

**MATHS
AUTUMN 2
KNOWLEDGE
ORGANISERS**

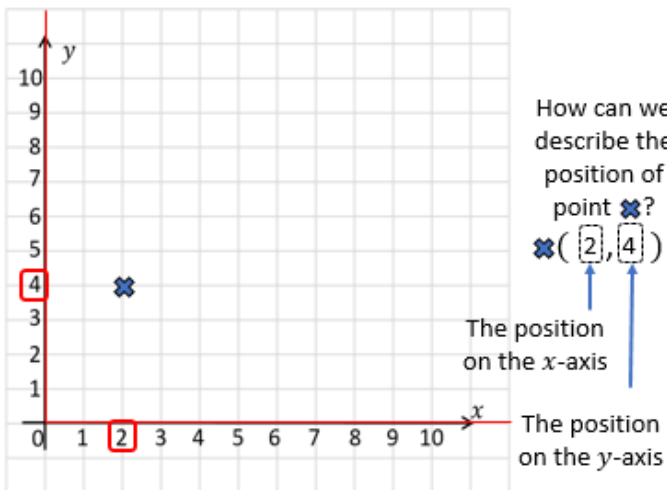
Year 5 Unit 2

Geometry—Position and Direction

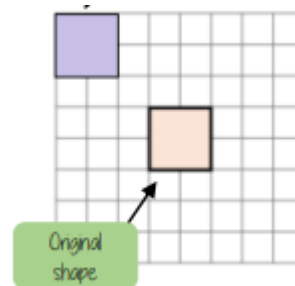


Quadrant	The four quarters of the coordinate grid
Horizontal	A straight line from left to right parallel to the x-axis
Vertical	A straight line from top to bottom, parallel with the y axis
Origin	(0,0) on a graph, the point where the 2 axes cross

Coordinates in the first quadrant



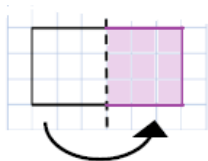
Translation



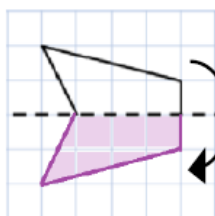
This square has been translated 3 squares to the left and 3 squares up.

Every vertex has been translated by the same amount

Reflect vertically and horizontally

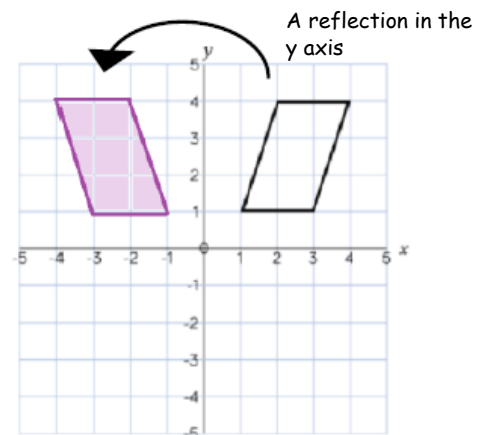
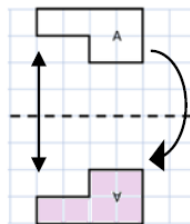


Reflection in a vertical line



Reflection in a horizontal line

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



Year 5 Unit 3

Addition and Subtraction



Addition	The joining of two or more numbers or quantities.	In addition two or more numbers are joined to get one number which is the sum or the total .
Sum Total	The result of adding; the whole amount	
Subtraction	When one quantity is taken away from another	80 subtract 30 is 50.
Difference	The result of subtracting one number from another	The difference between 80 and 30 is 50
Commutative	Numbers can be added in any order, but in subtraction the order is important.	$a + b = b + a$ $6 + 2 = 8$ or $2 + 6 = 8$

Diagram showing a tree structure where a circle with a question mark is connected to two circles containing 104,328 and 61,731.

Diagram showing a box with 104,328 and a box with 61,731, with a bracket and a question mark above them.

Diagram showing a box with 104,328 and a box with 61,731, with a bracket and a question mark to the right.

$104,328 + 61,731 = 166,059$

HTh	TTh	Th	H	T	O
1000		1000 1000 1000 1000	1000 1000 1000	100 100	1 1 1 1 1 1 1 1
	10000 10000 10000 10000	1000	1000 1000 1000 1000	100 100 100	1

1	0	4	3	2	8
+	6	1	7	3	1
1	6	6	0	5	9
					1

Diagram showing a tree structure where a circle with 4,357 is connected to two circles containing 2,735 and a question mark.

Diagram showing a box with 2,735 and a box with a question mark, with 4,357 written above them.

Diagram showing a box with 4,357 and a box with 2,735, with a question mark and an arrow pointing to the right.

$4,357 - 2,735 = 1,622$

3	1		
4	3	5	7
-	2	7	3
1	6	2	2

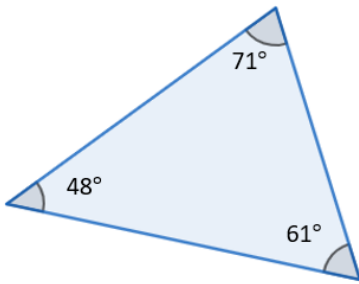
Thousands	Hundreds	Tens	Ones
4 3 5 7	2 2 2 2		
	2 2 2 2		

Thousands	Hundreds	Tens	Ones
4 3 5 7	2 2 2 2	2 2 2	2 2 2 2
	2 2 2 2		

Year 6 Unit 3 – Angles



Sum of angles in a triangle



What do you notice about the angles in this triangle?

$$48^\circ + 71^\circ + 61^\circ = 180^\circ$$

Types of angle

Acute Angle $< 90^\circ$

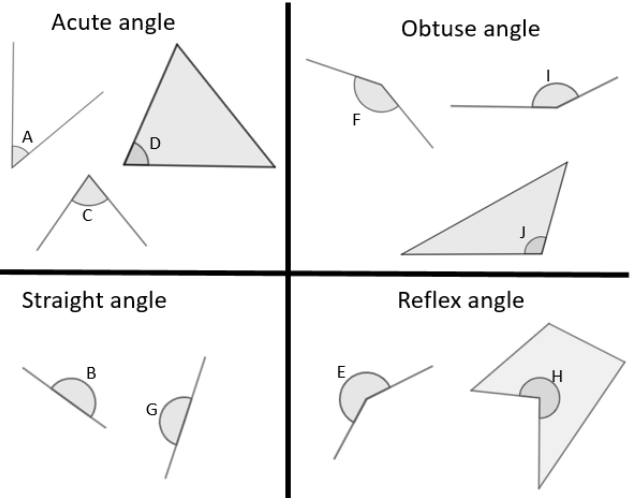
Right Angle = 90°

Notice the special notation

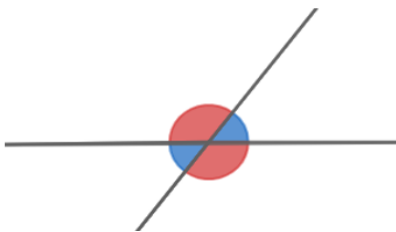
$90^\circ <$ Obtuse angle $< 180^\circ$

Straight Line = 180°

$180^\circ <$ Reflex angle



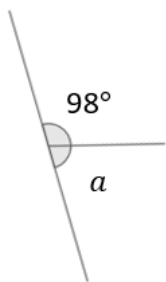
Vertically opposite angles



These are called **vertically opposite angles**.

Vertically opposite angles are equal in size.

Sum of angles on a straight line

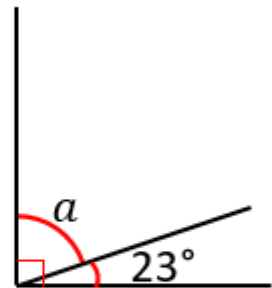
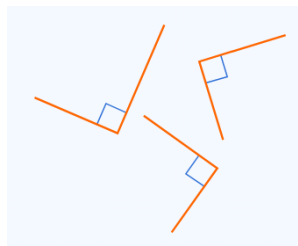


$$a + 98^\circ = 180^\circ$$

$$a = 82^\circ$$

angles on a straight line sum to 180 °

A right angle



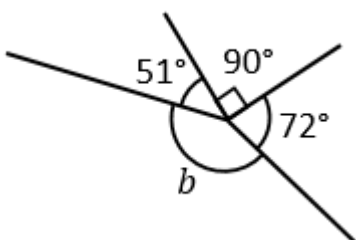
$$a + 23^\circ = 90^\circ$$

$$a = 67^\circ$$

Angles in a right angle add up to 90 °

Sum of angles around a point

Angles around a point sum to 360 °



$$90^\circ + 51^\circ + 72^\circ = 213^\circ$$

$$213^\circ + b = 360^\circ$$

$$b = 147^\circ$$

Year 6 Unit 4

Fractions



Equivalence	Having the same value	 $\frac{1}{2}$ $\frac{2}{4}$ $\frac{8}{16}$ $1 \div 2 = 0.5$ $2 \div 4 = 0.5$ $8 \div 16 = 0.5$
Proper Fraction	A fraction smaller than one whole	 $\frac{2}{3}$ $\frac{3}{10}$
Improper Fraction	A fraction greater than one whole	 $\frac{8}{5}$
Mixed Number	A number written as a whole number and a proper fraction	 $1 \frac{3}{4}$

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.

$$\frac{3}{4} = \frac{6}{8}$$

(An arrow labeled 'x2' points from 3 to 6 and from 4 to 8.)

Now we have:

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

Simplifying Fractions

numerator
18
denominator
30

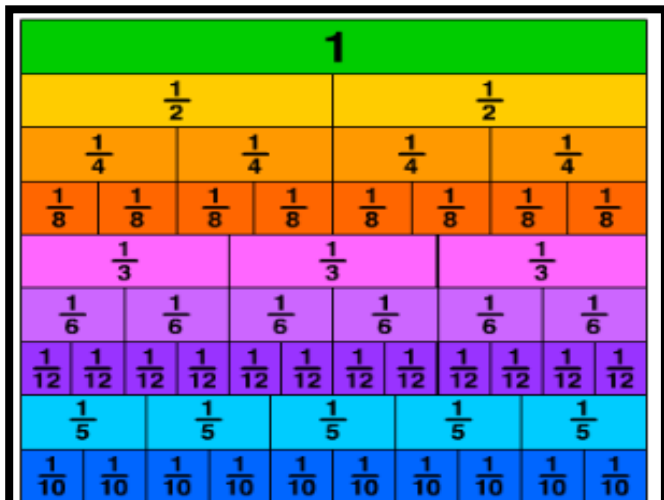
To simplify a fraction, we divide both the numerator (top number) and the denominator (bottom number) by the same number.

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

$$\frac{18}{30} \xrightarrow{\div 6} \frac{3}{5}$$

(Red lines indicate 18 divided by 6 to get 3, and 30 divided by 6 to get 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!



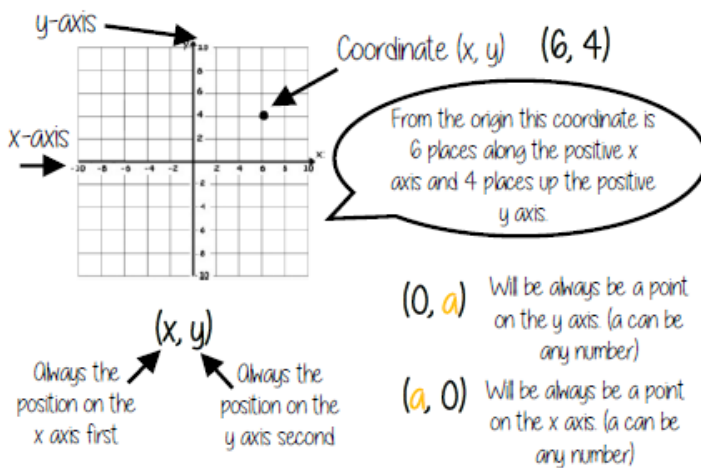
Year 6 Unit 5

Geometry—Position and Direction

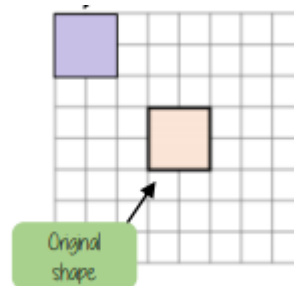


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Coordinates in all 4 quadrants



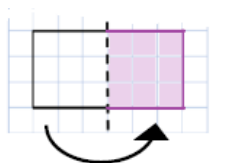
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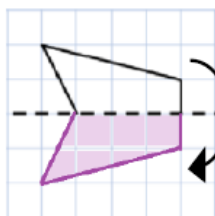
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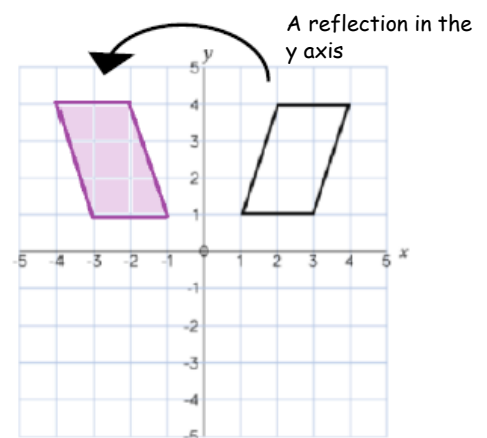
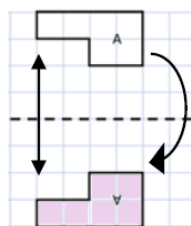


Reflection in a vertical line



Reflection in a horizontal line

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



Year 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 .	<p>highest score - lowest score = range</p> <p>3, 4, 5, 5, 6, 6, 7, 8, 8, 9</p> <p>9 - 3 = 6</p> <p>Range = 6</p>
Median	A type of average which is the middle value of an ordered set of values.	<p>Order the values from least to greatest.</p> <p>Locate the middle value.</p> <p>3, 4, 5, 5, 5, 6, 6, 7, 8, 8, 9</p>
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.	<p>This is always base of 10!</p> <p>$c \times 10^n$</p> <p>Any number from 1 to 10 but not including 10.</p> <p>This must be an integer.</p>

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 8 Unit 2—Sets and Probability



Set	A collection of things. All members of a set are unique. {1,2,3,4} is the set of counting numbers less than 5
Element	Each item in a set is called an element. The number 2 is an element of the set {1,2,3}
Intersection	The overlapping part of a Venn diagram. The symbol is an upside down U like this: \cap
Union	Two ellipses/circles that join. The symbol is a special u like this: \cup

Identify and represent sets
The **universal** set has the symbol ξ this means **everything** in the Venn diagram is in this set.

$\xi = \{\text{the numbers between 1 and 50 inclusive}\}$

My sets can include every number between 1 and 50 including those numbers

$A = \{\text{Square numbers}\}$

$A = \{1, 4, 9, 16, 25, 36, 49\}$

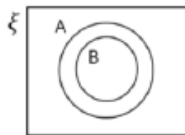
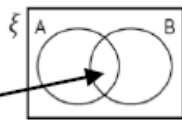
Interpret and create Venn diagrams



Mutually exclusive sets

The two sets have nothing in common
No overlap

Union of sets
The two sets have some elements in common — they are placed in the intersection



Subset

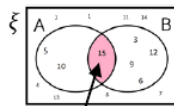
All of set B is also in Set A so the ellipse fits inside the set.

Around the outside of every Venn diagram will be a box. If an element is not part of any set then it will be placed outside of the ellipse, but within the box.

Intersection of sets

Elements in the Intersection are in sets A and B

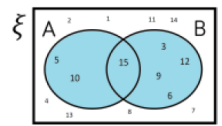
$\xi = \{\text{the numbers between 1 and 15 inclusive}\}$
 $A = \{\text{Multiples of 5}\}$ $B = \{\text{Multiples of 3}\}$



The element in $A \cap B$ is 15

Union of sets

Elements in the union could be in sets A or B



The notation for this is $A \cup B$

$\xi = \{\text{the numbers between 1 and 15 inclusive}\}$
 $A = \{\text{Multiples of 5}\}$ $B = \{\text{Multiples of 3}\}$

The elements in $A \cup B$ are
5, 10, 15, 3, 9, 6, 12

Mutually exclusive

Events that do not happen at the same time. Kings and Aces are Mutually Exclusive. A card can't be an Ace and a King at the same time.

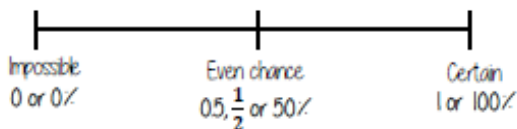
Probability

The likelihood of an event happening.

Random

When an event happens by chance and cannot be predicted.

The Probability Scale



The more likely an event the further up the probability it will be in comparison to another event (it will have a probability closer to 1)



There are 2 pink and 2 yellow balls, so they have the same probability

There are 5 possible outcomes
So 5 intervals on this scale, each interval value is $\frac{1}{5}$

Probability of a single event

A probability can be a fraction, decimal or a percentage. It is always a value between 0 and 1.



Probability notation
 $P(\text{event})$

Probability = $\frac{\text{number of times event happens}}{\text{total number of possible outcomes}}$

$$P(\text{Blue}) = \frac{4}{10}$$

← There are 4 blue sectors
← There are 10 sectors overall

$$= \frac{2}{5}$$

Sum of probabilities

The sum of probabilities is always 1.



The probability of getting a blue ball is $\frac{1}{5}$
 \therefore The probability of NOT getting a blue ball is $\frac{4}{5}$