

## Inequality Notation

### Starter

1. **(Review of last lesson)** A quadratic curve of the form  $y = x^2 + bx + c$  has its vertex at the point (2, 3). Find its equation.
2. **(Review of last lesson)** By completing the square, find the coordinates of the vertex of the curve  $y = 13 + 8x - 2x^2$  and state whether it is a maximum or minimum.
3. **(Review of last lesson)**
  - (a) Write  $3x^2 - 24x + 11$  in completed square form and state the coordinates of the vertex of the graph  $y = 3x^2 - 24x + 11$ .
  - (b) State, without any further working, for what values of  $k$  is the curve  $y = 3x^2 - 24x + 11 + k$  completely above the  $x$ -axis.

### Notes

#### Interval notation

$$x \in (a, b) \text{ means } a < x < b$$

$$x \in [a, b] \text{ means } a \leq x \leq b$$

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#### Set notation

$$x \geq 5 \equiv x \in [5, \infty)$$

$$2 < x < 5 \equiv \{x : 2 < x < 5\}$$

or  $2 < x < 5 \equiv \{x : x > 2\} \cap \{x : x < 5\}^*$  where  $\cap$  means intersection

$$x < 2, x > 5 \equiv \{x : x < 2, x > 5\}$$

or  $x < 2, x > 5 \equiv \{x : x < 2\} \cup \{x : x > 5\}^*$  where  $\cup$  means union

**N.B.** The second version\* is the one to use in exams

$\emptyset$  - empty set notation i.e. no solutions

**E.g. 1** Copy and complete the table:

Inequality	Set notation	Interval notation
$x > 4$		
	$\{x : x \geq -3\} \cap \{x : x \leq 8\}$	
$x \leq 6$		
		$(-\infty, 9] \cup [15, \infty)$

Video: [Solving doubles inequalities](#)

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

**Exercise**

p8 1B Qu 1iac, 2iac, 3iac, 4iac, 5iac

**Summary**

Interval notation:  $x \in (a, b)$  means  $a < x < b$   
 $x \in [a, b]$  means  $a \leq x \leq b$   
 $x \in [a, b)$  means  $a \leq x < b$   
 $x \in (a, b]$  means  $a < x \leq b$

Set notation:  $x \geq 5 \equiv x \in [5, \infty)$

$2 < x < 5 \equiv \{x : x > 2\} \cap \{x : x < 5\}^*$  where  $\cap$  means intersection

$x < 2, x > 5 \equiv \{x : x < 2\} \cup \{x : x > 5\}^*$  where  $\cup$  means union