

Exercise walk-through

Inequalities ■ E2.6

eXercise

You must be able to

- solve a linear inequality (and reverse the sign when needed)
- solve a double inequality
- list the integers that satisfy an inequality

Method — Solving inequalities

- **Worked:** $-3 \leq 3x - 2 < 7 \rightarrow \text{add } 2: -1 \leq 3x < 9 \rightarrow \div 3: -\frac{1}{3} \leq x < 3.$
- **Reverse:** $-2x < 6 \rightarrow x > -3$ (sign flips when dividing by -2).
- **Number line:** closed circle for $\leq / \geq$, open circle for $< / >$.

Answer shapes: **M1** a correct method, **A1** the correct answer.

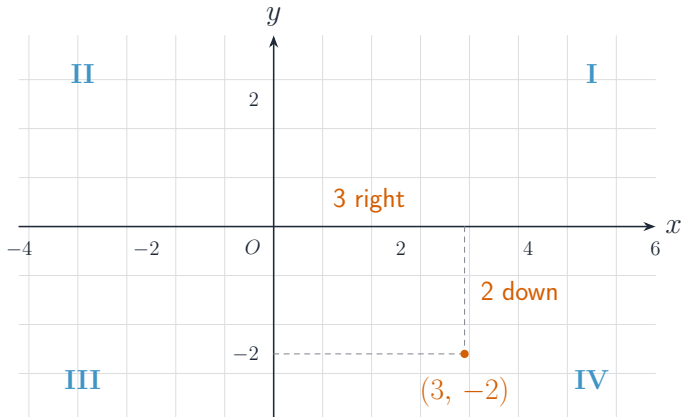
Method — Solving inequalities

$-\frac{1}{3}$ included (closed circle) 3 excluded (open circle)



A number line: closed circle includes the value, open circle excludes it

Method — Solving inequalities



Two-variable inequalities shade regions of the plane

Practice 2.1 ■ 2 marks

Solve $2x + 1 > 9$.

Solution 2.1

Worked steps

$$2x > 8 \rightarrow x > 4 \quad \text{M1} \quad \text{A1} \quad \text{for } 2x > 8; \text{ for } x > 4.$$

Practice 2.2 ■ 2 marks

Solve $-3x \leq 12$.

Solution 2.2

Method: Solving inequalities

Worked steps

dividing by -3 reverses the sign: $x \geqslant -4$ **M1** **A1** *for dividing by -3 and reversing;*
for $x \geqslant -4$.

Practice 2.3 ■ 2 marks

Solve $5x - 4 < 11$.

Solution 2.3

Worked steps

$$5x < 15 \rightarrow x < 3 \quad \text{M1} \quad \text{A1} \quad \text{for } x < 3.$$

Exam-style 3.1 ■ 3 marks

Solve the inequality $5 \leq 2x + 1 \leq 11$.

Solution 3.1

Method: Solving inequalities

Worked steps

subtract 1: $4 \leq 2x \leq 10$; divide by 2: $2 \leq x \leq 5$ **M1** **M1** **A1** *for subtracting 1; for dividing by 2; for $2 \leq x \leq 5$.*

Exam-style 3.2 ■ 2 marks

Write down the integers that satisfy $-2 < x \leq 3$.

Solution 3.2

Worked steps

the integers are $-1, 0, 1, 2, 3$ **M1** **A1** *for excluding -2 but including 3 ; for the full list.*

Exam-style 3.3 ■ 2 marks

Solve $7 - 2x \geq 1$.

Solution 3.3

Method: Solving inequalities

Worked steps

$-2x \geq -6 \rightarrow$ dividing by -2 reverses the sign $\rightarrow x \leq 3$ **M1** **A1** *for $-2x \geq -6$ and reversing; for $x \leq 3$.*