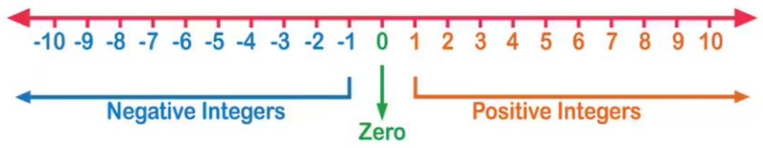
Year 7 Maths Topics 9 & 10
Operations & equations with directed number, Adding and subtracting fractions

Week 1

This topic we are going to introduce negative numbers which are referred to as **directed numbers**. We will look at extending the number line below zero and look at thermometers as real-life examples of this.



We will compare numbers using the symbols **<** less than and **>** greater than.
We are going to use a number line to perform calculations that cross the zero.
E.g. 2 - 8 = -6

Week 2

This week we are going to learn some rules that apply to directed numbers and use them to add, subtract multiply and divide with directed numbers.

"Two negatives make a positive"
e.g. 3 - -2 means 3 + 2 = 5 and -4 x -6 = 24
"Negative always wins"
E.g. 7+ -3 means 7 - 3 = 4 and 32 ÷ -8 = -4
We will also **substitute** negative numbers into algebraic expressions e.g. substitute n=-3 into 2n +1 → 2 x -3 = -6 + 1 = -5

Week 3

This week we are going to recap solving 1-step equations and learn to solve 2-step equations. **Solving** means to find out what the letter is worth. To solve equations we use the **inverse** to work backwards.
The inverse of addition is subtraction and the inverse of multiplication is division.
E.g. Solve $3x + 2 = 17$

$$3x = 15$$
$$x = 5$$

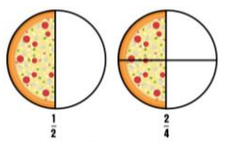
We will look at the order we need to do calculations in and **BIDMAS** helps us to remember the order. It stands for Brackets, Indices, Division, Multiplication, Addition and Subtraction.
Higher learners will look at roots and powers.

Week 4

This next topic is going to look at fractions. We will start by representing fractions as diagrams. The **denominator** (bottom number) tells us how many equal parts the shape is split into and the **numerator** (top number) tells how many will be shaded in. We are then going to learn to convert between **mixed numbers** and **improper fractions**. A mixed number tells us how many wholes and how many left over parts there are e.g. $2\frac{1}{2}$. An improper fraction is when the numerator is bigger than the denominator e.g. $\frac{7}{3}$
We will then begin to add and subtract fractions. To do this the denominators have to be the same and then we just add or subtract the numerators whilst the denominator stays the same.

Week 5

This week we will look at **equivalent fractions**. Equivalent fractions are different ways of writing the same thing.

E.g. $\frac{2}{4} \equiv \frac{1}{2}$ 

We will then use equivalent fractions to help us add and subtract fractions that do not have the same denominators by rewriting the question to make the denominators the same.

E.g. $\frac{1}{4} + \frac{1}{2}$ becomes $\frac{1}{4} + \frac{2}{4} = \frac{3}{4}$

We will also do questions where we have to alter both fractions by looking for a **common multiple** of the denominators.

E.g. $\frac{1}{4} + \frac{2}{3}$ becomes $\frac{3}{12} + \frac{8}{12} = \frac{11}{12}$

When working out equivalent fractions you must remember "what ever you do to the top you do the same to the bottom."

Week 6

This week we will move our learning on further by adding and subtracting mixed numbers. You will need to convert them into improper fractions, make the denominators the same, do the calculation and then convert it back to a mixed number.

E.g. $2\frac{1}{3} - 1\frac{5}{6} = \frac{7}{3} - \frac{11}{6} = \frac{14}{6} - \frac{11}{6} = \frac{3}{6} = \frac{1}{2}$

Sometimes you can **simplify** your answer by writing an equivalent fraction where the numbers are smaller. We will also use our knowledge from topic 8 to add decimal and fractions together by **converting** them both to the same format first.

E.g. $\frac{2}{10}$ + 0.7

= 0.2 + 0.7 = 0.9 **Or** $\frac{2}{10} + \frac{7}{10} = \frac{9}{10}$

Higher learners will look at fractions containing algebra.

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Week 1

Questions	Answers
What do mathematicians mean by directed numbers?	Negative numbers
What do these symbols mean < and > ?	< less than > greater than
Give a real-life example of a negative number line	Thermometer
What number come before zero on a number line?	-1 or minus one
What is 2 subtract 8?	-6

Week 2

Questions	Answers
If there are two negatives the answer will be _____	positive
If there is one positive and one negative the answer will be _____	negative
What does substitute mean?	When you swap a letter for a number.
What is -4 x -6 ?	24
What is 8 - -5 ?	8 + 5 = 13

Week 3

Questions	Answers
What does solving an equation mean?	Finding out what the letter is worth.
What do you need to use to solve an equation?	The inverse
What is the inverse of subtraction?	Addition
What is the inverse of division?	Multiplication
What does BIDMAS stand for?	Brackets, Indices, Division, Multiplication, Addition and Subtraction.

Week 4

Questions	Answers
What is the denominator?	The bottom number of a fraction
What is the numerator?	The top number of a fraction
What is a mixed number?	When you have a whole number and part of another number eg $2\frac{1}{2}$
What do you call it when the numerator is bigger than the denominator?	An improper fraction
What do the fractions need to have to be able to add or subtract them?	The same denominators

Week 5

Questions	Answers
What are equivalent fractions?	Different ways of representing the same thing
What do you need to remember when working out equivalent fractions	Whatever you do to the top you do the same to the bottom.
How do you add or subtract fractions that have different denominators?	Use equivalent fractions to rewrite the question where the denominators are the same.
How do you know what to change the denominator to?	You find a common multiple of both denominators
How do you add fractions when the denominators are the same?	Add the numerators but the denominator stays the same.

Week 6

Questions	Answers
How do you add or subtract mixed numbers?	Convert the mixed numbers into improper fractions first then calculate as before.
What does simplifying a fraction mean?	When you write an equivalent fraction where the numbers are smaller.
How would you add or subtract a fraction and a decimal?	Convert them both to fractions or convert them both to decimals.