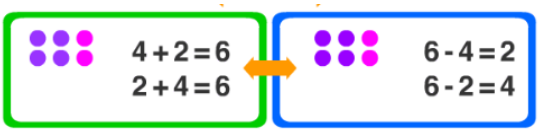
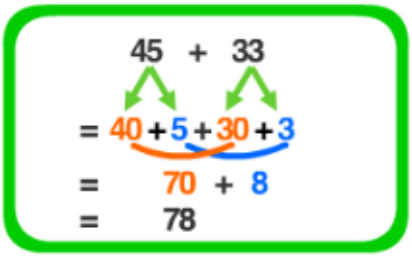

MATHS
AUTUMN 2
KNOWLEDGE
ORGANISERS

Year 5 Unit 5
Using Mental Methods

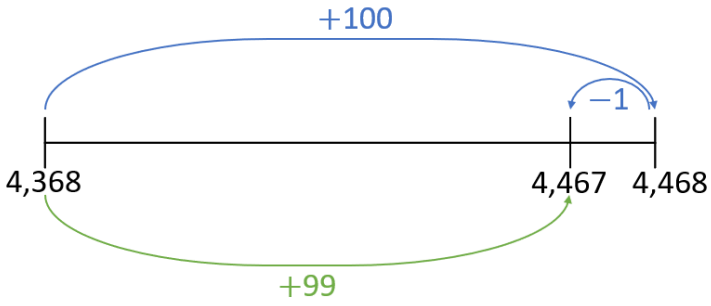
Inverse	The reverse or opposite of an operation.	
Partition	To split a number into parts using place value	
Commutative	Numbers can be added in any order, but in subtraction the order is important.	a + b = b + a 6 + 2 = 8 or 2 + 6 = 8

502 + 305 = 807

I can partition 502 into 500 and 2 and partition 305 into 300 and 5 and then add the parts separately.

500 + 300 = 800
2 + 5 = 7

4,368 + 99 = 4,467

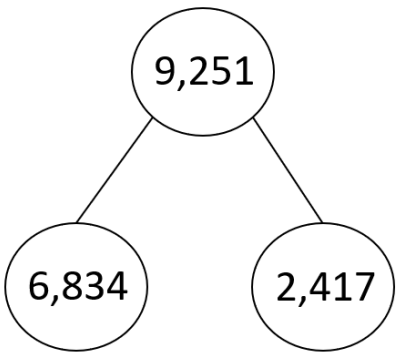


Fact Families

Addition is the inverse of subtraction.

Subtraction is the inverse of addition.

9,251	
2,417	6,834



2,417 + 6,834 = 9,251

6,834 + 2,417 = 9,251

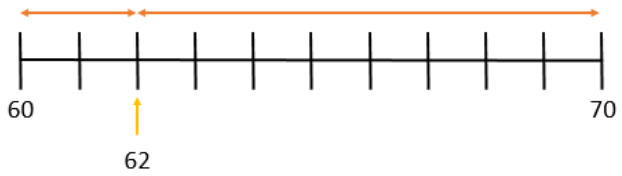
9,251 − 2,417 = 6,834

9,251 − 6,834 = 2,417

Year 5 Unit 6
Rounding and Estimation

Multiples of 10	10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140
Multiples of 100	100, 200, 300, 400, 500, 600, 700, 800, 900, 1000, 1100, 1200
Vertical	A straight line from top to bottom, parallel with the y axis
Origin	(0,0) on a graph, the point where the 2 axes cross

Round 62 to the nearest 10



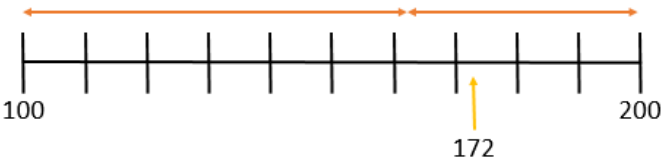
The previous multiple of 10 is 60

The next multiple of 10 is 70

62 is closer to 60 than 70

62 rounded to the nearest 10 is 60

Round 172 to the nearest 100



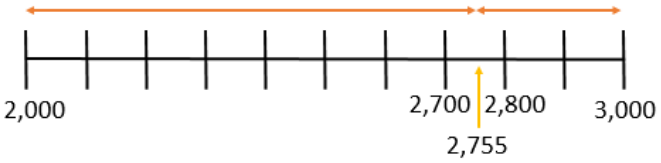
The previous multiple of 100 is 100

The next multiple of 100 is 200

172 is closer to 200 than 100

172 rounded to the nearest 100 is 200

Round 2,755 to the nearest 1,000 3,000



The previous multiple of 1,000 is 2,000

The next multiple of 1,000 is 3,000

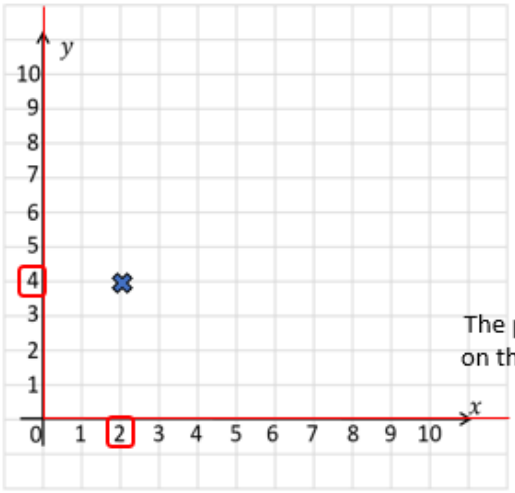
2,755 is closer to 3,000 than 2,000

2,755 rounded to the nearest 1,000 is 3,000

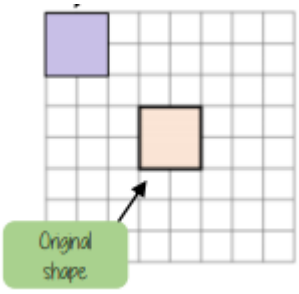
Year 5 Unit 8
Geometry—Position and Direction

Quadrant	The four quarters of the coordinate grid
Horizontal	A straight line from left to right parallel to the x-axis
Vertical	A straight line from top to bottom, parallel with the y axis
Origin	(0,0) on a graph, the point where the 2 axes cross

Coordinates in the first quadrant



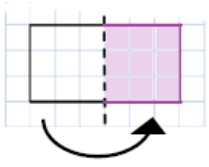
Translation



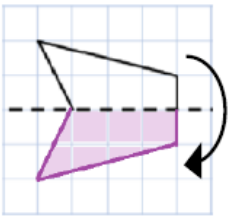
This square has been translated 3 squares to the left and 3 squares up.

Every vertex has been translated by the same amount

Reflect vertically and horizontally

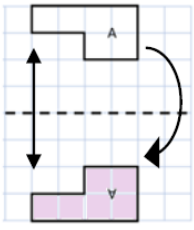


Reflection in a vertical line



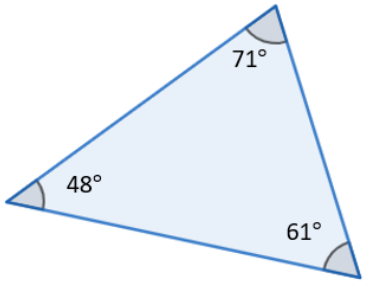
Reflection in a horizontal line

All points need to be the same distance away from the line of reflection



Year 6 Unit 3 — Angles

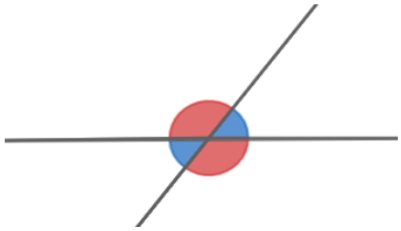
Sum of angles in a triangle



What do you notice about the angles in this triangle?

$48° + 71° + 61° = 180°$

Vertically opposite angles

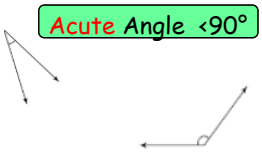


These are called **vertically opposite angles**.

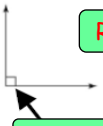
Vertically opposite angles are equal in size.

Types of angle

Acute Angle <90°

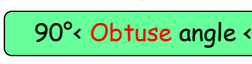


Right Angle = 90°



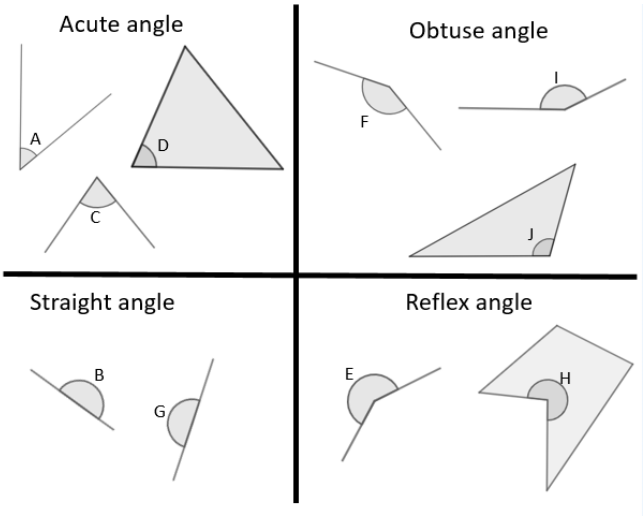
Notice the special notation

90°< Obtuse angle <180°

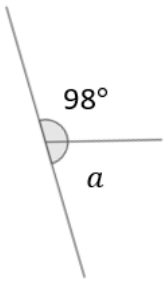


Straight Line = 180°

180°< Reflex angle



Sum of angles on a straight line

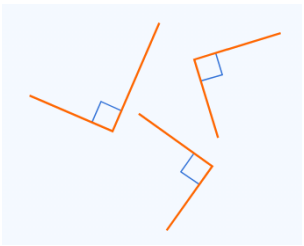


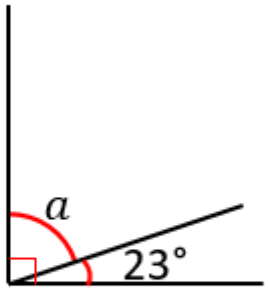
$a + 98° = 180°$

$a = 82°$

angles on a straight line sum to 180 °

A right angle





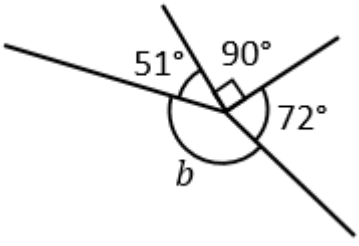
$a + 23° = 90°$

$a = 67°$

Angles in a right angle add up to 90°

Sum of angles around a point

Angles around a point sum to 360 °

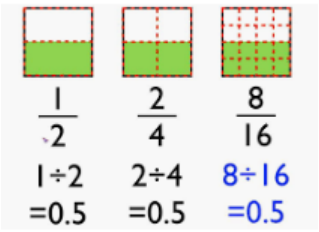
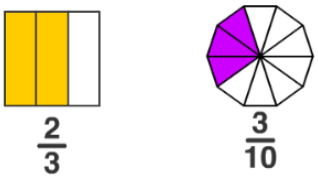
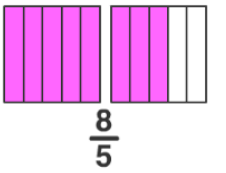
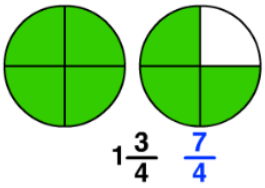


$90° + 51° + 72° = 213°$

$213° + b = 360°$

$b = 147°$

Year 6 Unit 4
Fractions

Equivalence	Having the same value	
Proper Fraction	A fraction smaller than one whole	
Improper Fraction	A fraction greater than one whole	
Mixed Number	A number written as a whole number and a proper fraction	

Adding and Subtracting

When fractions have the same denominator it is quite easy to add them together and to subtract them.

For example,

$$\frac{3}{5} + \frac{1}{5} = \frac{3+1}{5} = \frac{4}{5}$$

We can show this calculation in a diagram:

We can use **equivalent** fractions to add fractions that do not have the same **denominator**.

For example:

$$\frac{3}{4} + \frac{1}{8}$$

We need to change $\frac{3}{4}$ into an equivalent fraction with a denominator of 8.

$$\frac{3}{4} \overset{\times 2}{=} \frac{6}{8}$$

Now we have:

$$\frac{6}{8} + \frac{1}{8} = \frac{7}{8}$$

Simplifying Fractions

numerator 18 / denominator 30

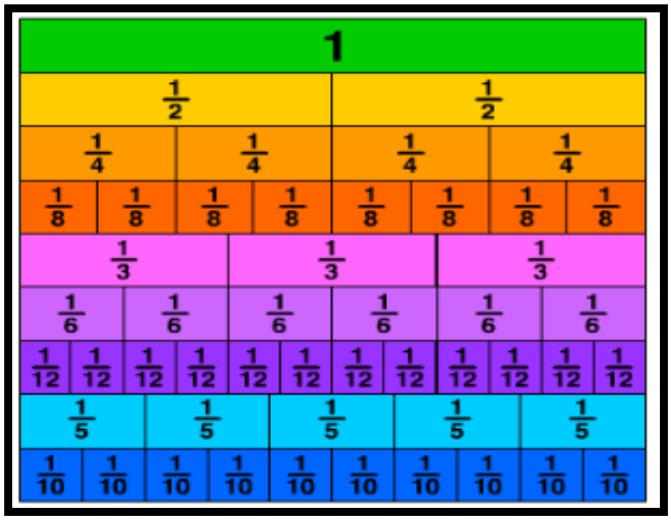
To simplify a fraction, we divide both the numerator (top number) and the denominator (bottom number) by the same number.

If we divide both these numbers by 6, the fraction becomes:

18 divided by 6 → 3; 30 divided by 6 → 5

$$\frac{18}{30} = \frac{3}{5}$$

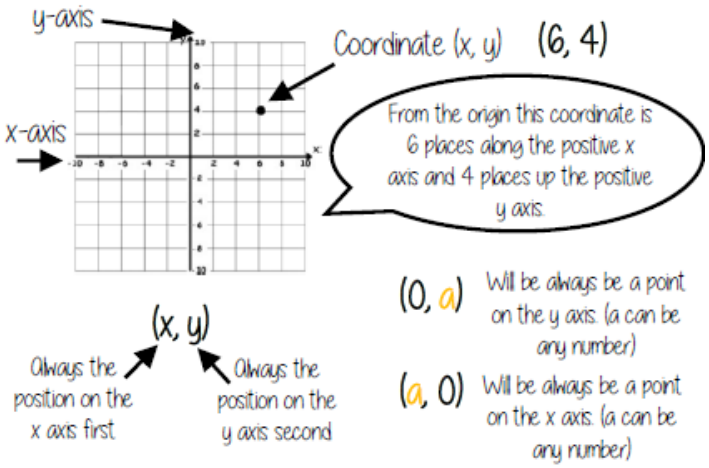
The trick is knowing what number to divide by – you need to find a number that you know both numerator and denominator will divide by without a remainder. Knowing your times tables well will help!



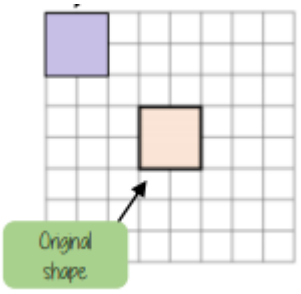
Year 6 Unit 5
Geometry—Position and Direction

Quadrant	The four quarters of the coordinate grid
Horizontal	A straight line from left to right parallel to the x-axis
Vertical	A straight line from top to bottom, parallel with the y axis
Origin	(0,0) on a graph, the point where the 2 axes cross

Coordinates in all 4 quadrants



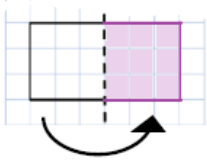
Translation



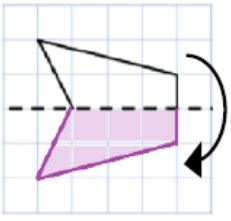
This square has been translated 3 squares to the left and 3 squares up.

Every vertex has been translated by the same amount

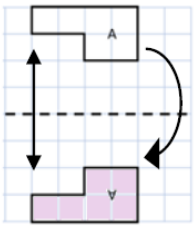
Reflect vertically and horizontally

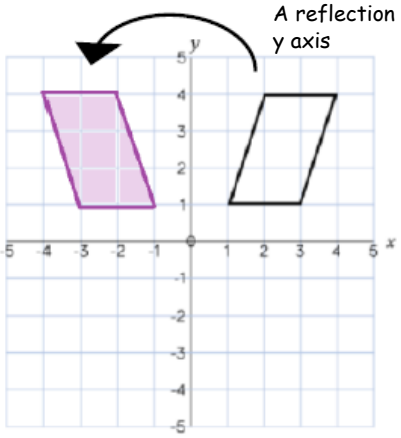


Reflection in a vertical line

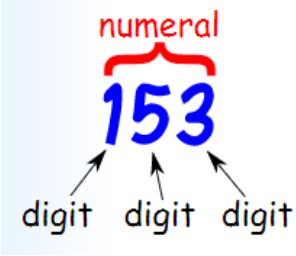
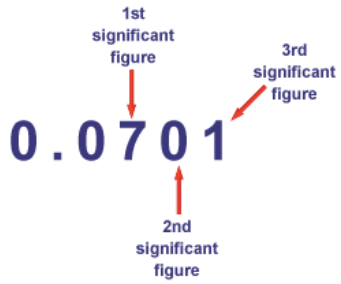
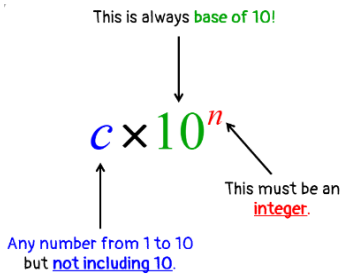


All points need to be the same distance away from the line of reflection





Year 7 – Unit 3
Place Value

Digit	One of the symbols of a number system most commonly the symbols 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9. The position or place of a digit in a number tells you its value.	
Numeral	A symbol used to denote a number. The Arabic numerals 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9 are used in the Hindu-Arabic system giving numbers in the form that is widely used today.	
Integer	A positive number, a negative number or zero but not a fraction or a decimal.	
Range	The difference between the lowest and highest values .	highest score - lowest score = range 3, 4, 5, 5, 5, 6, 6, 7, 8, 8, 9 9 - 3 = 6 Range = 6
Median	A type of average which is the middle value of an ordered set of values.	Order the values from least to greatest. Locate the middle value. 3, 4, 5, 5, 5, 6, 6, 7, 8, 8, 9
Significant Figure	The digits in a number that are needed to specify the size of the number, starts from the first non zero digit.	
Standard Form	Numbers are recorded as a number multiplied by a power of 10.	

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

3,148,033,029 is three billion, one hundred and forty eight million, thirty three thousand and twenty nine.

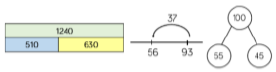
=	is equal to, equals
≠	is not equal to
≈	is approximately equal to
<	is less than
>	is greater than
≤	is less than or equal to
≥	is greater than or equal to

Year 7 Unit 5
Applying Addition and Subtraction

Commutative	Numbers can be added in any order, but in subtraction the order is important.	$a + b = b + a$ $6 + 2 = 8$ or $2 + 6 = 8$
Inverse	The reverse or opposite of an operation.	$4+2=6$ $2+4=6$ $6-4=2$ $6-2=4$

Addition and Subtraction

@whisto_maths



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	7
−	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

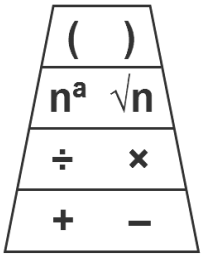
Addition and Subtraction of decimals

4	.	3	8	
7	.	9	0	+

0 can be used to fill empty places with value

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

Order of Operations



- Brackets
- Powers /Indices
- Multiplication or Division
- Addition or Subtraction

Multiplication methods

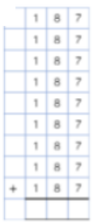
@whisto_maths

	H	T	O
	1	8	7
×			9

Long multiplication (column)

×	100	80	7
9			

Grid method



Repeated addition

Less effective method especially for bigger multiplication

Multiplication with decimals

Perform multiplications as integers
e.g. 0.2 x 0.3 → 2 x 3

Make **adjustments** to your answer to match the question: 0.2 x 10 = 2
0.3 x 10 = 3
Therefore 6 ÷ 100 = 0.6

Estimations: Using estimations allows a 'check' if your answer is reasonable

Division methods

$3584 \div 7 = 512$

Short division

$$7 \overline{)\,3\,{}^{3}5\,8\,{}^{1}4} \quad 5\ 1\ 2$$

Complex division

$\div 24 = \div 6 \div 4$

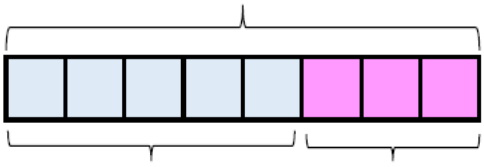
Break up the divisor using factors

Year 8 Unit 4 – Ratio

What is a ratio?

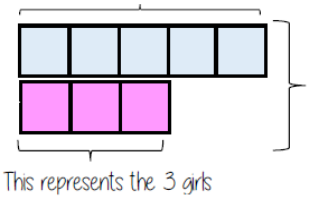
"For every 5 boys there are 3 girls"

This is the "whole" – boys and girls together



This represents the 5 boys This represents the 3 girls

5:3



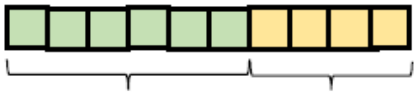
Simplifying a ratio

Cancel down the ratio to its lowest form

"For every 6 days of rain there are 4 days of sun"

6:4

÷ by 2



3:2

Find the biggest common factor that goes into all parts of the ratio

For 6 and 4 the biggest factor (number that multiplies into them is 2)

"For every 3 days of rain there are 2 days of sun" – when this happens twice the ratio becomes 6:4

Writing a ratio in form 1:n

4 : 20

1 : 5

The question states that this part has to be 1 unit. Therefore Divide by 4

This side has to be divided by 4 too – to keep in proportion

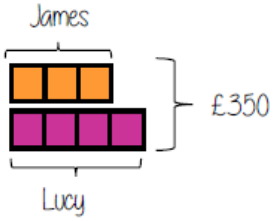
Dividing into a given ratio

James and Lucy share £350 in the ratio 3:4. Work out how much each person earns

Model the Question

James: Lucy

3 : 4



Find the value of one part

Whole: £350

7 parts to share between (3 James, 4 Lucy)

£350 ÷ 7 = £50

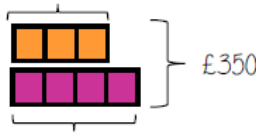
□ = one part = £50

Put back into the question

James: Lucy

(x 50) 3 : 4 (x 50)

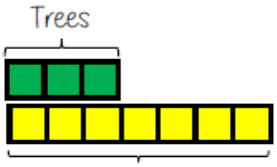
£150:£200



Ratio and fractions

Trees: Flowers

3 : 7



Ratio

There are 3 parts for trees

Fraction of trees

Number of parts of in group / Total number of parts

3/10

Fraction

Tree parts 3 + Flower parts 7 = 10

Order is important

"For every dog there are 2 cats"

Dogs: Cats

1:2

The ratio has to be written in the same order as the information is given

@whisto_maths