MATHEMATICS · GRADES 7-9

# Equations with brackets

### Difficulty level: Intermediate

### Mathematics: Grades 7-9

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## *Overview of the concept*

This is how you solve for an unknown when brackets are hiding it. A discount that applies to a whole group of items, or a total cost that includes several things bundled together, both hide the unknown inside brackets. Opening the brackets up lets you see the unknown clearly and solve for it. It is the step that turns a messy real-life total into a problem you can actually solve.




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## Worked examples

EXAMPLE 1

**Q** Solve $3(x + 2) = 21$.

SOLUTION

This is an equation with brackets, and the quick way here is to divide first: 3 divides both sides, and $21 \div 3 = 7$.

That leaves $x + 2 = 7$

Take 2 off both sides: $x = 5$

EXAMPLE 2

**Q** Solve $2(x - 4) = 10$.

SOLUTION

This time expand the brackets first: 2 times x is 2x, and 2 times −4 is −8.

That gives $2x - 8 = 10$, so $2x = 18$

Divide by 2: $x = 9$

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## Practice questions

**1** Solve $4(x + 3) = 28$

- **A** x = 3
- **B** x = 4
- **C** x = 5
- **D** x = 7

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**2** Solve $2(x + 3) + 4 = 18$

- **A** x = 2
- **B** x = 4
- **C** x = 5
- **D** x = 7

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**3** Solve $2(3x + 1) = 14$

- **A** x = 1
- **B** x = 2
- **C** x = 3
- **D** x = 4

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**4** Solve $3(x + 2) = 2(x + 5)$.

- **A** x = 2
- **B** x = 3
- **C** x = 4
- **D** x = 6

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**5** Solve $-2(x - 3) = 8$

- **A** $x = -4$
- **B** $x = -1$
- **C** $x = 1$
- **D** $x = 4$

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**6** Three bags each hold $x + 5$ marbles, for 30 marbles in all. What is $x$?

- **A** $x = 2$
- **B** $x = 5$
- **C** $x = 7$
- **D** $x = 10$

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**7** The solution is $x = 6$. Which equation has this solution?

- **A** $2(x + 1) = 14$
- **B** $2(x + 1) = 12$
- **C** $3(x - 1) = 12$

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**8** Ali solves $3(x + 2) = 18$ by writing $3x + 2 = 18$. What did Ali forget?

- **A** He added 2 instead of multiplying it; $x = 5$
- **B** He forgot to divide by 3; $x = 6$
- **C** He did not multiply the 2 by 3; $x = 4$
- **D** He multiplied the 3 by 2; $x = 3$

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**9** Solve $4(2x - 3) - 3(x - 2) = 5(x + 1) - 7$

A $x = 0$

B No solution

C $x = 1$

D Infinitely many solutions

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**10** A rectangle's length is 4 m more than its width. Its perimeter is 48 m. Write an equation with brackets for the perimeter and find the width.

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## ANSWER KEY

**1.** $x = 4$

**2.** $x = 4$

**3.** $x = 2$

**4.** $x = 4$

**5.** $x = -1$

**6.** $x = 5$

**7.** $2(x + 1) = 14$

**8.** He did not multiply the 2 by 3; $x = 4$

**9.** No solution

**10.** 10 m

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