

E2.6 Inequalities

Name: _____ Class: _____ Date: _____

Total: 13 marks**KEY WORDS** inequality 不等式 • number line 数轴 • region 区域 • equation 方程 • linear 一次

Objective

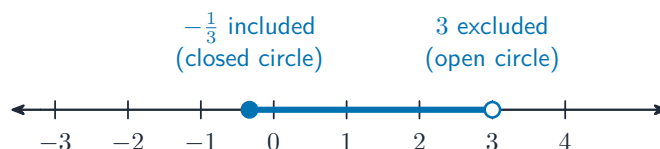
Build the skills to answer Extended exam questions on **inequalities** 不等式 — solving them, the rule for **multiplying or dividing by a negative** 乘除负数, and showing a solution on a **number line** 数轴.

You must be able to:

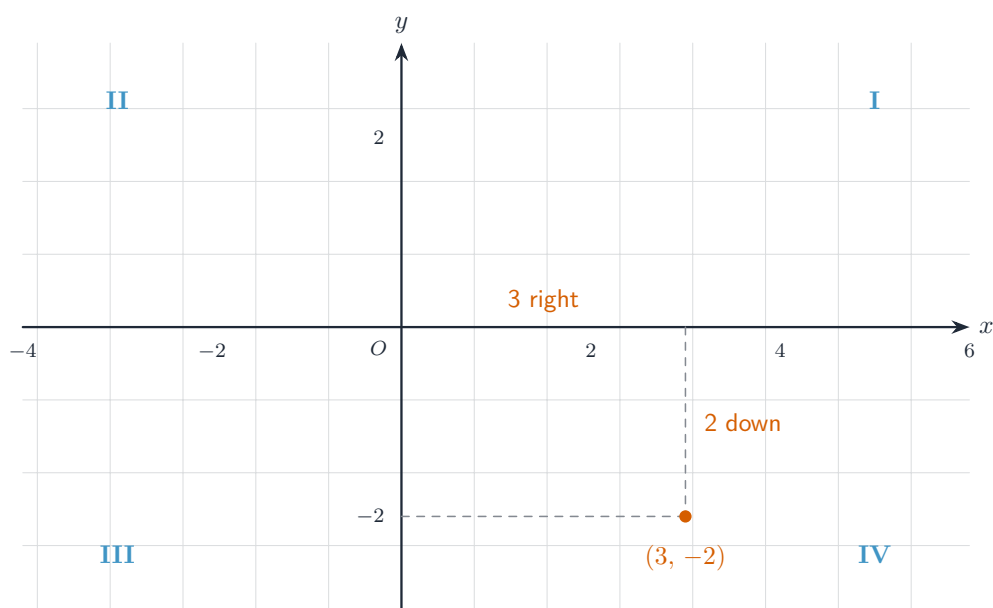
- solve a linear inequality (and reverse the sign when needed)
- solve a double inequality
- list the integers that satisfy an inequality

1 Worked examples

■ Solving inequalities



Solve like an equation, but reverse the sign if you $\div$ or $\times$ by a negative



Two-variable inequalities shade regions of the plane

- **Worked:** $-3 \leq 3x - 2 < 7 \rightarrow$ 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.

2 Practice

2.1 Solve $2x + 1 > 9$. [2]

2.2 Solve $-3x \leq 12$. [2]

2.3 Solve $5x - 4 < 11$. [2]

3 Exam-style questions

3.1 Solve the inequality $5 \leq 2x + 1 \leq 11$. [3]

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

3.3 Solve $7 - 2x \geq 1$. [2]

Solutions

Marking: **M1** a correct method, **A1** the correct answer.

2.1 $2x > 8 \rightarrow x > 4.$

2.2 dividing by -3 reverses the sign: $x \geqslant -4.$

2.3 $5x < 15 \rightarrow x < 3.$

3.1 subtract 1: $4 \leqslant 2x \leqslant 10$; divide by 2: $2 \leqslant x \leqslant 5.$

3.2 the integers are $-1, 0, 1, 2, 3.$

3.3 $-2x \geqslant -6 \rightarrow$ dividing by -2 reverses the sign $\rightarrow x \leqslant 3.$