CLASS 10 · MATHEMATICS · CHAPTER 4

Quadratic Equations - Exercise 4.2

Exercise 4.2 with independently verified solutions.

CHAPTER	RESOURCE	SOURCE
Quadratic Equations	NCERT Exercises	NCERT Mathematics, Reprint 2026-27

PART 1

Verified NCERT questions and solutions

Verified NCERT questions and solutions

Solutions are checked independently and follow the supplied NCERT chapter edition.

QUESTION

Question 1

factorisation · roots

Find the roots by factorisation.

1. $x^2 - 3x - 10 = 0$

2. $2x^2 + x - 6 = 0$

3. $\sqrt{2}x^2 + 7x + 5\sqrt{2} = 0$

4. $2x^2 - x + \frac{1}{8} = 0$

5. $100x^2 - 20x + 1 = 0$

Solution

1. $(x - 5)(x + 2) = 0 \Rightarrow x = 5, -2$

2. $(2x - 3)(x + 2) = 0 \Rightarrow x = \frac{3}{2}, -2$

3. $$(\sqrt{2}x + 5)(x + \sqrt{2}) = 0 \Rightarrow x = -\frac{5}{\sqrt{2}}, -\sqrt{2}$$

4. $$16x^2 - 8x + 1 = (4x - 1)^2 = 0 \Rightarrow x = \frac{1}{4}, \frac{1}{4}$$

5. $$(10x - 1)^2 = 0 \Rightarrow x = \frac{1}{10}, \frac{1}{10}$$

Substitution of every listed root in its original equation gives zero.

QUESTION

Question 2

factorisation · word problems

Solve the two problems given in Example 1.

Solution

1. $$x^2 - 45x + 324 = (x - 9)(x - 36) = 0$$

   The initial marble counts are 9 and 36, in either order; after losing five each, 4 × 31 = 124.

2. $$x^2 - 55x + 750 = (x - 25)(x - 30) = 0$$

   The industry made either 25 toys at ₹30 each or 30 toys at ₹25 each; either total is ₹750.

QUESTION

Question 3

factorisation · word problem

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

Solution

$$x(27-x) = 182 \Rightarrow x^2 - 27x + 182 = 0$$

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

Both roots give the pair 13 and 14, whose sum and product verify the conditions.

Final answer

13 and 14.

QUESTION

Question 4

factorisation · word problem

Find two consecutive positive integers whose squares sum to 365.

Solution

$$x^2 + (x+1)^2 = 365 \Rightarrow x^2 + x - 182 = 0$$

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

x = −14 is rejected because the integers must be positive. For x = 13, $13^2 + 14^2 = 365$.

Final answer

13 and 14.

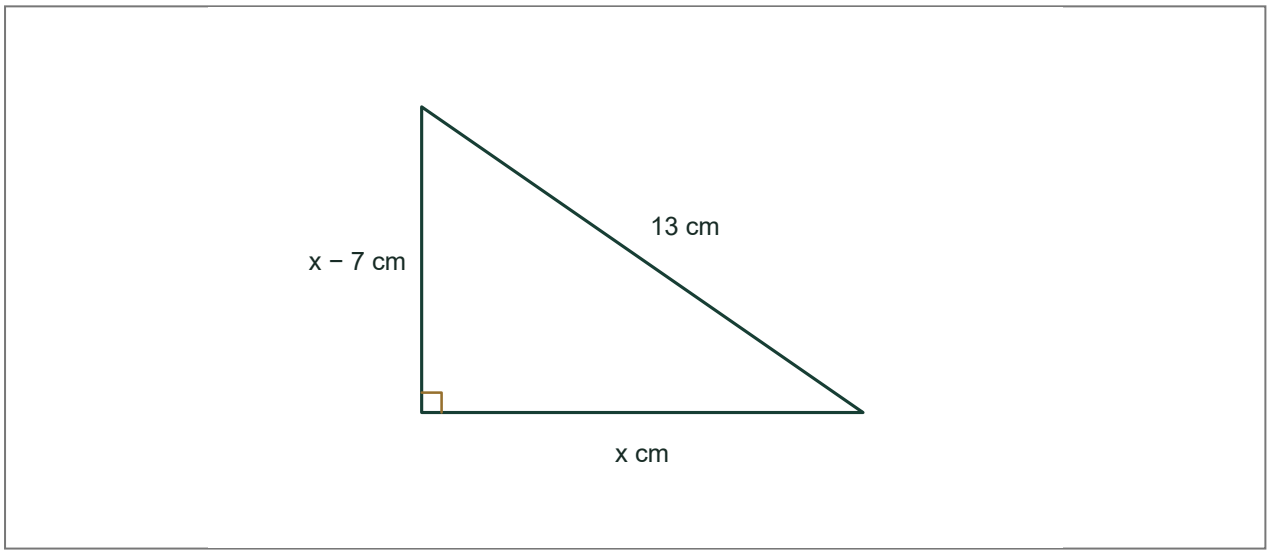
QUESTION

Question 5

factorisation · word problem · right triangle

The altitude of a right triangle is 7 cm less than its base and the hypotenuse is 13 cm. Find the other sides.

Solution



Right triangle with a 13 cm hypotenuse — solution sketch (not to scale).

Let the base be x cm; altitude = x − 7 cm.

$$x^2 + (x-7)^2 = 13^2 \Rightarrow x^2 - 7x - 60 = 0$$

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

x = −5 is impossible for a length. Hence the base is 12 cm and altitude is 5 cm; $5^2 + 12^2 = 13^2$.

Final answer

Base = 12 cm; altitude = 5 cm.

QUESTION

Question 6

factorisation · word problem

A cottage industry makes pottery articles. The cost per article is ₹3 more than twice the number made; total cost is ₹90. Find the number and cost per article.

Solution

Let x be the number of articles; cost per article = ₹(2x + 3).

$$x(2x+3) = 90 \Rightarrow 2x^2 + 3x - 90 = 0$$

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

x = −7.5 is rejected because a production count cannot be negative. For x = 6, the cost is ₹15 and 6 × 15 = 90.

Final answer

6 articles; ₹15 per article.