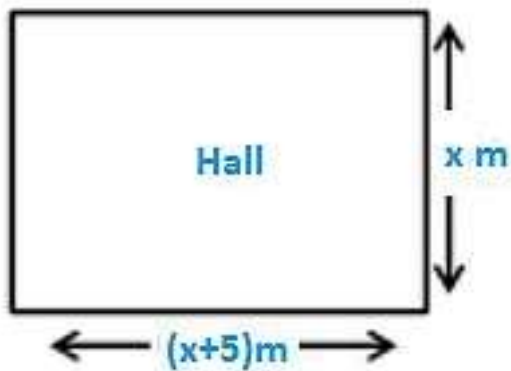
$$= (x-16)(x-25) = 0$$

Either $x-16 = 0$ therefore $x=16$

Or, $x-25=0$ therefore $x = 25$

Hence the breadth of the above mentioned rectangle is either 16 m or 25 m respectively.

Question 2:



The length of the hall is 5 m more than its breadth. If the area of the floor of the hall is 84 m^2 , what is the length and breadth of the hall?

Soln:

Let the breadth of the rectangle be $x \text{ m}$

Let the length of the hall is 5 m more than its breadth $= (x+5) \text{ m}$

Also given that,

Area of the hall is $= 84 \text{ m}^2$

The shape of the hall is rectangular

Area of the rectangular hall = length * breadth

$$84 = x(x+5)$$

$$= x^2 + 5x - 84 = 0$$

$$= x^2 + 12x - 7x - 84 = 0$$

$$= x(x+12) - 7(x+12) = 0$$

$$= (x+12)(x-7) = 0$$

Either $x+12 = 0$ therefore $x = -12$

Or, $x-7 = 0$ therefore $x = 7$

Since the value of x cannot be negative

So $x = 7$

$$= x+5 = 12$$

The length and breadth of the rectangle is 7 and 12 respectively.

Question 3: Two squares have sides x and $(x+4)$ cm. The sum of their area is 656 cm^2 . Find the sides of the square.

Soln:

Let S_1 and S_2 be the two square

Let x cm be the side square S_1 and $(x+4)$ cm be the side of the square S_2 .

Area of the square $S_1 = x^2 \text{ cm}^2$

Area of the square $S_2 = (x+4)^2 \text{ cm}^2$

According to the question,

Area of the square S_1 + Area of the square $S_2 = 656 \text{ cm}^2$

$$= x^2 \text{ cm}^2 + (x+4)^2 \text{ cm}^2 = 656 \text{ cm}^2$$

$$= x^2 + x^2 + 16 + 8x - 656 = 0$$

$$= 2x^2 + 16 + 8x - 656 = 0$$

$$= 2(x^2 + 4x - 320) = 0$$

$$= x^2 + 4x - 320 = 0$$

$$= x^2 + 20x - 16x - 320 = 0$$

$$= x(x+20) - 16(x+20) = 0$$

$$= (x+20)(x-16) = 0$$

Either $x+20 = 0$ therefore $x = -20$

Or, $x-16 = 0$ therefore $x = 16$

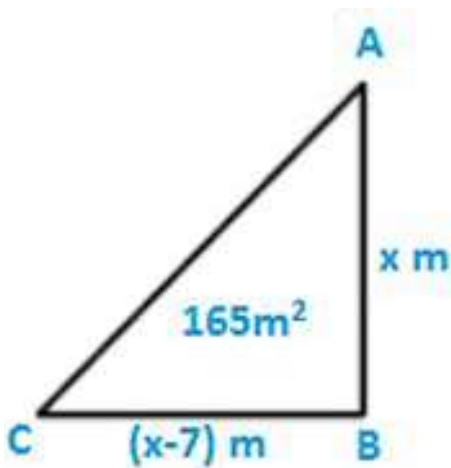
Since the value of x cannot be negative so the value of $x = 16$

The side of the square $S_1 = 16$ cm

The side of the square $S_2 = 20$ cm

Question 4: The area of the right-angled triangle is 165 cm^2 . Determine the base and altitude if the latter exceeds the former by 7m.

Soln:



Let the altitude of the right angles triangle be denoted by $x \text{ m}$

Given that the altitude exceeds the base by $7 \text{ m} = x-7 \text{ m}$

We know

$$\text{Area of the triangle} = \frac{1}{2} \times \text{base} \times \text{altitude}$$

$$= 165 = \frac{1}{2} \times (x-7) \times x$$

$$= x(x-7) = 330$$

$$= x^2 - 7x - 330 = 0$$

$$= x^2 - 22x + 15x - 330 = 0$$

$$= x(x-22) + 15(x-22) = 0$$

$$= (x-22)(x+15) = 0$$

Either $x-22 = 0$ therefore $x = 22$

Or, $x+15=0$ therefore $x=-15$

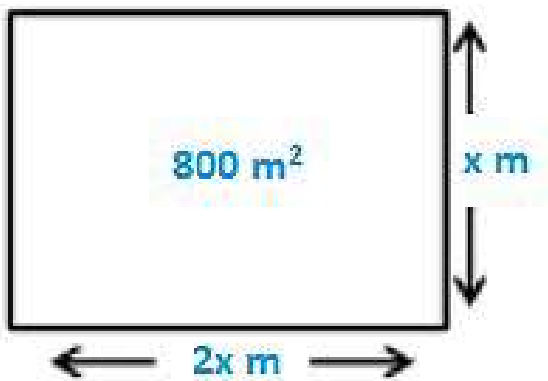
Since the value of x cannot be negative so the value of $x=22$

$$=x-7=15$$

The base and altitude of the right angled triangle are 15 cm and 22 cm respectively.

Question 5: Is it possible to design a rectangular mango grove whose length is twice its breadth and area is 800 m^2 . find its length and breadth.

Soln:



Let the breadth of the rectangular mango grove be $x \text{ m}$

Given that length of rectangle is twice of its breadth

$$\text{Length} = 2x$$

$$\text{Area of the grove} = 800 \text{ m}^2$$

We know,

$$\text{Area of the rectangle} = \text{length} * \text{breadth}$$

$$= 800 = x(2x)$$

$$= 2x^2 - 800 = 0$$

$$= x^2 - 400 = 0 = x^2 = 400 = x = \sqrt{400} = 20 \quad x = \sqrt{400} = 20$$

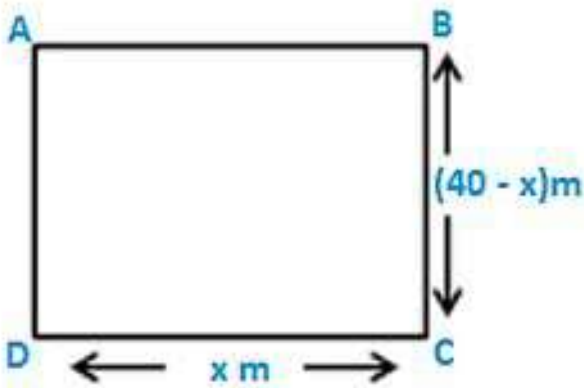
Breadth of the rectangular grove is 20 m

Length of the rectangular grove is 40 m

Yes, it is possible to design a rectangular groove whose length is twice of its breadth.

Question 6: Is it possible to design a rectangular park of perimeter 80 m and area 400 m²? If so find its length and breadth.

Soln:



In order to prove the given condition let us assume that the length of the rectangular park is denoted by x m

Given that,

$$\text{Perimeter} = 80 \text{ m}$$

$$\text{Area} = 400 \text{ m}^2$$

$$\text{Perimeter of the rectangle} = 2(\text{length} + \text{breadth})$$

$$80 = 2(x + \text{breadth})$$

$$\text{Breadth} = (40 - x) \text{ m}$$

We know,

$$\text{Area of the rectangle} = (\text{length}) (\text{breadth})$$

$$= 400 = x(40 - x)$$

$$= 40x - x^2 = 400$$

$$= x^2 - 40x + 400 = 0$$

$$= x^2 - 20x - 20x + 400 = 0$$

$$= x(x-20)-20(x-20) = 0$$

$$= (x-20)(x-20) = 0$$

$$= (x-20)^2 = 0$$

$$= x-20 = 0 \text{ therefore } x=20$$

Length of the rectangular park is = 20 m

Breadth of the rectangular park $= (40-x) = 20$ m

Yes, it is possible to design a rectangular Park of perimeter 80 m and area 400m^2

Question 7: Sum of the area of the square is 640 m^2 .if the difference of their perimeter is 64 m, find the sides of the two squares.

Soln:

Let the two squares be S_1 and S_2 respectively. let he sides of the square S_1 be x m and the sides of the square S_2 be y m

Given that the difference of their perimeter is 64 m

We know that the

Perimeter of the square = $4(\text{side})$

Perimeter of the square $S_1 = 4x$ m

Perimeter of the square $S_2 = 4y$ m

Now, difference of their perimeter is 64 m

$$= 4x - 4y = 64$$

$$x - y = 16$$

$$x = y + 16$$

Also, given that the sum of their two areas

= area of the square 1 + area of the square 2

$$= 640 = x^2 + y^2$$

$$= 640 = (y+16)^2 + y^2$$

$$= 2y^2 + 32y + 256 - 640 = 0$$

$$= 2y^2 + 32y - 384 = 0$$

$$= 2(y^2+16y-192) = 0$$

$$= y^2+16y-192 = 0$$

$$= y^2+24y-8y-192 = 0$$

$$= y(y+24)-8(y+24) = 0$$

$$= (y+24)(y-8) = 0$$

Either $y+24 = 0$ therefore $y = -24$

Or, $y-8 = 0$ therefore $y=8$

Since the value of y cannot be negative so $y = 8$

Side of the square 1 = 8 m

Side of the square 2 = $8+16 = 24$ m

The sides of the squares 1 and 2 are 8 and 24 respectively.