



Quadratic Equations Ex 8.13 Q7

Answer :

Let x students planned a picnic.

Then, the share of each student $= \frac{500}{x}$

According to question, 5 students fail to go picnic, then remaining students $= (x - 5)$.

Therefore, new share of each student $= \frac{500}{x - 5}$

It is given that

$$\frac{500}{x - 5} - \frac{500}{x} = 5$$

$$\frac{500x - 500(x - 5)}{(x - 5)x} = 5$$

$$\frac{\cancel{500x} - \cancel{500x} + 2500}{(x - 5)x} = 5$$

$$\frac{2500}{(x - 5)x} = 5$$

$$5(x^2 - 5x) = 2500$$

$$(x^2 - 5x) = 500$$

$$x^2 - 5x - 500 = 0$$

$$x^2 + 20x - 25x - 500 = 0$$

$$x(x + 20) - 25(x + 20) = 0$$

$$(x + 20)(x - 25) = 0$$

$$(x + 20) = 0 \quad \text{or} \quad (x - 25) = 0$$

$$x = -20 \quad \quad \quad x = 25$$

Because x cannot be negative.

Thus, the total numbers of students attend a picnic

$$= x - 5$$

$$= 25 - 5$$

$$= 20$$

Therefore, the total numbers of students attend a picnic be $\boxed{x = 20}$

Quadratic Equations Ex 8.13 Q8

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

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

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

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

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

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

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

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

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

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

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

$$(x+12) = 0 \quad \text{or} \quad (x-5) = 0$$

$$x = -12 \quad \text{or} \quad x = 5$$

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 8.13 Q9

Answer :

Let marks obtained by P in mathematics be x , then in science $= (28 - x)$

It is given that,

$$(x+3) \times (28-x-4) = 180$$

$$(x+3) \times (24-x) = 180$$

$$24x - x^2 + 72 - 3x = 180$$

$$-x^2 + 21x + 72 - 180 = 0$$

$$-(x^2 - 21x + 108) = 0$$

$$x^2 - 21x + 108 = 0$$

$$x^2 - 12x - 9x + 108 = 0$$

$$x(x-12) - 9(x-12) = 0$$

$$(x-12)(x-9) = 0$$

$$(x-12) = 0 \quad \text{or} \quad (x-9) = 0$$

$$x = 12 \quad \text{or} \quad x = 9$$

Therefore, when $x = 12$ then

$$(28-x) = (28-12)$$

$$= 16$$

Hence, marks in mathematics $x = 12$ and marks in science $= 16$.

Or, when $x = 9$ then

$$(28-x) = (28-9)$$

$$= 19$$

Hence, marks in mathematics $x = 9$ and marks in science $= 19$.

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