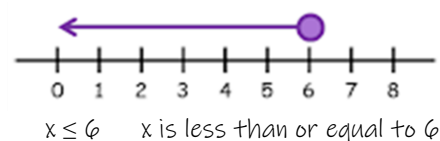# Y9 Maths Knowledge Organiser Topic 4: Inequalities

What must I be able to do?	Key vocabulary	

You may need to revise the following:
• Year 8 Topic 6: Negative Numbers 2
New content:
☐ Show and read inequalities on a number line.
   ➢ Mathswatch 138 (GCSE)
☐ Solve linear inequalities
   ➢ Mathswatch 139 (GCSE)
	Inequality	An inequality <u>compares two</u> numbers or algebraic expressions, showing if one is <u>greater than</u>, greater than or equal to, less than, or <u>less than</u> or equal to another value.

Representing Inequalities

- The key points of the inequality are represented by circles on the number line. We usually use a letter to represent the range of possible values e.g. x
- An empty circle represents either a < or > (the value is not included)
- A filled in circle represents either a ≤ or ≥ (the value is included)
- The direction of the line/arrow decides whether it is less than or greater than

x > 2   x is greater than 2

x < 5   x is less than 5

x ≥ 3   x is greater than or equal to 3

x ≤ 6   x is less than or equal to 6
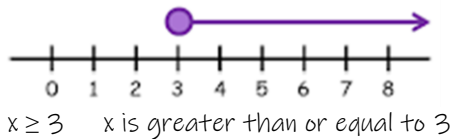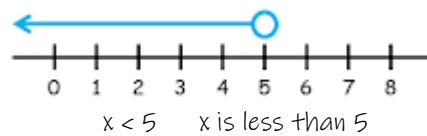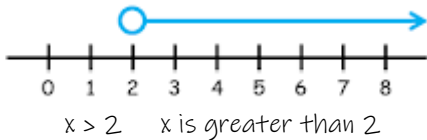
If x is between two values we can use 2 circles.

1 < x ≤ 6   x is greater than 1 but less than or equal to 6

Solving Inequalities

Solving an inequality is generally the same method and steps as solving any other equation. The main difference is the equals sign has been replaced by an inequality sign.

The one difference in the method is if at any point there is a need to multiply or divide by a negative number then the direction of the inequality changes.

Method 1

e.g.

$-3y + 2 > 8$

+3y   +3y

$2 > 8 + 3y$

-8   -8

$-6 > 3y$

÷3   ÷3

$-2 > y$

Avoid dividing by the negative by doing the inverse of the -3y first and turn it into + 3y

These two answers are equivalent (the same)

Method 2

$-3y + 2 > 8$

-2   -2

$-3y > 6$

÷ -3   ÷ -3

$y < -2$

As there is a division by a negative the inequality sign has changed direction