

YEAR 7 — APPLICATION OF NUMBER

Solving problems with addition and subtraction

@whisto_maths

What do I need to be able to do?

By the end of this unit you should be able to:

- Understand properties of addition/ subtraction
- Use mental strategies for addition/subtraction
- Use formal methods of addition/subtraction for integers
- Use formal methods of addition/subtraction for decimals
- Solve problems in context of perimeter
- Solve problems with finance, tables and timetables
- Solve problems with frequency trees
- Solve problems with bar charts and line charts

Keywords

Commutative: changing the order of the operations does not change the result

Associative: when you add or multiply you can do so regardless of how the numbers are grouped

Inverse: the operation that undoes what was done by the previous operation (The opposite operation)

Placeholder: a number that occupies a position to give value

Perimeter: the distance/ length around a 2D object

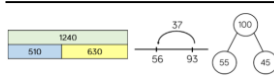
Polygon: a 2D shape made with straight lines

Balance: in financial questions — the amount of money in a bank account

Credit: money that goes into a bank account

Debit: money that leaves a bank account


Addition/ Subtraction with integers



Modelling methods for addition/ subtraction

- Bar models
- Number lines
- Part/ Whole diagrams

Addition is commutative



$$6 + 3 = 3 + 6$$

The order of addition does not change the result

Subtraction the order has to stay the same

$$360 - 147 = 360 - 100 - 40 - 7$$

- Number lines help for addition and subtraction
- Working in 10's first aids mental addition/ subtraction
- Show your relationships by writing fact families

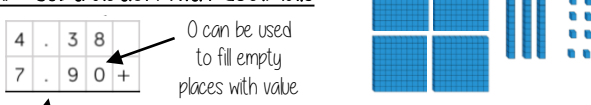
Formal written methods

	H	T	O
	1	8	7
+	5	4	2

	H	T	O
		4	2
-		2	4
			9


Remember the place value of each column
You may need to move 10 ones to the ones column to be able to subtract

Addition/ Subtraction with decimals



0 can be used to fill empty places with value

The decimal place acts as the placeholder and aligns the other values

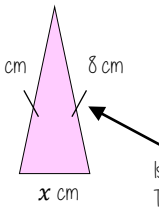
If  represents 1 instead of 100

Revisit Fraction — Decimal equivalence
 $5.43 + 0.8$

$$5.43 + \frac{8}{10}$$

Solve problems with perimeter

Perimeter is the length around the outside of a polygon



Isosceles Triangle notation

The triangle has a perimeter of 25cm
Find the length of x

$$8\text{cm} + 8\text{cm} + x\text{cm} = 25\text{cm}$$

$$16\text{cm} + x\text{cm} = 25\text{cm}$$

$$x\text{cm} = 9\text{cm}$$

Solve problems with finance

Profit = Income - Costs

Credit — Money coming into an account

Debit — Money leaving an account

Money uses a two decimal place system
14.2 on a calculator represents £14.20

Check the units of currency — work in the same unit

Tables and timetables

Distance tables

London		Cardiff	Glasgow	Belfast
211	556	493	177	
518	392			

This shows the distance between Glasgow and London
It is where their row and column intersects

Bus/ Train timetables

Harton	1005	1045	1130
Bridge	1024	1106	1147
Aville	1051	1133	1205
Ware	1117	1202	1233

Each column represents a journey each row represents the time the 'bus' arrives at that location

TIME CALCULATIONS — use a number line

Two-way tables

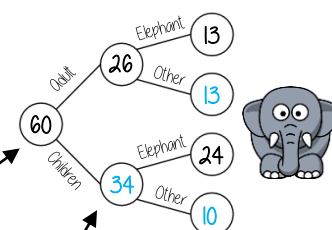
	H	T
H	HH	HT
T	TH	TT

Where rows and columns intersect is the outcome of that action

Frequency trees

60 people visited the zoo one Saturday morning

26 of them were adults. 13 of the adult's favourite animal was an elephant. 24 of the children's favourite animal was an elephant

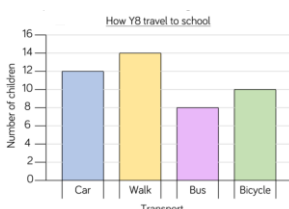


The overall total "60 people"

A frequency tree is made up from part-whole models
One piece of information leads to another

Probabilities or statements can be taken from the completed trees
e.g. 34 children visited the zoo

Bar and line charts



Use addition/ subtraction methods to extract information from bar charts

e.g. Difference between the number of students who walked and took the bus
Walk frequency — bus frequency

When describing changes or making predictions

- Extract information from your data source
- Make comparisons of difference or sum of values
- Put into the context of the scenario

YEAR 7 — PLACE VALUE AND PROPORTION... FDP equivalence

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What do I need to be able to do?

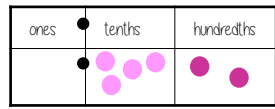
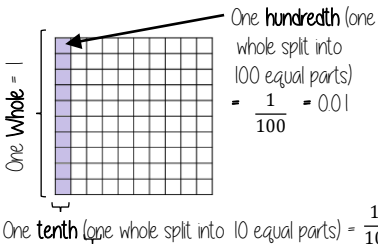
By the end of this unit you should be able to:

- Convert fluently between fractions, decimals & percentages

Keywords

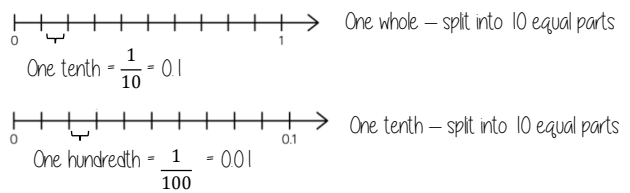
- Fraction:** how many parts of a whole we have
- Decimal:** a number with a decimal point used to separate ones, tenths, hundredths etc.
- Percentage:** a proportion of a whole represented as a number between 0 and 100
- Place value:** the numerical value that a digit has decided by its position in the number
- Placeholder:** a number that occupies a position to give value
- Interval:** a range between two numbers
- Tenth:** one whole split into 10 equal parts
- Hundredth:** one whole split into 100 equal parts
- Sector:** a part of a circle between two radius (often referred to as looking like a piece of pie)
- Recurring:** a decimal that repeats in a given pattern

Tenths and hundredths

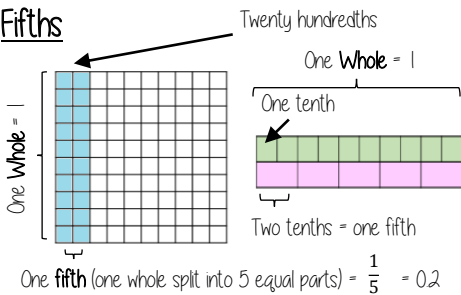


0 ones, 5 tenths and 2 hundredths
 $0 + 0.1 + 0.1 + 0.1 + 0.1 + 0.01 + 0.01$
 $= 0 + 0.5 + 0.02$
 $= 0.52$

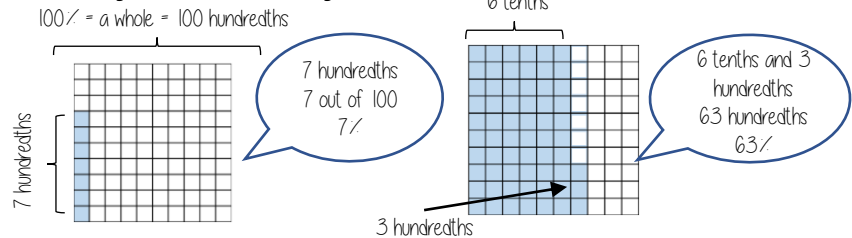
On a number line



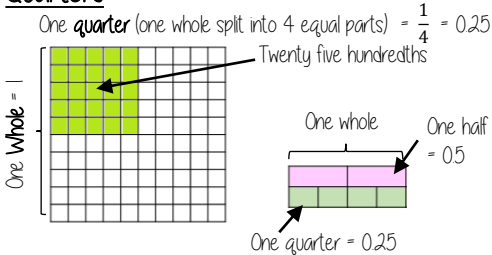
Fifths



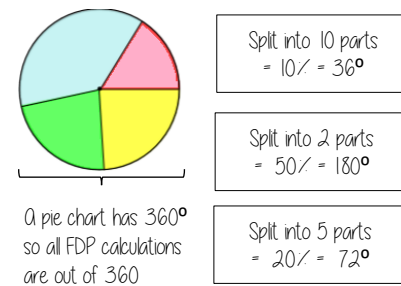
Percentages on a hundred grid



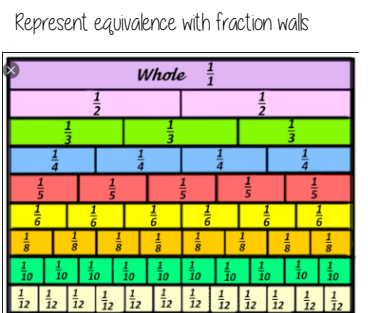
Quarters



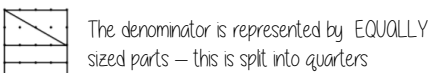
Simple pie charts



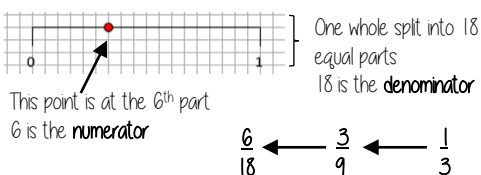
Equivalent fractions



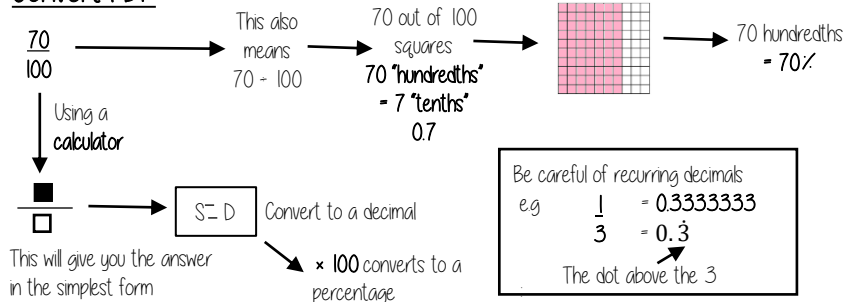
Fractions — on a diagram



Fractions — on a number line



Convert FDP



YEAR 7 — PLACE VALUE AND PROPORTION

Ordering integers and decimals

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What do I need to be able to do?

By the end of this unit you should be able to:

- Understand place value and the number system including decimals
- Understand and use place value for decimals, integers and measures of any size
- Order number and use a number line for positive and negative integers, fractions and decimals;
- use the symbols $=$, \neq , \leq , \geq
- Work with terminating decimals and their corresponding fractions
- Round numbers to an appropriate accuracy
- Describe, interpret and compare data distributions using the median and range

Keywords

- Approximate:** To estimate a number, amount or total often using rounding of numbers to make them easier to calculate with
- Integer:** a whole number that is positive or negative
- Interval:** between two points or values
- Median:** A measure of central tendency (middle, average) found by putting all the data values in order and finding the middle value of the list
- Negative:** Any number less than zero, written with a minus sign
- Place holder:** We use 0 as a place holder to show that there are none of a particular place in a number
- Place value:** The value of a digit depending on its place in a number. In our decimal number system, each place is 10 times bigger than the place to its right
- Range:** The difference between the largest and smallest numbers in a set
- Significant figure:** A digit that gives meaning to a number. The most significant digit (figure) in an integer is the number on the left. The most significant digit in a decimal fraction is the first non-zero number after the decimal point

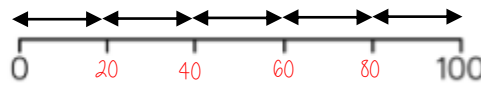
Integer Place Value

Billions			Millions			Thousands			Ones		
H	T	O	H	T	O	H	T	O	H	T	O
		3	1	4	8	0	3	3	0	2	9

Placeholder

Three billion, one hundred and forty eight million, thirty three thousand and twenty nine
 1 billion 1,000,000,000
 1 million 1,000,000

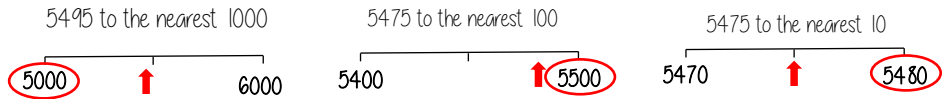
Intervals on a number line



Divide the difference by the number of intervals (gaps).
 Eg $100 \div 5 = 20$

Rounding to the nearest power of ten

If the number is halfway between we "round up"



Compare integers using $<$, $>$, $=$, \neq

- $<$ less than Two and a half million ① 2 500 000
 $>$ greater than 300 000 000 ② Three billion
 $=$ equal to Six thousand and eighty ③ 68 000
 \neq not equal to

Range Spread of the values

Difference between the biggest and smallest
 3 9 8 12
 Range: Biggest value - Smallest value
 $12 - 3 = 9$
 Range = 9

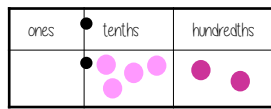
Median The middle value

Example 1 Median: put the in order 3 4 8 9 12
 4 3 9 8 12 find the middle number 3 4 **8** 9 12

Example 2 Median: put the in order 150 154 148 137 148 **150 154** 158 160
 137 160 158 There are 2 middle numbers
 Find the midpoint 152

Decimals

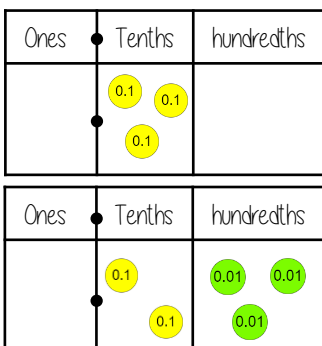
We say "nought point five two"
 Five tenths and two hundredths



0 ones, 5 tenth and 2 hundredths
 $0 + 0.1 + 0.1 + 0.1 + 0.1 + 0.1 + 0.01 + 0.01$
 $= 0 + 0.5 + 0.02$
 $= 0.52$

Comparing decimals

Which the largest of 0.3 and 0.23?

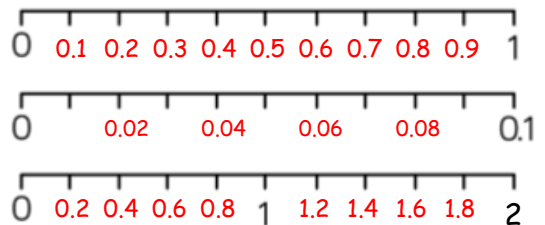


$0.3 > 0.23$
 "There are more counters in the furthest column to the left"

0.30 } Comparing the values both with the same number of decimal places is another way to compare the number of tenths and hundredths
 0.23 }

Decimal intervals on a number line

One whole split into 10 parts makes tenths = 0.1
 One tenth split into 10 parts makes hundredths = 0.01



Round to 1 significant figure

370 to 1 significant figure is 400
 37 to 1 significant figure is 40
 37 to 1 significant figure is 4
 0.37 to 1 significant figure is 0.4
 0.00000037 to 1 significant figure is 0.0000004

Round to the first non zero number