



Quadratic Equations Ex 8.10 Q1

Answer :

Let the length of one side of right triangle be $= x$ cm then other side be $= (x + 5)$ cm

And given that hypotenuse $= 25$ cm

As we know that by Pythagoras theorem,

$$x^2 + (x + 5)^2 = (25)^2$$

$$x^2 + x^2 + 10x + 25 = 625$$

$$2x^2 + 10x + 25 - 625 = 0$$

$$2x^2 + 10x - 600 = 0$$

$$x^2 + 5x - 300 = 0$$

$$x^2 - 15x + 20x - 300 = 0$$

$$x(x - 15) + 20(x - 15) = 0$$

$$(x - 15)(x + 20) = 0$$

So, either

$$(x - 15) = 0$$

$$x = 15$$

Or

$$(x + 20) = 0$$

$$x = -20$$

But the side of right triangle can never be negative

Therefore, when $x = 15$ then

$$x + 5 = 15 + 5$$

$$= 20$$

Hence, length of one side of right triangle be $= 15$ cm then other side be $= 20$ cm

Quadratic Equations Ex 8.10 Q2

Answer :

Let the length of smaller side of right triangle be $= x$ cm then larger side be $= y$ cm

Then, as we know that by Pythagoras theorem

$$x^2 + y^2 = (3\sqrt{10})^2$$

$$x^2 + y^2 = 90 \dots (1)$$

If the smaller side is triple and the larger side be doubled, the new hypotenuse is $9\sqrt{5}$ cm

Therefore,

$$(3x)^2 + (2y)^2 = (9\sqrt{5})^2$$

$$9x^2 + 4y^2 = 405 \dots (2)$$

From equation (1) we get $y^2 = 90 - x^2$

Now putting the value of y^2 in equation (2)

$$9x^2 + 4(90 - x^2) = 405$$

$$9x^2 + 360 - 4x^2 - 405 = 0$$

$$5x^2 - 45 = 0$$

$$5(x^2 - 9) = 0$$

$$x^2 - 9 = 0$$

$$x^2 = 9$$

$$x = \sqrt{9}$$

$$= \pm 3$$

But, the side of right triangle can never be negative

Therefore, when $x = 3$ then

$$y^2 = 90 - x^2$$

$$= 90 - (3)^2$$

$$= 90 - 9$$

$$= 81$$

$$y = \sqrt{81}$$

$$= \pm 9$$

Hence, length of smaller side of right triangle be = **3 cm** then larger side be **= 9 cm**

Quadratic Equations Ex 8.10 Q3

Answer :

Let P be the required location on the boundary of a circular park such that its distance from gate B is $= x$ metres that is $BP = x$ metres

Then, $AP = x + 7$

In the right triangle ABP we have by using Pythagoras theorem

$$AP^2 + BP^2 = AB^2$$

$$(x+7)^2 + x^2 = (13)^2$$

$$x^2 + 14x + 49 + x^2 = 169$$

$$2x^2 + 14x + 49 - 169 = 0$$

$$2x^2 + 14x - 120 = 0$$

$$2(x^2 + 7x - 60) = 0$$

$$x^2 + 7x - 60 = 0$$

$$x^2 + 12x - 5x - 60 = 0$$

$$x(x+12) - 5(x+12) = 0$$

$$(x+12)(x-5) = 0$$

$$(x+12) = 0$$

$$x = -12$$

or

$$(x-5) = 0$$

$$x = 5$$

But the side of right triangle can never be negative

Therefore, $x = 5$

Hence, P is at a distance of **5 meters** from the gate B .

Quadratic Equations Ex 8.10 Q4

Answer :

Let the length of smaller side of rectangle be $= x$ metres then larger side be $= x + 30$ metres and their diagonal be $= x + 60$ metres

Then, as we know that Pythagoras theorem

$$x^2 + (x+30)^2 = (x+60)^2$$

$$x^2 + (x+30)^2 = (x+60)^2$$

$$x^2 + x^2 + 60x + 900 = x^2 + 120x + 3600$$

$$2x^2 + 60x + 900 - x^2 - 120x - 3600 = 0$$

$$x^2 - 60x - 2700 = 0$$

$$x^2 - 90x + 30x - 2700 = 0$$

$$x(x-90) + 30(x-90) = 0$$

$$(x-90)(x+30) = 0$$

$$(x-90) = 0$$

$$x = 90$$

or

$$(x+30) = 0$$

$$x = -30$$

But, the side of rectangle can never be negative.

Therefore, when $x = 90$ then

$$x + 30 = 90 + 30$$

$$= 120$$

Hence, length of smaller side of rectangle be = **90 metres** and larger side be **= 120 metres**

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