

Inequalities

- Solving linear inequalities in one variable
- Representing solutions on a number line.

Check that you can:

- know how to write positive and negative integers in the correct order
- know the meanings of $<$, $>$, \leq , and \geq
- can solve simple one- and two-part equations.

You can solve an inequality in one variable in the same way as solving ordinary equations. We use inverse operations in the same way.

Example 1:

$$x + 5 < 12$$

Subtract 5 from each side of the $<$

$$x + 5 - 5 < 12 - 5$$

$$x < 7$$

Example 3:

$$5x - 9 \geq 26$$

$$5x - 9 + 9 \geq 26 + 9$$

$$5x \geq 35$$

Divide each side by 5.

$$\frac{5x}{5} \geq \frac{35}{5}$$

$$x \geq 7$$

Example 2:

$$x - 8 > 12$$

Add 8 to each side of the $>$

$$x - 8 + 8 > 12 + 8$$

$$x > 20$$

Example 4:

$$6x + 5 \leq 29$$

Subtract 5 from each side.

$$6x + 5 - 5 \leq 29 - 5$$

$$6x \leq 24$$

Divide each side by 6.

$$\frac{6x}{6} \leq \frac{24}{6}$$

$$x \leq 4$$

$<$ means LESS than

$n < 4$ means all numbers less than 4 (but not including 4).

e.g. n can be 3, 2, 1, 0, -1...

n can also be decimal numbers less than 4.

$>$ means GREATER than

$n > 4$ means all numbers greater than 4 (but not including 4).

e.g. n can be 5, 6, 7, 8...

n can also be decimal numbers greater than 4.

\leq means LESS than or EQUAL to

$n \leq 4$ means all numbers less than or equal to 4 (including 4).

e.g. n can be 4, 3, 2, 1, 0, -1...

n can also be decimal numbers less than 4.

\geq means GREATER than or EQUAL to

$n \geq 4$ means all numbers greater than or equal to 4 (including 4).

e.g. n can be 4, 5, 6, 7, 8...

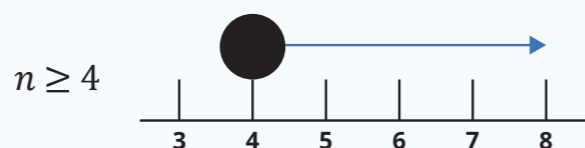
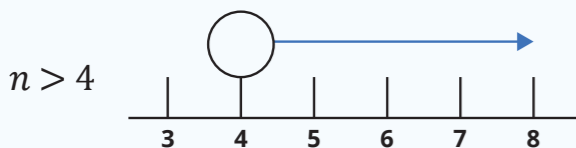
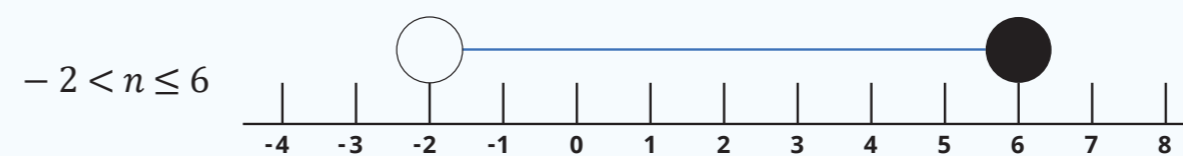
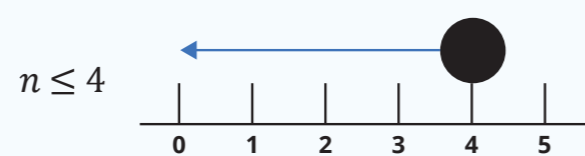
n can also be decimal numbers greater than 4.

REMEMBER!

When solving an inequality, we treat the symbol ($<$, $>$, \leq or \geq) like an $=$ sign in an equation.

If we need to multiply or divide each side by a negative number, we reverse the direction of the sign. Otherwise, we don't change the sign.

Representing solutions on a number line:



A coloured-in circle means that number is included.

A circle that is not coloured in means that number is not included.