

WA7MNALE1

Linear and non-linear equations and inequalities

Core + Challenge

Solving Two-Step Equations

I can solve linear equations with up to two operations using the balance model or backtracking, and verify my solution.

Name: _____ Date: _____ Score: _____ / 55

Key idea

Backtracking: undo the operations in **reverse order**. $5m - 3 = 12$: add 3 $\rightarrow 5m = 15$; divide by 5 $\rightarrow m = 3$

Balance model: do the same thing to both sides at each step. $2x + 3 = 11 \rightarrow 2x = 8 \rightarrow x = 4$

Fractions: $\frac{e}{2} - 1 = 5 \rightarrow \frac{e}{2} = 6 \rightarrow e = 12$

Always verify: substitute back. $m = 3$: $5 \times 3 - 3 = 12 \checkmark$

A Fluency *practise the skill*

/ 16 marks

Solve each equation. Show the first step.

1. $2x + 3 = 11$ _____

9. $\frac{x}{4} + 3 = 7$ _____

2. $5m - 3 = 12$ _____

10. $7a - 4 = 45$ _____

3. $3p + 7 = 22$ _____

11. $2.5w + 5 = 30$ _____

4. $4k - 9 = 11$ _____

12. $\frac{m}{3} - 2 = 4$ _____

5. $48 = 14 + 2p$ _____

13. $0.5k + 6 = 10$ _____

6. $\frac{e}{2} - 1 = 5$ _____

14. $9 + 4t = 29$ _____

7. $6y + 1.5 = 13.5$ _____

15. $\frac{1}{4} + 2k = \frac{3}{8}$ _____

8. $10 = 3n - 5$ _____

16. $\frac{(n+4)}{3} = 5$ _____

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B

Core *apply the skill to problems*

/ 21 marks

- 1 Three bags with equal numbers of chocolates are tipped into a container that already holds 5 chocolates. There are now 62 altogether. How many were in each bag? Write and solve an equation. [2 marks]

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Answer: _____

- 2 A taxi charges \$4 plus \$2.50 per km. A fare was \$29. How far was the trip? Write and solve an equation. [2 marks]

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Answer: _____

- 3 An isosceles triangle tile has two equal sides that are each 2 cm longer than the shortest side, s. The perimeter is 25 cm. [3 marks]
- (a) Write an equation.
- (b) Find the length of each side.

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Answer: _____

- 4 Maximum heart rate is $220 - \text{age}$. At what age is it 187 beats per minute? Write and solve an equation. [2 marks]

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Answer: _____

- 5 A phone bill is \$25 plus 10 cents per text. The bill was \$43.50. How many texts were sent? [2 marks]

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Answer: _____

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- 6 Two adult tickets and a \$12 child ticket cost \$58 in total. Write and solve an equation to find the price of one adult ticket. [2 marks]

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Answer: _____

- 7 I think of a number, multiply it by 4 and subtract 7. The answer is 25. What was my number? [2 marks]

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Answer: _____

- 8 A rectangle has a perimeter of 30 cm and a length of 9 cm. Write and solve an equation to find the width. [2 marks]

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Answer: _____

- 9 A gym charges a \$50 joining fee plus \$15 per week. Jess has paid \$185 in total. How many weeks has she been a member? [2 marks]

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Answer: _____

- 10 Bike hire costs \$12 plus \$8 per hour. How many hours can you hire a bike for with \$60? [2 marks]

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Answer: _____

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C

Reasoning *explain, justify and check*

/ 9 marks

- 1 Explain why, to solve $2x + 3 = 11$, you subtract 3 before dividing by 2. [2 marks]

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- 2 Mo started solving $3p + 7 = 22$ by dividing only the $3p$ by 3, writing $p + 7 = 22$. Explain his mistake. [2 marks]

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- 3 Is $x = 4$ a solution of $5x - 3 = 2x + 9$? Show by substitution. [2 marks]

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- 4 Solve $4k - 9 = 11$ twice: once with backtracking and once with the balance model. Which do you prefer, and why? [3 marks]

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D

Challenge *multi-step and problem-solving*

/ 9 marks

- 1 Solve $\frac{2x}{3} + 4 = 10$ [2 marks]

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Answer: _____

- 2 The sum of three consecutive whole numbers is 57. Write and solve an equation to find them. [3 marks]

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Answer: _____

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- 3 Jess is 3 times as old as her brother. Their ages add to 48. How old is each? [2 marks]

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Answer: _____

- 4 Write a two-step equation whose solution is 2.5, and a real-life story to match it. [2 marks]

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Answer: _____

How did I go?

Fluency ____ / 16 Core ____ / 21 Reasoning ____ / 9 Challenge ____ / 9 **Total ____ / 55**

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