MATHEMATICS · GRADES 7-9

# One-step equations

### Difficulty level: Intermediate

### Mathematics: Grades 7-9

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## *Overview of the concept*

This is how you work out a missing number in everyday maths, like how many hours you worked if you know your total pay and your hourly rate. A worker checks a paycheque this way, and a driver works out how many litres went into a tank from the total cost and the price per litre. Whenever one number is unknown and the rest are known, a single step finds it. It is the habit behind checking bills, splitting costs, and making sure the numbers you are given actually add up.



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## *Rule*

**To solve a one-step equation, undo the operation on x by doing the opposite operation to both sides.**

Addition is undone by subtraction, subtraction by addition, multiplication by division, and division by multiplication. Then check the answer in the original equation.

## Worked examples

EXAMPLE 1

**Q** Solve $x + 7 = 12$

**SOLUTION**

Picture it

$x + 7 = 12$

Undo the addition by subtracting 7 from both sides: $x = 12 - 7$

Work it out: $12 - 7 = 5$

So $x = 5$. Check: $5 + 7 = 12$

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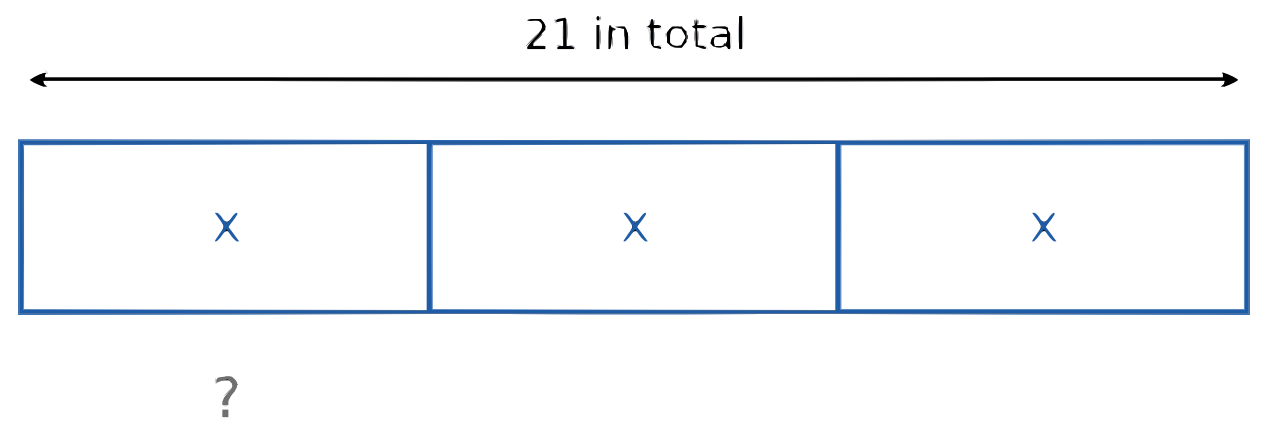
EXAMPLE 2

## Q Solve 3x = 21




**Picture it**

| 3x | = | 21 |
|---|---|---|

### SOLUTION

Undo the multiplication by dividing both sides by 3: $x = 21 \div 3$

Work it out: $21 \div 3 = 7$

So $x = 7$. Check: $3 \times 7 = 21$

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## Practice questions

1. You have some marbles. You get 5 more and now you have 9. How many did you start with?

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2. You spend 3 dollars and have 8 dollars left. How much did you start with?

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3. Four identical bags hold 32 marbles in all. How many marbles are in each bag?

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4 Sara splits her stickers into 2 equal piles, with 7 stickers in each pile. How many stickers did she start with?

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5 Which number makes $x + 6 = 11$ true? Write the number.

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6 One quarter of a number is 9. What is the number?

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**7** Five identical packs hold 45 pencils in all. How many pencils are in 2 packs?

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**8** You have some ribbon. You add 2.5 m and now have 7.5 m. How long was the ribbon? Write the length in m.

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**9** A rope is cut into 3 equal pieces. Each piece is 6 m long. How long is the rope in centimetres?

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10 **Three bags hold 0 marbles in all. How many marbles are in each bag?**

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## ANSWER KEY

**1.** 4

**2.** 11

**3.** 8

**4.** 14

**5.** 5

**6.** 36

**7.** 18

**8.** 5 m

**9.** 1800 cm

**10.** 0

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