



EDUCATION SOURCE

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QUADRATIC EQUATIONS
Solution of a Quadratic
Equation by Factorisation
chapter: 4, Exercise: 4.2
Part-2

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Find two numbers whose sum is 27 and product is 182.

Sol
Let the first number is (x)
Second number is $(27-x)$

Acc. to question

$$x(27-x) = 182$$

$$27x - x^2 = 182$$

$$\underline{\underline{x^2 - 27x + 182 = 0}}$$

$$x^2 - 14x - 13x + 182 = 0$$

$$\underline{\underline{x(x-14) - 13(x-14) = 0}}$$

$$(x-14)(x-13) = 0$$

$$x-14=0 \quad | \quad x-13=0$$

$$(x=14) \quad | \quad (x=13)$$

$$\text{if } x=14 \checkmark$$

$$27-14=13$$

$$\text{if } x=13$$

$$27-13=14$$

∴ our two numbers are 13 and 14

$$\begin{array}{r|l} 2 & 182 \\ \hline 7 & 91 \\ \hline 13 & 13 \\ \hline & 1 \end{array}$$



Find two consecutive positive integers, sum of whose squares is 365. \hookrightarrow 1, 2, 3

Let the two consecutive positive integers (x) (x+1)

Acc. to question

$$x^2 + (x+1)^2 = \underline{365}$$

$$x^2 + x^2 + 1 + 2x = 365$$

$$2x^2 + 1 + 2x - 365 = 0$$

$$\underline{2x^2} + \underline{2x} - \underline{364}$$

$$2(x^2 + x - 182) = 0$$

$$\underline{2 \neq 0}$$

$$\underline{x^2 + x - 182 = 0}$$

$$x^2 + 14x - 13x - 182 = 0$$

$$x(x+14) - 13(x+14) = 0$$

$$(x-13) = 0 \quad (x+14) = 0$$

$$\boxed{x=13}$$

$$\rightarrow \boxed{x=-14} \rightarrow \text{neg}$$

$$\begin{array}{r} 2 \overline{) 182} \\ \underline{7} \\ 13 \\ \underline{13} \\ 0 \end{array}$$

$$14 - 13 = 1$$

\therefore out two consecutive positive integers are 13 and 14.

The altitude of a right triangle is 7 cm less than its base. If the hypotenuse is 13 cm, find the other two sides.

Given hypotenuse = 13 cm

let base = x cm

altitude = $(x-7)$ cm

P.G.T

$$H^2 = B^2 + P^2$$

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

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

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

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

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

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

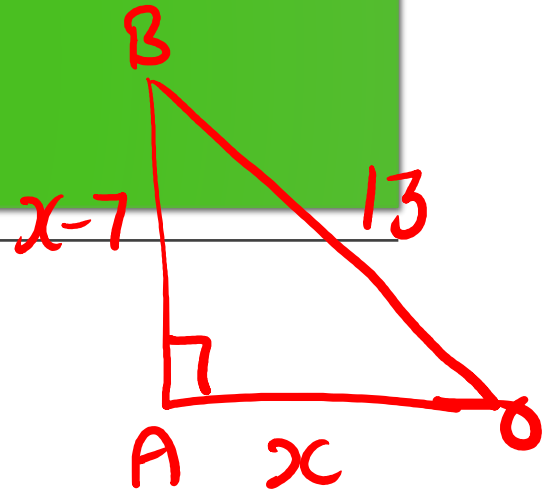
$$(x^2 - 7x - 60) = 0$$

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

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

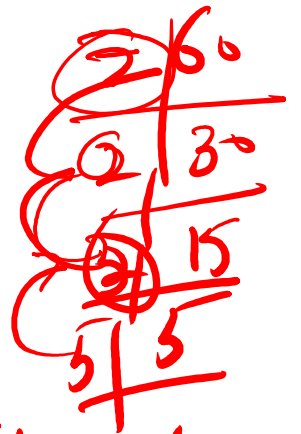
$$(x+5)(x-12) = 0$$

$$x = -5, \quad \boxed{x = 12}$$



$$-12 + 5$$

?



$$\text{Base} = 12 \text{ cm}$$

$$\text{altitude} = 12 - 7 = 5 \text{ cm} \checkmark$$



A cottage industry produces a certain number of pottery articles in a day. It was observed on a particular day that the cost of production of each article (in rupees) was 3 more than twice the number of articles produced on that day. If the total cost of production on that day was ₹90, find the number of articles produced and the cost of each article.

Let the total no. of articles = x
And Cost of each article = $2x + 3$
Acc to question.

$$x(2x + 3) = 90$$

$$2x^2 + 3x = 90$$

$$2x^2 + 3x - 90 = 0$$

$$2x^2 + 15x - 12x - 90 = 0$$

$$x(2x + 15) - 6(2x + 15) = 0$$

$$(x - 6)(2x + 15) = 0$$

$$x - 6 = 0$$

$$x = 6$$

$$2x + 15 = 0$$

$$x = -\frac{15}{2}$$

Here no. of article = 6

Price of each article = $2(6) + 3$
 $= ₹15$

