

Set Notation for Inequalities

Starter

1. (Review of last lesson)

Solve these inequalities, expressing your answer as (i) an inequality and (ii) as a diagram:

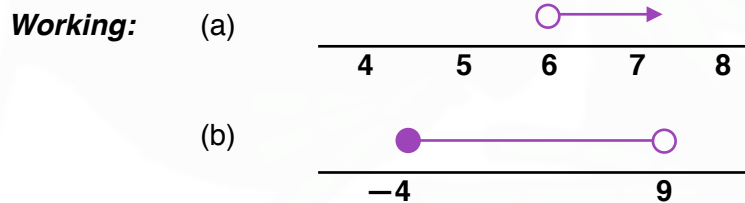
(a) $-30 \leq -7x + 12 < 61$ (b) $x - 9 < 6x + 1 < 2x + 13$

Working: (a)
$$\begin{array}{l} -30 \leq -7x + 12 < 61 \\ -30 \leq -7x + 12 \qquad -7x + 12 < 61 \\ -42 \leq -7x \qquad -7x < 49 \\ 6 \geq x \qquad x > -7 \\ \text{Combine into 1 inequality:} \qquad -7 < x \leq 6 \\ \text{N.B. } 6 \geq x > -7 \text{ would be incorrect.} \end{array}$$

(b)
$$\begin{array}{l} x - 9 < 6x + 1 < 2x + 13 \\ x - 9 < 6x + 1 \qquad 6x + 1 < 2x + 13 \\ -10 < 5x \qquad 4x < 12 \\ -2 < x \qquad x < 3 \\ \text{Combine into 1 inequality:} \qquad -2 < x < 3 \end{array}$$

E.g. 1 Draw a number line to illustrate each inequality:

(a) $\{x : x > 6\}$ (b) $\{x : -4 \leq x < 9\}$



E.g. 2 Write in set notation the solutions for the inequalities:

(a) $5x - 2 > 43$ (b) $5 < 3x - 1 < 17$

Working: (a)
$$\begin{array}{l} 5x - 2 > 43 \\ 5x > 45 \\ x > 9 \\ \text{In set notation:} \qquad \{x : x < 9\} \end{array}$$

(b)
$$\begin{array}{l} 5 < 3x - 1 < 17 \\ 5 < 3x - 1 \qquad 3x - 1 < 17 \\ 6 < 3x \qquad 3x < 18 \\ 2 < x \qquad x < 6 \\ \text{Combining the inequalities:} \qquad 2 < x < 6 \\ \text{In set notation:} \qquad \{x : 2 < x < 6\} \end{array}$$

[Solutions to Starter and E.g.s](#)

Exercise

- 9-1 class textbook: p510 E16.1 Qu 1ace, 2ac, 3, 4
 A*-G class textbook: No exercise
 9-1 homework book: p172 E16.1 Qu 1-5
 A*-G homework book: No exercise