

GCSE Maths: The unknown on both sides (Higher): answers

GCSE Maths - Linear Equations - Higher - Lesson 9.4

Answers. Final answers to the worksheet questions. Full step-by-step solutions for every question are free at websink.site/gcse/maths/ch09-linear-equations/higher/the-unknown-on-both-sides/

Exercise 9D The unknown on both sides

Non-calculator

1 Solve these equations. There are no plain numbers to move.

(a) $5x = 3x + 8$

Answer: $x = 4$

(b) $4x = x + 12$

Answer: $x = 4$

(c) $7x = 4x + 15$

Answer: $x = 5$

(d) $6x = 2x + 20$

Answer: $x = 5$

(e) $9x = 5x + 28$

Answer: $x = 7$

(f) $8x = 3x + 35$

Answer: $x = 7$

2 Solve these equations.

(a) $3x + 5 = x + 11$

Answer: $x = 3$

(b) $5x + 2 = 2x + 14$

Answer: $x = 4$

(c) $4x + 1 = x + 16$

Answer: $x = 5$

(d) $6x + 3 = 4x + 11$

Answer: $x = 4$

(e) $7x + 4 = 3x + 20$

Answer: $x = 4$

(f) $8x + 1 = 5x + 19$

Answer: $x = 6$

3 Solve these equations. Each has a subtraction.

(a) $5x - 3 = 2x + 9$

Answer: $x = 4$

(b) $6x - 4 = 3x + 14$

Answer: $x = 6$

(c) $4x - 7 = x + 8$

Answer: $x = 5$

(d) $7x - 1 = 5x + 13$

Answer: $x = 7$

(e) $9x - 8 = 4x + 27$

Answer: $x = 7$

(f) $8x - 5 = 3x + 20$

Answer: $x = 5$

4 Solve these equations. The bigger x term is on the right-hand side.

(a) $x + 12 = 3x + 4$

Answer: $x = 4$

(b) $2x + 9 = 5x$

Answer: $x = 3$

(c) $3x + 8 = 5x - 4$

Answer: $x = 6$

(d) $4x + 3 = 7x - 18$

Answer: $x = 7$

(e) $2x + 15 = 6x - 13$

Answer: $x = 7$

(f) $3x + 7 = 8x - 23$

Answer: $x = 6$

5 Solve these equations. Each solution is a negative number.

(a) $2x + 9 = 5x + 15$

Answer: $x = -2$

(b) $3x + 14 = 7x + 22$

Answer: $x = -2$

(c) $5x + 4 = 8x + 13$

Answer: $x = -3$

(d) $2x - 3 = 4x + 7$

Answer: $x = -5$

(e) $x + 1 = 4x + 10$

Answer: $x = -3$

(f) $6x + 5 = 9x + 20$

Answer: $x = -5$

- 6 Taxi firm A charges £3 plus £2 per mile. Taxi firm B charges £1 plus £3 per mile. For how many miles do the two firms charge the same amount?

Answer: 2 miles

- 7 Sam thinks of a number. He multiplies it by 5 and subtracts 6. If he had multiplied it by 3 and added 10 instead, he would have got the same answer. What is Sam's number?

Answer: 8

- 8 Lily solves $6x + 5 = 2x + 17$. Her first line is $8x + 5 = 17$. Explain her mistake and solve the equation correctly.

Answer: She added $2x$ to the left instead of subtracting it from both sides. $x = 3$

- 9 Show that $x = 5$ is the solution of $7x - 9 = 3x + 11$.

Answer: Both sides equal 26

- 10 Ali has £5 and saves £4 each week. Ben has £21 and saves £2 each week. After how many weeks will they have the same amount?

Answer: 8 weeks

- 11 To solve $3x + 8 = 7x - 4$, Amy subtracts $7x$ from both sides and gets $-4x + 8 = -4$. Ben subtracts $3x$ from both sides and gets $8 = 4x - 4$. Show that they both get the same value of x .

Answer: Both get $x = 3$

- 12 The equation $4x + a = 2x + 10$ has the solution $x = 3$. Work out the value of a .

Answer: $a = 4$

- 13 The equation $5x + 3 = kx + 11$ has the solution $x = 2$. Work out the value of k .

Answer: $k = 1$