

Inequalities

GCSE Maths · Written to the shared content for AQA, Edexcel and OCR

Name _____ Class _____ Date _____

1. Worked example

Solve $4 - 3x > 13$.

Step 1 · Subtract 4

$$-3x > 9$$

Step 2 · Divide by -3 and FLIP the sign

$$x < -3$$

Answer: $x < -3$

Check: $x = -4$: $4 + 12 = 16 > 13$ ✓

2. Now try one with the steps

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

Step 1 · -2 is NOT included ($<$); 3 IS included ($\leq$)

Answer:

3. Practice

Show your working. The marks tell you how much is expected.

1. Solve $3x + 2 < 14$. [2]

2. Solve $5 - 2x \geq 1$. [2]

3. List the integers that satisfy $-2 < x \leq 3$. [2]

4. Solve $x/3 \geq 4$. [1]

5. Solve $2(x - 3) > 8$. [2]

6. A number line shows an open circle at 1 with an arrow pointing right. Write the inequality. [1]

7. Solve $5x - 4 \geq 2x + 11$. [2]

8. Solve $-5 \leq 2x + 1 < 9$. [2]

9. List the integers n with $3 < 2n \leq 12$. [2]

10. Find the smallest integer x such that $4x + 3 > 20$. [2]

11. Find the largest integer x such that $7 - 3x > -8$. [2]

12. Write $x > 3$ in set notation. [1]

13. How many points with integer coordinates satisfy $x \geq 0$, $y \geq 0$ and $x + y \leq 4$? [2]

14. Write the inequality for the region below the line $y = 2x + 1$, not including the line. [1]

15. List all the points with integer coordinates that satisfy $x > 1$, $y > 1$ and $x + y < 6$. [3]

4. Before you hand it in

$$-3x > 9 \rightarrow x > -3$$

Dividing by -3 reverses the sign: $x < -3$. Check with $x = -4$.

Integers for $-2 < x \leq 3$: $-2, -1, 0, 1, 2, 3$

$<$ means -2 is NOT included. The list starts at -1 .

$$-5 \leq 2x + 1 < 9 \rightarrow -5 \leq 2x < 8$$

Subtract 1 from ALL three parts: $-6 \leq 2x < 8$, then divide all by 2.

Drawing $y < 2x + 1$ with a solid line

Strict ($<$ or $>$) boundaries are DASHED; $\leq$ and $\geq$ are solid.