FOUNDATION & HIGHER

HIGHER EXTENDS

Name ..... Class .....

A22: Inequalities

Reason with solving and representing inequalities

20 marks · 25 minutes · Non-calculator

1) Show that $x = 4$ satisfies $3x - 2 > 8$

[Question 1: 1 marks]

2) Sam solves $-2x < 6$ and writes $x < -3$. Explain his mistake.

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[Question 2: 2 marks]

3) Show that the solution of $5x + 3 \leqslant 2x + 15$ is $x \leqslant 4$

[Question 3: 2 marks]

4) Explain the difference between an open circle and a filled circle on a number line.

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[Question 4: 2 marks]

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5) Show that the integers satisfying $-1 < 2x + 1 \leqslant 7$ are 0, 1, 2 and 3

[Question 5: 2 marks]

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6) Explain why the solution of $x^2 < 9$ is $-3 < x < 3$ and not just $x < 3$.

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[Question 6: 2 marks]

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7) Show that $x^2 - 5x + 4 > 0$ when $x < 1$ or $x > 4$

[Question 7: 3 marks]

8) Does the point $(2, 3)$ satisfy both $y > x + 1$ and $x + y < 6$? Explain.

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[Question 8: 2 marks]

9) Kim says there are values of x with $x > 5$ and $x < 2$. Explain why she is wrong.

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[Question 9: 1 marks]

10) Use an example to explain why multiplying both sides of an inequality by a negative number reverses the sign.

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[Question 10: 3 marks]

End of paper – 20 marks in total

Answers and brief mark scheme

Q	Answer	Method / notes
1	Shown	$12 - 2 = 10 > 8$ (C1).
2	$x > -3$	Dividing by a negative reverses the sign (C1); B1.
3	Shown	$3x \leqslant 12$ (M1); C1.
4	Explanation	Open: value not included (C1); filled: included (C1).
5	Shown	$-1 < x \leqslant 3$ (M1); C1.
6	Explanation	e.g. $x = -4$ gives 16, not less than 9 (C1); both ± 3 are critical values (C1).
7	Shown	$(x-1)(x-4)$ (M1); roots 1 and 4 (M1); U-shaped so positive outside (C1).
8	No	$3 > 3$ is false (M1); C1.
9	Explanation	No number is both above 5 and below 2 (C1).
10	Explanation	e.g. $2 < 3$ but $-2 > -3$ (M1, M1); conclusion (C1).