

Generalising Arithmetic

Understanding Inequalities

Inequalities are used when we want to show that one thing is bigger or smaller than another.

$$x > 4 \quad 6 < x \quad x < 12$$

x is greater than 4 x is greater than 6 x is less than 12

$$x \geq -2 \quad x \leq 21$$

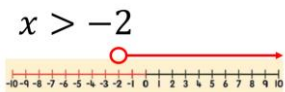
x is greater than or equal to -2 x is less than or equal to 21

Inequalities on Number Lines 1

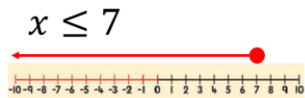
Mathswatch Video:20a

As inequalities have a range of answers, we can show all the possible answers over a number line.

Examples:



For $<$ and $>$ we use an empty circle



For \leq and \geq we use a dot (filled circle)

Vocabulary

Inequalities – Are similar to equal signs and are used to show that one side may be bigger or smaller than the other side

Range – A number of different possible answers

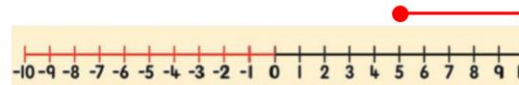
Solve – To find the value of the unknown

Inequalities on Number Lines 2

Mathswatch Video:20a

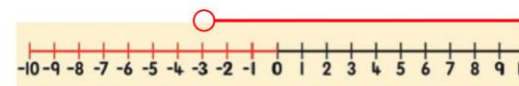
Drawing number lines from inequalities

$$x \geq 5$$



- 1) Put a circle above the number?
- 2) Is x bigger(right) or smaller(left)?
- 3) Do I need to fill in the dot (\leq, \geq)?

Finding Inequality from number line



$$x > -3$$

- 1) What number is the circle above?
- 2) Is the arrow going right(bigger) or left(smaller)?
- 3) Is the dot filled in (\leq, \geq)?

Solving Inequalities

Mathswatch Video:20b

Solving inequalities can be treated exactly the same as solving equations. The steps are exactly the same. The only difference is that your answer will be an inequality.

Solve the following:

$$\begin{aligned} 3x + 5 &= 17 && -5 \\ 3x &= 12 && \div 3 \\ x &= 4 \end{aligned}$$

Solve the following:

$$\begin{aligned} 3x + 5 &< 17 && -5 \\ 3x &< 12 && \div 3 \\ x &< 4 \end{aligned}$$

TOP TIP: The inequality always faces the same way