

# GCSE Maths: Solving linear inequalities (Higher): answers

GCSE Maths - Inequalities - Higher - Lesson 10.3

**Answers.** Final answers to the worksheet questions. Full step-by-step solutions for every question are free at [websink.site/gcse/maths/ch10-inequalities/higher/solving-linear-inequalities/](https://websink.site/gcse/maths/ch10-inequalities/higher/solving-linear-inequalities/)

## Exercise 10C Solving one-step and two-step inequalities Non-calculator

**1** Solve each inequality.

(a)  $x + 5 > 9$

**Answer:**  $x > 4$

(b)  $x - 3 \leq 4$

**Answer:**  $x \leq 7$

(c)  $2x < 14$

**Answer:**  $x < 7$

(d)  $\frac{x}{4} \geq 3$

**Answer:**  $x \geq 12$

(e)  $x + 7 \leq 2$

**Answer:**  $x \leq -5$

(f)  $5x > 35$

**Answer:**  $x > 7$

**2** Solve each inequality.

(a)  $2x + 3 > 11$

**Answer:**  $x > 4$

(b)  $3x - 4 \leq 14$

**Answer:**  $x \leq 6$

(c)  $5x + 1 < 26$

**Answer:**  $x < 5$

(d)  $4x - 7 \geq 9$

**Answer:**  $x \geq 4$

(e)  $2x + 9 \leq 3$

**Answer:**  $x \leq -3$

(f)  $6x - 5 > -17$

**Answer:**  $x > -2$

**3** Solve each inequality. Give your answer with  $x$  on the left.

(a)  $12 > 2x + 4$

**Answer:**  $x < 4$

(b)  $20 \leq 3x - 1$

**Answer:**  $x \geq 7$

(c)  $7 < 5x - 8$

**Answer:**  $x > 3$

(d)  $10 \geq 4x + 2$

**Answer:**  $x \leq 2$

(e)  $-4 < 2x + 6$

**Answer:**  $x > -5$

(f)  $2 > 3x - 7$

**Answer:**  $x < 3$

**4** Solve each inequality. (The letter is divided by a number.)

(a)  $\frac{x}{3} - 2 > 1$

**Answer:**  $x > 9$

(b)  $\frac{x}{2} + 3 \leq 5$

**Answer:**  $x \leq 4$

(c)  $\frac{x}{5} + 1 \geq 4$

**Answer:**  $x \geq 15$

(d)  $\frac{2x}{3} < 8$

**Answer:**  $x < 12$

**5** Hana solves  $2x - 5 < 9$  and writes  $x < 2$ . Explain her mistake and give the correct solution.

**Answer:**  $x < 7$ . She subtracted 5 instead of adding 5

**6** Show that  $x = 4$  is a solution of  $5x - 3 > 12$ , but  $x = 3$  is not.

**Answer:**  $x = 4$  gives  $17 > 12$  (true);  $x = 3$  gives  $12 > 12$  (false)

**7** Solve  $4x - 3 \leq 17$ . Write down the largest whole number that satisfies the inequality.

**Answer:** 5

**8** Solve  $3n + 5 > 20$ . Write down the smallest whole number that satisfies the inequality.

**Answer:** 6

**9** The number  $n$  satisfies  $5n - 4 < 31$ . What is the largest whole-number value of  $n$ ?

**Answer:** 6

**10** Solve  $2x + 7 \geq 25$  and show your solution on a number line.

**Answer:**  $x \geq 9$

**11** Solve  $3x + 2 = 14$  and  $3x + 2 > 14$ . What is the difference between the two answers?

**Answer:**  $x = 4$ ;  $x > 4$ . The equation has one solution, the inequality has a range

**12** Is it true that  $2x < 10$  and  $10 > 2x$  have the same solutions? Show your working.

**Answer:** Yes: both give  $x < 5$

**13** Mia and Leo both solve  $3x + 4 > 19$ . Mia gets  $x > 5$ . Leo gets  $x \geq 5$ . Who is right? Test  $x = 5$  to decide.

**Answer:** Mia is right

## Exercise 10D Solving, number lines and whole-number solutions

Non-calculator

**1** Solve each inequality and show the solution on a number line.

(a)  $2x + 1 > 9$

**Answer:**  $x > 4$

(b)  $3x - 2 \leq 7$

**Answer:**  $x \leq 3$

(c)  $4x + 5 < 1$

**Answer:**  $x < -1$

(d)  $5x - 1 \geq 14$

**Answer:**  $x \geq 3$

**2** Solve each inequality, then write down the **largest whole number** that satisfies it.

(a)  $2x + 3 < 12$

**Answer:** 4

(b)  $5x - 1 \leq 24$

**Answer:** 5

(c)  $3x + 2 < 9$

**Answer:** 2

(d)  $4x + 1 \leq 20$

**Answer:** 4

**3** Solve each inequality, then write down the **smallest whole number** that satisfies it.

(a)  $3x + 1 > 13$

**Answer:** 5

(b)  $2x - 5 \geq 4$

**Answer:** 5

(c)  $5x + 2 > 6$

**Answer:** 1

4 Solve each inequality, then list the **positive whole numbers** that satisfy it.

(a)  $2x + 1 < 11$

**Answer:** 1, 2, 3, 4

(b)  $3x \leq 12$

**Answer:** 1, 2, 3, 4

(c)  $5x - 3 < 12$

**Answer:** 1, 2

(d)  $4x + 3 \leq 20$

**Answer:** 1, 2, 3, 4

5 Sam thinks of a whole number,  $n$ . He multiplies it by 3 and adds 4. The answer is less than 30. What is the largest number Sam could be thinking of?

**Answer:** 8

6 Dev solves  $2x + 1 < 8$  and gets  $x < 3.5$ . He says the largest whole number is 4. Is he right? Explain.

**Answer:** No. The largest whole number is 3, because 4 is bigger than 3.5

7 Explain why the smallest whole number satisfying  $n > 1.3$  is 2, and not 1.

**Answer:** 1 is smaller than 1.3, so 1 is not a solution; the next whole number up is 2

8 Solve each inequality.

(a)  $\frac{x+3}{2} \geq 4$

**Answer:**  $x \geq 5$

(b)  $\frac{2x-1}{3} < 5$

**Answer:**  $x < 8$

(c)  $\frac{x+4}{5} > 3$

**Answer:**  $x > 11$

9 Solve each inequality.

(a)  $\frac{x+3}{2} \geq \frac{x-1}{3}$

**Answer:**  $x \geq -11$

(b)  $\frac{2x-1}{3} < \frac{x+4}{2}$

**Answer:**  $x < 14$

(c)  $\frac{3x + 1}{4} > \frac{x - 2}{3}$

**Answer:**  $x > -2.2$