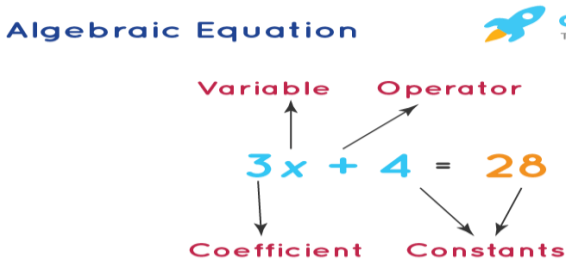
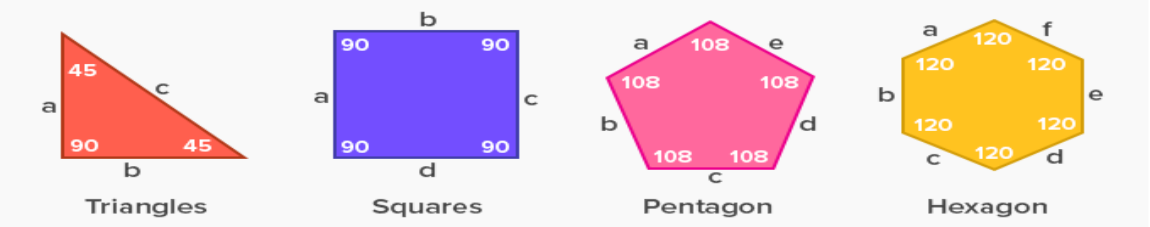


MATHS HOMEWORK SUPPORT BOOKLET FOR Parents KS 3



Content Page

Place Value and Rounding

Booklet 1: Place Value and Rounding			
1	Place value	The value of a digit depending on its place in a number.	
2	Number	A word, symbol, or figure, that represents a particular quantity. Used in counting and making calculations e.g. Two hundred and thirty four, 234, 45.7, $\sqrt{2}$.	
3	Integer	A whole positive or negative number	
4	Decimal	A number with digits after a decimal point	
5	Decimal place	The number of digits after the decimal point	
6	Round	Change a number to one which is easier to use	
7	Estimate (verb)	To give a rough idea of an answer. "Estimate the answer to 4.6 x 19.2"	
8	Estimate (noun)	The rough answer. "My estimate to 4.6 to 19.2 is 100".	
Inequalities			
9	=	Equal to – the left is equal to the right	
10	≠	Not equal to	e.g. $4 + 3 \neq 6$
11	<	Less than	e.g. $3 < 4$
12	>	Greater than	e.g. $4 > 3$
13	≤	Less than or equal to	
14	≥	Greater than or equal to	
15	≈	Approximately	$4.8 \approx 5$

Place Value

Value of the Digit

The column the digit is in tells us its **value.**

Example

Thousands	Hundreds	Tens	Units
3	5	0	2

The value of the 5 is 500 because it is in the hundreds column (5 x 100 = 500).

The value of the 3 is 3000 because it is in the thousands column (3 x 1000 = 3000)

Example:

48	6542	80321
Is made up of 4 tens 8 units	Is made up of 6 thousands 5 hundreds 4 tens 2 units	Is made up of 8 ten thousands 0 thousands 3 hundreds 2 tens 1 unit

Place Value Table									
Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Units	Tenths	Hundredths	Thousandths
						●	●		

Rounding whole Numbers

We have a rhyme when rounding Under Line, draw a line/say the rhyme **5 or more add 1 more, 4 or less let it rest**

Round to nearest 10

6/7↖ say the rhyme = 70

10/2↖ say the rhyme = 100

Round to nearest 100

1/6↖7 say the rhyme = 200

1/3↖3 say the rhyme = 100

Rounding decimals

Rounding means making a number simpler but keeping its value close to what it was.

Examples:

Round 59.9261 to the following place value…		
a) to 1 decimal place/nearest tenth **S**	**b) to 2 decimal places/nearest hundredth** **U** 59 . 9261	**c) to 3 decimal places/nearest thousandth** **S**

59 . 9261 decider The decider is 2, so we keep it the same. 59.9261 ≈ 59.9	1 decider 5 9 . 93 The decider is 6, so we round up the 2 by adding 1. 59.9261 ≈ 59.93	59 . 9261 decider The decider is 1, so we keep it the same. 59.9261 ≈ 59.926

Dealing with 9s

We have looked at rounding decimals to different place values. What we haven't looked at yet is what do you do when you have to round up a '9'? In our base ten system, '9' is the biggest single digit number there is, so when rounding a '9' up you make the '9' a '0' and carry over a '1' to the next biggest place value. The easiest way to do this is using a column addition layout. This is especially useful when there are lots of 9s!

Examples:

Rounding		
a) to 1 decimal place/nearest tenth U 14 . 9684 decider . 1 15 . 0 1	**b) to 2 decimal places/nearest hundredth** U 14 . 9982 decider . 1 15 . 00 1 1 6	**c) to 3 decimal places/nearest thousandth** U 99. 9998 decider . 1 100. 000 1 1 1 1

The decider is a '6', so we round up. The easiest way is to "add 1" using column addition. We carry '1' to the ones. The '4' turns into a '5'. **14.9694 ≈ 15.0** There is one digit after the decimal point. It is rounded to 1 decimal place.	The decider is a '8', so we round up. The easiest way is to "add 1" using column addition, carrying each time. **14.9982 ≈ 15.00** There are two digits after the decimal point. It is rounded to 2 decimal places.	The decider is an '8', so we round up. The easiest way is to "add 1" using column addition, carrying each time. **99.9988 ≈ 100.000** There are three digits after the decimal point. It is rounded to 3 decimal places.

Factors and Multiples

Factors and Multiples

A **divisibility rule** is a **short, easy** way of determining whether an integer is divisible by a whole number, without performing the division itself. It is also a very quick way of finding a **factor** of a number.

Divisibility Rules	
A number is divisible by	
2	If last digit is 0, 2, 4, 6, or 8
3	If the sum of the digits is divisible by 3
4	If the last two digits is divisible by 4
5	If the last digit is 0 or 5
6	If the number is divisible by 2 and 3
9	If the sum of the digits is divisible by 9
10	If the last digit is 0

If a number is divisible by 2, then the number 2 as one of its factors. The number itself is a multiple of 2.

Example

- 982 is divisible by 2.
- 2 is a factor of 982.
- 982 is a multiple of 2.

Non-Example

- 835 is **not** divisible by 2.

- 2 is **not** a factor of 835
- 835 is **not** a multiple of 2.

Digit Sums: Divisibility rules for 3s and 9s.

- If a number is in the 3 times table then the **sum of its digits** is divisible by 3.
- If a number is in the 9 times table then the **sum of its digits** is divisible by 9.

Divisibility rule for 6

- All numbers in the 6 times table have 3 and 2 as a factor.
- If a number is in **both** the 3 times table **and** 2 times table then the number is divisible by 6.
- You can remember this as "Test for 2 and 3… if it has two ticks then it divides by six!"

Multiples

- Multiples of a number are the numbers which are in its times table.

Multiples of a number are the '**same or more**'.

Common Multiples

Common multiples are numbers which are in the times table of two or more numbers.

Lowest Common Multiple

The smallest number that is a common multiple of two or more numbers is called the **lowest common multiple (LCM)**. The LCM is very useful when adding or subtracting fractions.

Example:

What is the lowest common multiple of 3 and 4
3, 6, 9, **12**, 15, 18, 21, 24, 27, 30, 33, 36…
4, 8, **12**, 16, 20, 24, 28, 32, 36 …

12, 24 and 36 (and others not shown here) are common multiples of 3 and 4.
The **lowest common multiple** (LCM) is 12.

Factors

A **factor pair** of a number are two numbers that you multiply together that results in that given number. If the number is repeated (for example 4 x 4), we only list each

factor once. For this reason, we can say that numbers have either an **even** an **odd** number of **unique factors**.

Example
Write all the factor pairs for 100. 1 x 100 2 x 50 4 x 25 5 x 20 10 x 10 List the factors of 100 1, 2, 4, 5, 10, 20, 25, 50, 100. It has 9 unique factors.

Prime Factors

A prime factor is a factor of a number which is also prime. We will discover just how important these prime factors are!

Prime factors only have TWO factors 1 and itself.

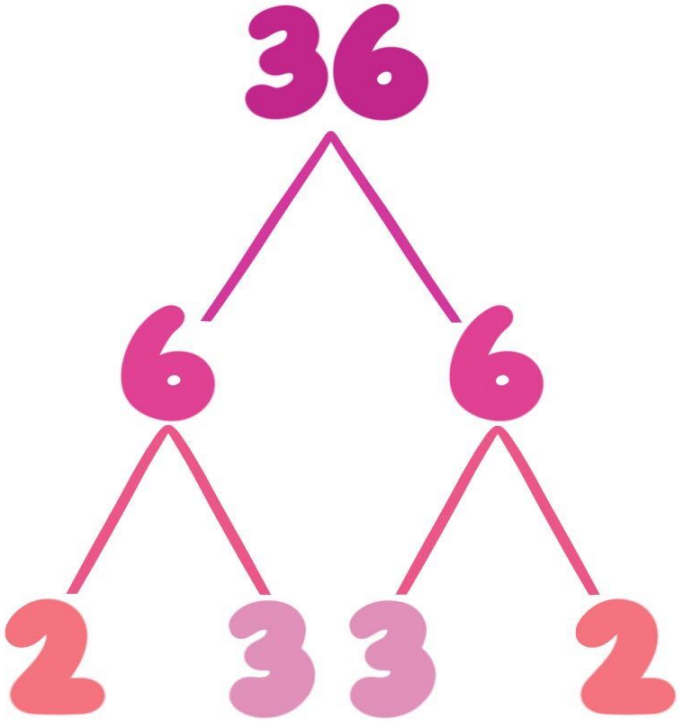
The first 10 prime numbers: 2,3,5,7,11,13,17,19,23,29

For example, 2 is prime number which is a factor of 6.

Therefore 2 is a prime factor of 6.

Example
What are the **prime factors** of 12? 1) Factor pairs of 12 12 1 12 2 6 3 4 2) Circle the prime numbers 3) Prime factors: 2 and 3

Factor Trees: a way to find prime factorization



Index Form

$2x2x3x3$

$= 2^2 \times 3^2$

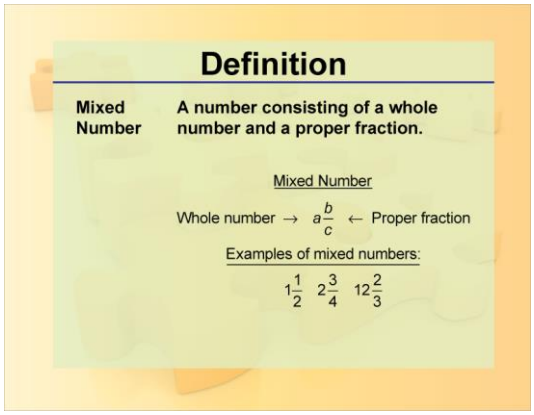
Fractions

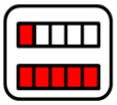
Booklet 2: Working with Fractions			
16	Fraction	Part of a whole	
17	Equivalent fraction	Two or more fractions with the same value	$\frac{1}{2} = \frac{3}{6}$
18	Numerator	The top of a fraction	$\frac{Numerator}{Denominator}$
19	Denominator	The bottom of a fraction	
20	Unit Fraction	A fraction where the numerator is 1	½, 1/3, 1/6
21	Proper Fraction	Value is less than one. Numerator is smaller than the denominator	2/7 , 1/6, 100/365
22	Improper Fraction	Value is larger than 1. Numerator is larger than the denominator.	8/5, 13/2, 47/1
23	Mixed Number	A number written as an integer and a proper fraction.	$2\frac{1}{3}$, $12\frac{11}{30}$
24	Fraction in its *simplest form*	The numerator and denominator have no common factors larger than 1.	$\frac{3}{6}$ not in its simplest form as top and bottom ÷3 $\frac{2}{5}$ is in its simplest form.
25	Fraction represents an integer	Numerator is a multiple of the denominator	$\frac{12}{6} = 2$, $\frac{2a}{a} = 2$
26	Fraction is equal to 1	Numerator and denominator are equal	$\frac{6}{6} = 1$, $\frac{a}{a} = 1$
27	Integers as a fraction	Write as a fraction with denominator 1.	$6 = \frac{6}{1}$

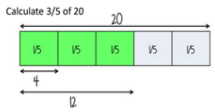
r

Examples of improper fractions:

$\frac{4}{3}$ $\frac{3}{2}$ $\frac{10}{5}$ $\frac{15}{15}$ $\frac{100}{50}$



Representing Fractions using pictures			
33	**The whole**	One shape in a fraction drawing.	
34	**Equal parts**	In a fraction drawing the whole is split into **equal** parts.	
35	**Fraction diagrams**	Proper Fraction	Improper Fraction
		Each whole is split into five equal parts two are shaded: $\frac{2}{5}$ 	Each whole is split into five equal parts, six are shaded. $\frac{6}{5}$ 
		Each whole is split into 10 equal parts, 6 are shaded: $\frac{6}{10}$ 	

Operations with Fractions			
36	Add or subtract fractions	Must have a common denominator fist. Add numerators. Denominator stays the same.	$\frac{1}{3}+\frac{2}{5}$ becomes $\frac{5}{15}+\frac{6}{15}=\frac{11}{15}$
37	Find fraction of an amount	• divide by bottom • Multiply by top. Can also solve using multiplying with fractions ($\frac{3}{5}$ x $\frac{20}{1}=\frac{60}{5}=12$)	
38	Multiply fractions	Does **not** need common denominator • Top x top • Bottom x bottom. • Simplify result where possible.	$\frac{1}{3}$ x $\frac{3}{5}=\frac{3}{15}=\frac{1}{5}$
39	"of"	Means multiply.	
40	Multiply fractions by an integer	All integers can be written as fractions with 1 as the denominator. Multiply as normal.	$\frac{1}{3}$ x 27 $\frac{1}{3}$ x $\frac{27}{1}=\frac{27}{3}=9$
41	Divide with fractions	Use "Keep, Flip, Change" Keep the first fraction same Flip the second fraction upside down Change the ÷ to x. Multiply as normal.	$\frac{1}{3}\div\frac{2}{5}$ K C F $\frac{1}{3}$ x $\frac{5}{2}=\frac{5}{6}$
42	Calculations with mixed numbers	Usually best to convert to improper fractions first. (see left)	$2\frac{1}{3}+\frac{2}{3}$ $\frac{7}{3}+\frac{2}{3}=\frac{9}{3}$ simplifies to 3

In Maths, there are three major types of fractions. They are **proper fractions, improper fractions and mixed fractions**. Fractions are those terms which have numerator

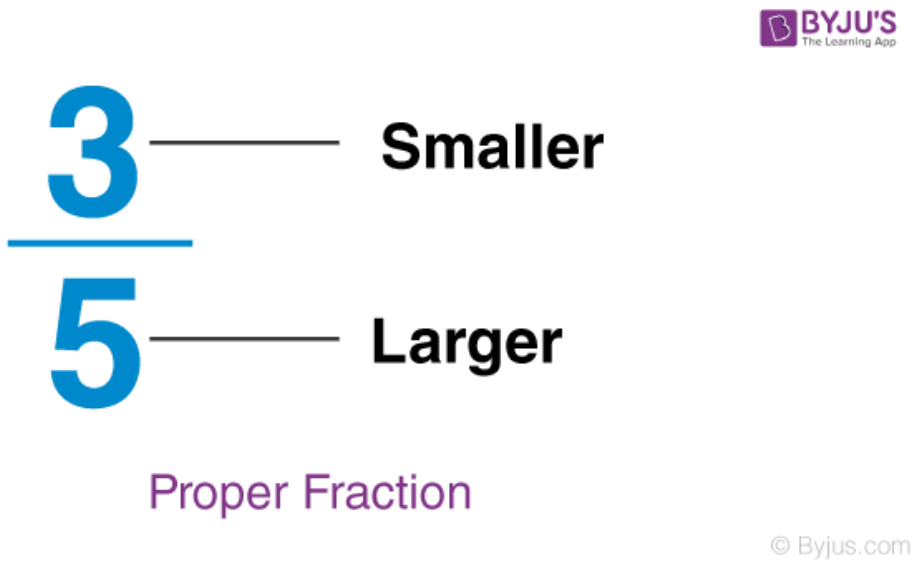
and denominator. Based on these two terms we define its types.

Proper Fraction

A fraction where the numerator is less than the denominator, then it is known as a proper fraction.

i.e., Numerator < Denominator

For example,

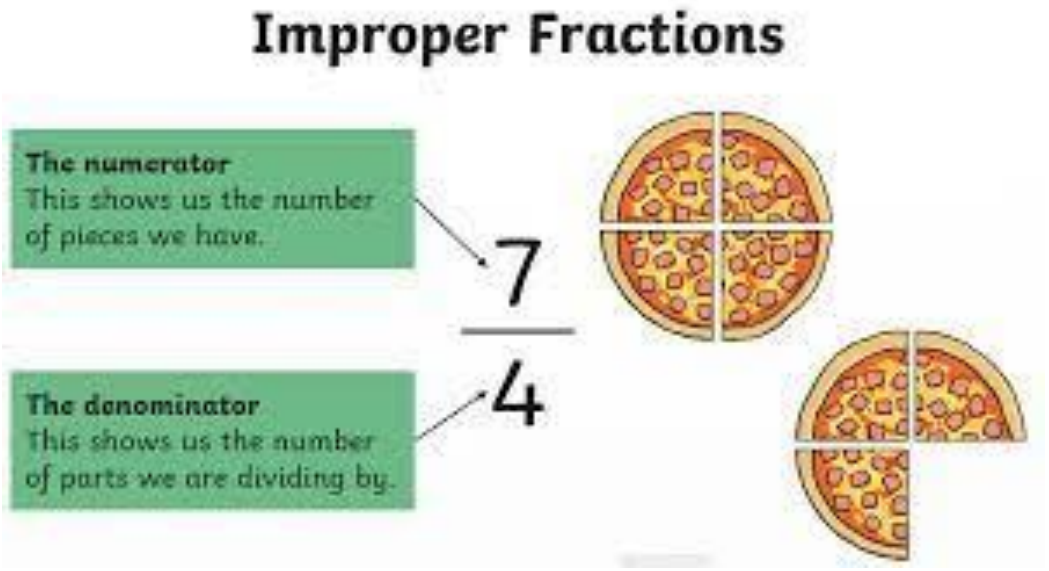


Note:

- The value of proper fraction after further simplification is always less than 1.

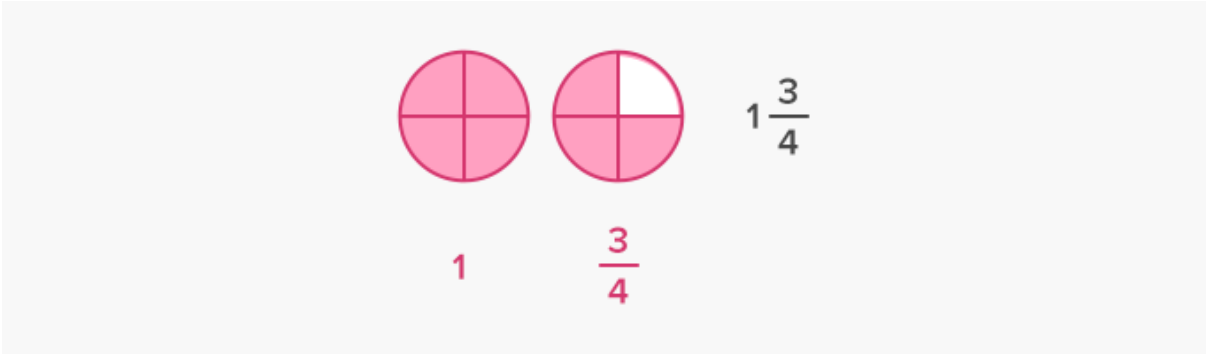
Improper Fraction

An improper fraction has a numerator greater than the denominator. For example, **3/2** is an improper fraction, but 2/3 is a proper fraction, whose denominator is greater than the numerator.



Mixed Number

A mixed number, or mixed fraction, is **a number that contains both an integer (whole number) and a proper fraction (a fraction whose numerator is less than its denominator)**.

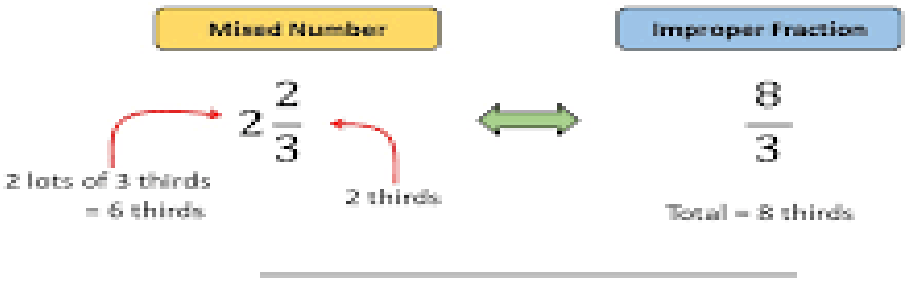


Converting Fractions

In order to convert a mixed number to an improper fraction:

1. Multiply the whole number by the denominator.

2. Add on the numerator.
3. Write the improper fraction by using the calculated value as the numerator over the original denominator.



Improper Fraction to Whole Number

To change an **improper fraction** to a **mixed number**, you must divide the numerator by the denominator. This will give you how many whole numbers the improper ...

Equivalent Fractions

When two or more fractions have the same result after simplification for which they represent the same portion of the whole, then such fractions are equal to each other and are called equivalent fractions.

For example, 1/2 and 2/4 are equivalent.

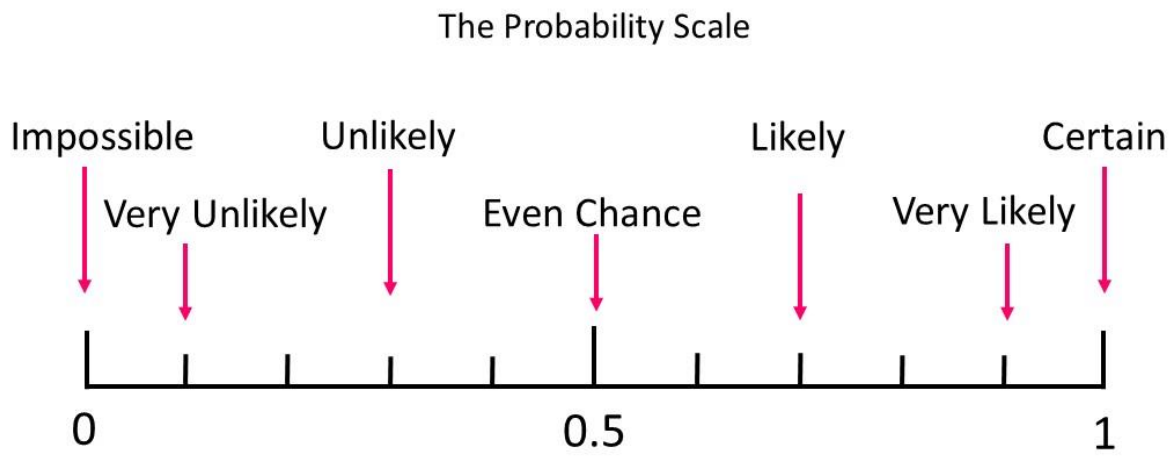
1/3 and 3/9 are equivalent.

Probability

What is probability?

Probability is about estimating or calculating how likely something is to happen.

In maths, probabilities are always written as fractions, decimals or percentages with values between 0 and 1.



Ratio

Question 3: Ralph has 9 cards, each with a number on it.

He picks a card at random.
Write down the probability that the chosen card is

(a) the number 8 (b) an even number (c) a number less than 7

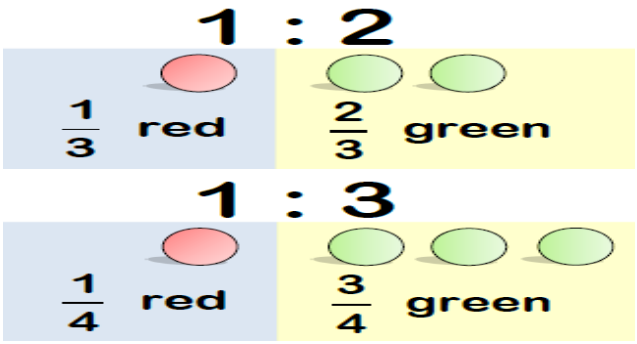
(d) a multiple of 4 (e) a square number (f) a prime number

A ratio **shows how much of one thing there is compared to another**. Ratios are usually written in the form a:b. If you are making orange squash and you mix one part orange to four parts water, then the ratio of orange to water will be 1:4 (1 to 4). The order in which a ratio is stated is important.

91	Ratio		The ratio of boys to girls is 2:3. For every 2 boys, there are 3 girls. **Boys : Girls** **2 : 3**

92	Proportion	The relationship between a part and a whole. Can be expressed as a fraction, decimal or percentage.	The ratio of boys to girls is 2:3 The proportion of the group which are boys is $\frac{2}{5}$
93	Express ratio as a fraction	Add the parts to find the denominator.	
94	Simplify Ratio	Divide both sides by a common factor	Squares : Diamonds is 9:12 3:4.

Example



ALGEBRA

Inverse operations

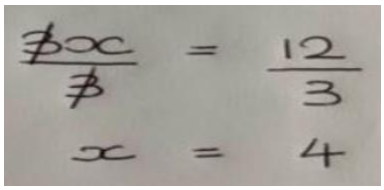
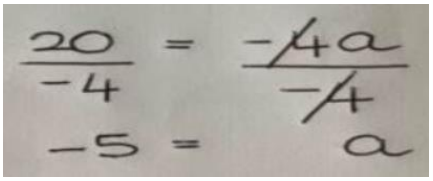
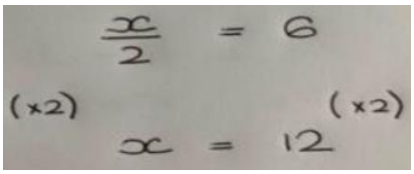
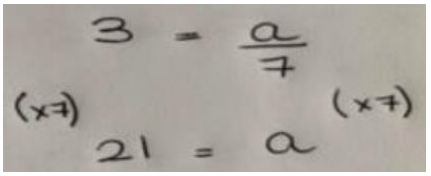
In maths, every operation has an inverse. When using the balance method to solve equations, we 'balance' or 'cancel' out an operation by using its inverse. Here are the inverse operations that you need to know:

Operation	Inverse
$\times$	$\div$
$\div$	$\times$
$+$	$-$
$-$	$+$
^{2} (square/power of 2)	$\sqrt{\ }$

Remember in algebra that

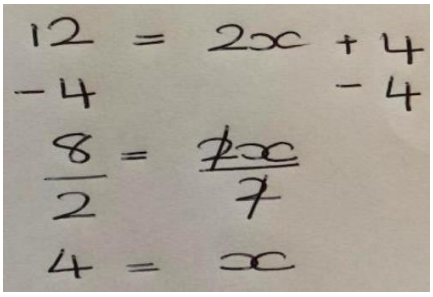
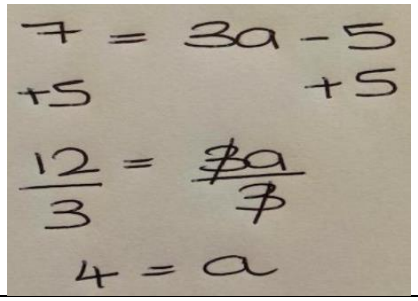
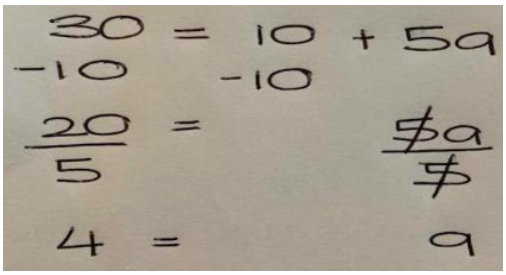
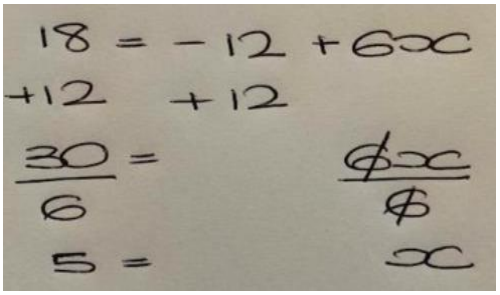
- $3a$ means $3 \times a$.
- $\frac{a}{3}$ means $a \div 3$

Examples:

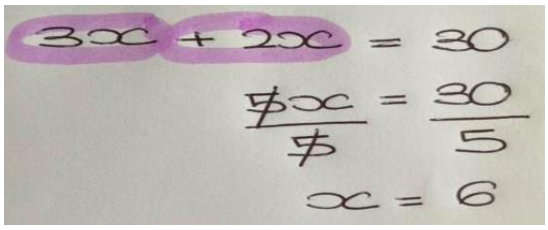
Solve $3x = 12$  Check 3(4) = 12 ☺	Solve $20 = -4a$  Check -4(-5) = 20 ☺
Solve $\frac{x}{2} = 6$ 	Solve $3 = \frac{a}{7}$ 
Check $\frac{12}{2} = 6$ ☺	Check $3 = \frac{21}{7}$ ☺

Collecting then solving

Examples:

Solve $12 = 2x + 4$  $12 = 2x + 4$ $-4 \quad\quad -4$ $\frac{8}{2} = \frac{2x}{2}$ $4 = x$	Solve $7 = 3a - 5$  $7 = 3a - 5$ $+5 \quad\quad +5$ $\frac{12}{3} = \frac{3a}{3}$ $4 = a$
Check $2(4) + 4$ $12 = 8 + 4$ ☐	Check $3(4) - 5$ $7 = 12 - 5$ ☐
 $30 = 10 + 5a$ $-10 \quad -10$ $\frac{20}{5} = \frac{5a}{5}$ $4 = a$ Solve $30 = 10 + 5a$	 $18 = -12 + 6x$ $+12 \quad +12$ $\frac{30}{6} = \frac{6x}{6}$ $5 = x$ Solve $18 = -12 + 6x$
Check $10 + 5(4)$ $30 = 10 + 20$ ☐	Check $-12 + 6(5)$ $-12 + 30 = 18$ ☐

Examples:



Solve $3x + 2x = 30$

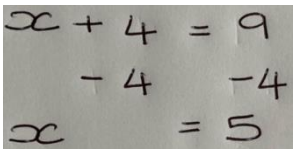
Check 3(6) + 2(6) = 30 ☺
18 + 12 = 30 ☺

Given that $x + 4 = 9$

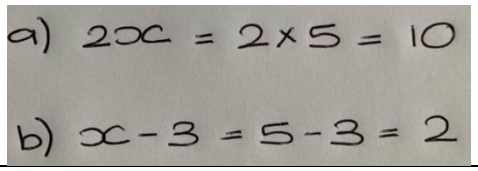
a) What is the value of $2x$?

b) What is the value of $x - 3$?

Firstly, work out the value of x:



Now substitute into find required expression:



Solving Two Step Equations

Two-step equations are equations that require us to do two balance steps to solve. It is really important that we do the balance steps in the correct order.

Examples:

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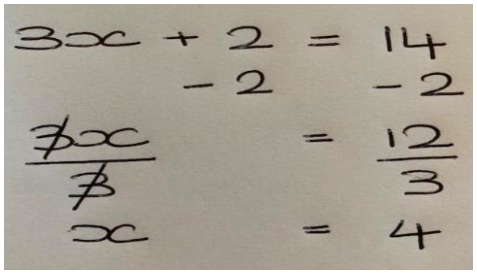
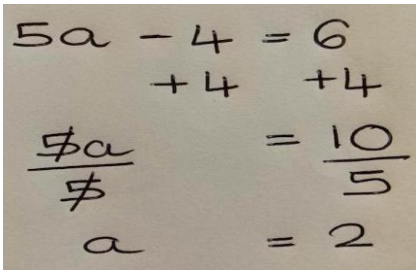
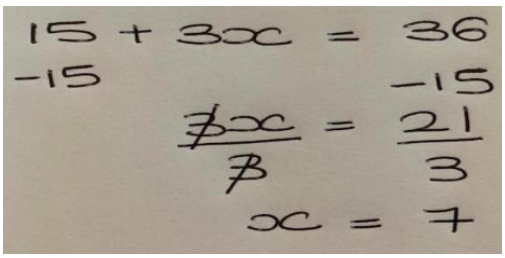
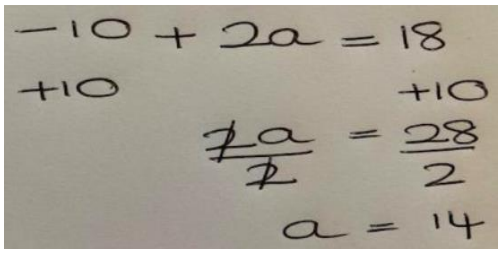
<tr>
<td> 

Solve $3x + 2 = 14$</td>
<td> 

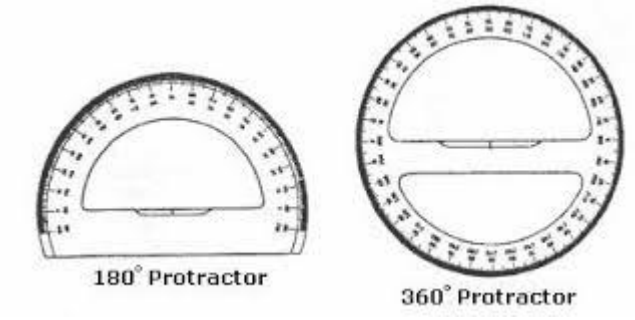
Solve $5a - 4 = 6$</td>
</tr>
<tr>
<td>Check 3(4) + 2
12 + 2 = 14 ✓</td>
<td>Check 5(2) - 4
10 - 4 = 6 ✓</td>
</tr>
<tr>
<td> 

Solve $15 + 3x = 36$</td>
<td> 

Solve $-10 + 2a = 18$</td>
</tr>
<tr>
<td>Check 15 + 3(7)
15 + 21 = 36 ✓</td>
<td>Check -10 + 2(14) = 18
-10 + 28 = 18 ✓</td>
</tr>
</table>

Angles

Protractor: Equipment used to measure angles.



Angle: A measure of turn

Acute Angle: Turn greater than 0°and less than 90°

Right Angle: 90°

Obtuse: Turn greater than 90° and less than 180°

Straight line: 180° turn

Reflex: Turn greater than 180° and less than 360°

Full Turn: 360° turn

Perpendicular line(s): Pair of lines that meet or cross at 90°

Polygon: 2D shape with straight lines

Interior Angles: The angles inside a polygon

Exterior Angles: Formed by extending a straight line next to interior angle.

Angles on a Straight line: Sum to 180°

Angles around a point: Sum to 360°

Vertical opposite angles: Are equal

Angles in Triangle's: Sum to 180 °

Angles in Quadrilaterals: Sum to 360°

Angle Facts: Straight Lines

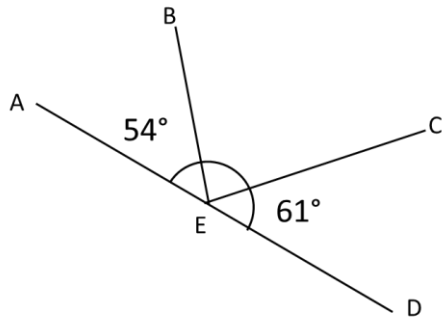
An angle is a measure of turn. The lengths of the lines do not matter. We measure angles in degrees. The larger the number, the greater the turn. A complete turn is 360°. Half a turn is 180°.

This is where we get our first angle fact

Adjacent angles on a straight line add up to 180°.

They must share a point.

Recap Example:	
The diagram below is not drawn accurately. Line AD is a straight line. Work out the size of angle $B\hat{E}C$.	State fact: Add up known angles: Subtract answer from known total:

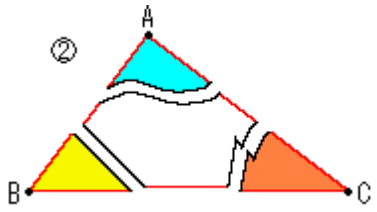
	

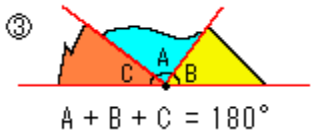
Angles in Triangles

We can use the angles on a straight line fact from lesson one to derive another fact.

Angle Fact: Interior Angles of a Triangle add up to 180°

Demonstration: If you tear the three angles off a triangle and put them together they will always make a straight line.

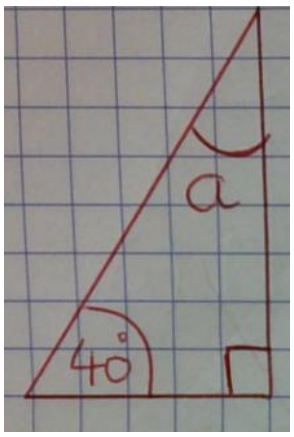
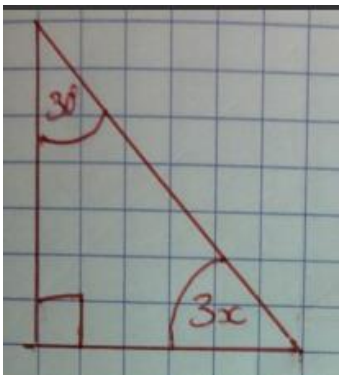




A + B + C = 180°

*You can also see this if you fold a triangle inwards

Example with one missing angle	Example with algebra

 Add any information to diagram Work out missing angle	 Add any information to diagram Form equation Solve

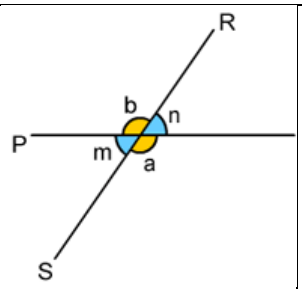
Vertically Opposite Angles

We have seen in the first lesson that adjacent angles on a straight line always add up to 180°.

We can use this fact to derive (work out) another angle fact.

Angle Fact: Vertically Opposite angles are equal

Demonstration



Fact: Adjacent angles on a straight line add up to 180°

180°	
b	n

180°	
a	n

b + n = 180°

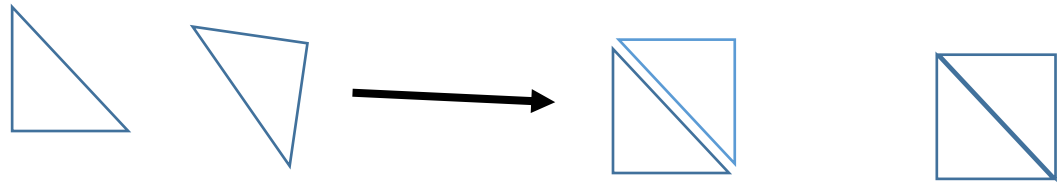
a + n = 180°

180°	
b	n
a	n

Angle a must be the same size as angle b

Angle Fact: The interior angles of a quadrilateral add up to 360°.

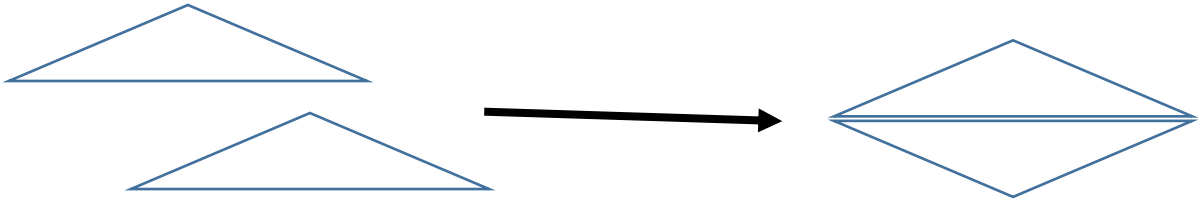
Demonstration



180°		
90°	40°	50°

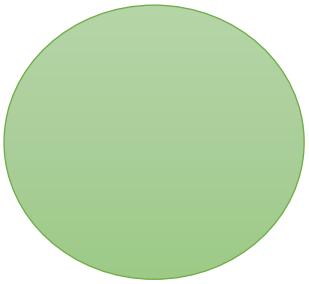
180°		
90°	50°	40°

360°					
90°	40°	50°	50°	40°	90°



- Angles in a triangle add up to 180°
- 2 triangles make up a quadrilateral
- **Therefore, angles in a quadrilateral add up to 360°**

Circles



Circle Definition

A circle is a closed two-dimensional figure in which the set of all the points in the plane is equidistant from a given point called "centre". Every line that passes through the circle forms the line of reflection symmetry. Also, it has rotational symmetry around the centre for every angle.

Circle Shaped Objects

There are many objects we have seen in the real world that are circular in shape. Some of the examples are:

- Ring
- CD/Disc
- Bangles
- Coins
- Wheels
- Button
- Hula hoop

We can observe many such examples in our day-to-day life.

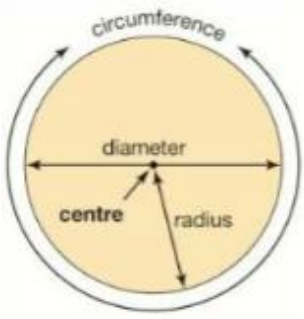
Key Vocabulary

Radius	A line drawn from the centre of the circle to the circumference. Stays the same all the way around
Diameter	A straight line that passes through the centre of a circle and touches two points on the circumference
Circumference	The distance around the circle. The perimeter of a circle.
Area	The space inside a 2D shape.
π	Greek Symbol, pronounced Pi. Represents the irrational number that begins 3.14159….
Sector	A part of a circle created by two radii and part of the circumference
Semi-Circle	Half a circle
Inscribed	A shape which fits into another with the perimeters touching.

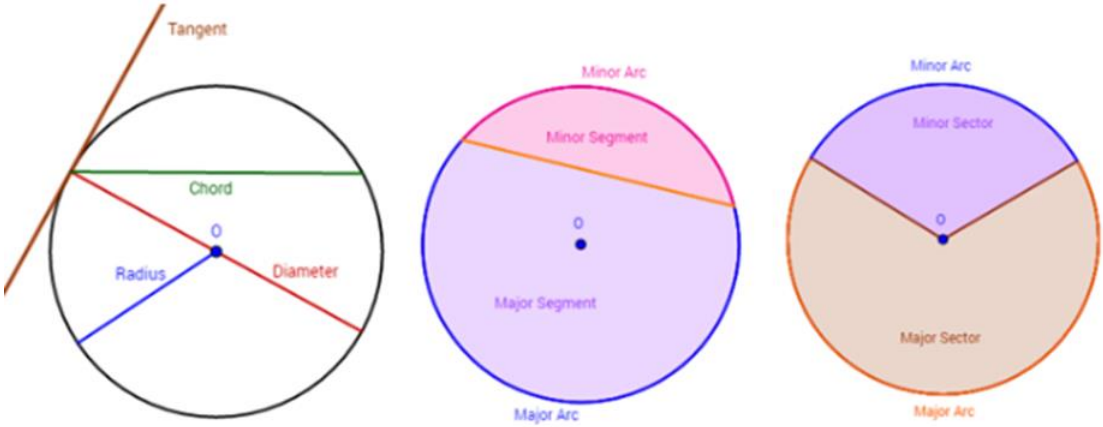
Parts of a circle

A circle is shape formed by points that are the same distance away from a centre. We need to learn the names of the parts of the circle.

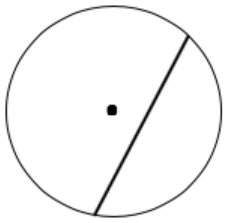
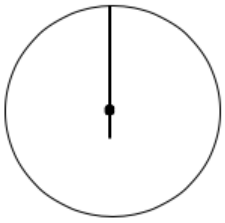
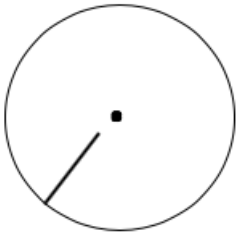
Name	Definition	
Diameter	A straight line that passes through the centre of a circle and touches two points on the circumference	

Radius (plural radii)	A line drawn from the centre of the circle to the circumference. Stays the same all the way around	
Circumference	The perimeter (distance around the outside) of a circle	

Additional Parts of a Circle to Learn



Non-examples:

		
This is **not** a diameter as it does not pass through the centre of the circle.	This is **not** a radius as the line is not drawn from the centre of the circle, it goes through the centre.	This is **not** a radius as the line is not drawn from the centre of the circle.

Examples:

Radius = 2cm

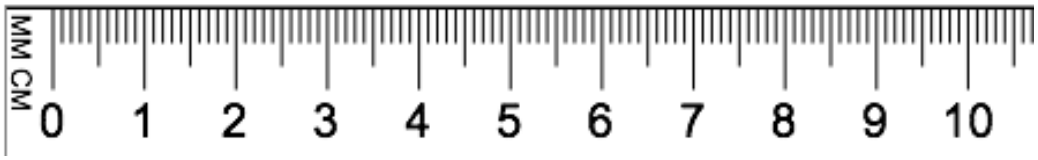
Diameter = 4cm

Drawing circles

i) Measuring lines

It is important to measure things accurately. If we do not measure accurately our drawings and answers will be incorrect. This is especially important for architects, builders and designers.

Remember 1cm = 10mm and 1mm = 0.1cm. On your ruler, each small line represents 1 mm or 0.1cm.



Remember - when measuring, we always start on zero (0).

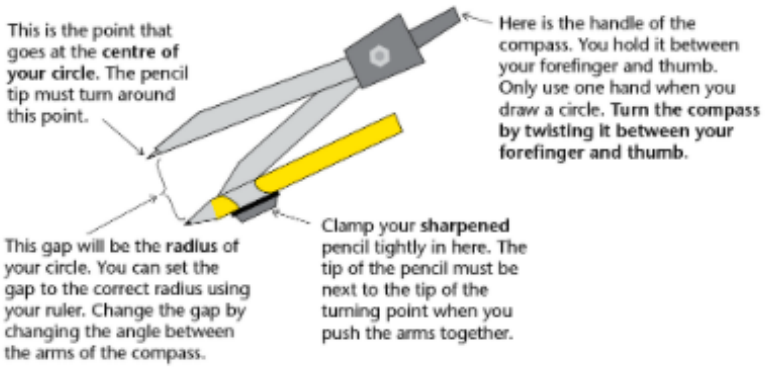
Measure the line below to the nearest 0.1cm _____
Measure the line below to the nearest tenth of a centimetre. [Remember a tenth is 0.1] _____
Measure the line below to one decimal place.


Draw a line exactly 6.3cm long in the space below.
Draw a line exactly 10.6cm long in the space below.

EQUIPMENT NEEDED: Ruler and compass

ii) Drawing circles given the radius or diameter

We need a special instrument called a **pair of compasses**, often just called a **compass** to draw a circle.



Negative Numbers

Getting the language right, especially the difference between "negative" and "subtract" is crucial.
We should not use "minus" or "plus" when saying these calculations, these words as not helpful.

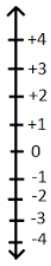
5	Should be read as "five", it means positive 5
- 5 or (-5)	should be read as "negative five"
2 – 5 = -3	should be read as "two subtract five equals negative three"
-2 – 5 = -7	should be read as "negative two subtract five equals negative seven"
-2 + 7 = 5	should be read as "negative two add seven equals five"

Inequalities and Negatives

=	Equal to. The left is equal to the right	6 = 2 + 4
≠	Not equal to	-6 ≠ 6
<	Less than	-5 < -2

>	Greater than	-1 > - 6
≤	Less than or equal to	-5 ≤ x <- 9
≥	Greater than or equal to	-5 > x ≥ -8
≈	Approximately	-5.2 ≈ -5

Temperature Number Line

Higher up	Warmer, Bigger	
Lower down	Colder, Smaller	
Warmer  colder	6 is warmer than 2	**6> 2**
	2 is colder than 6	**2 < 6**
	-2 is colder than 6	**-2 < 6**
	-6 is colder than 2	**-6 < 2**
	-6 is colder than -2	**-6 < -2**

Key Facts	
	Any positive number is greater than any negative number
	With negative numbers, the larger the **magnitude**, the **smaller** the number

Negative Numbers

Integer	A whole positive or negative number	5, -8, 113
Positive (number)	A number greater than zero. Above zero on a vertical number line.	8, 0.6, 4000, $\frac{1}{5}$, $2\frac{1}{5}$,
Negative (number)	A number less than zero . Below zero on a vertical number line.	-8, -0.6, -4000, $-\frac{1}{5}$, $-2\frac{1}{5}$,
Magnitude	The distance from zero on a number line	-9 has magnitude 9 6 has magnitude 6

Zero	A number which is neither positive or negative.	0
Zero-pair	A pair of numbers that sum to make zero .	e.g. 5 and -5 e.g. -6 and 6 e.g. 4.5 and -4.5
Ascending (order)	Going up from smallest to biggest.	-1, 0, 1, 2, 3, 4, 5, 6
Descending (order)	Going down from biggest to smallest .	6, 5, 4, 3, 2, 1, 0, -1
Vertical (number line)	A straight line that rises upwards perpendicular to the floor	
Horizontal (number line)	A straight line that goes across, parallel with the floor	
Bracket	Used to show multiplication, order of priority or to separate negative numbers	(-3) = negative 3 (-3)(-2) = -3 x -2 = +6

Percentages

Percentages and Proportions			
1	Percent	Out of 100. From the Latin, "per centum" meaning "for each hundred"	$\frac{36}{100}$ = 36%
2	Original	Before a change, at the start.	
3	Equivalent	Has equal value.	
4	Factor of 100	Number that divides into 100 leaving no remainder. Useful when converting fractions into percentages	1, 2, 4, 5, 10, 20, 25, 50, 100
5	Terminating	A number (decimal or percentage) which ends.	$\frac{1}{8}$ = 12.5%

6	Recurring	A number (decimal or percentage) which repeats in the same pattern. Shown with dot over the digits that repeat.	$\frac{1}{3}$= 33.$\dot{3}$% = 33.33333…% $\frac{4}{11}$= 36.$\dot{3}\dot{6}$% = 36.3636…%
Percentage Calculations (Command words in italics)			
	Express one thing as a % of another	$\frac{Number\ 1}{Number\ 2}$ x __= $\frac{\_\_}{100}$	• Write as a fraction. • Multiply bottom to make it 100. • Multiply top by same number.
	Express a change as a %	$\frac{Change}{Original}$ x 100	• Find the change/difference • Denominator is original/start • Multiply by 100.
	Find __% of an Amount	100% = Amount __% =	• Write percentage statement. • Use division or multiplication to get to %. Repeat on both sides. • Add together percentages and amounts when necessary.

	Increase an amount by ___%	100% = Amount + ___% = +	• Find percentage of amount. • Add on to the original
	Decrease or *reduce* an amount by ___%	100% = Amount - ___% = -	• Find percentage of amount. • Subtract from the original
	Find original given a %	___% = Amount 100% =	• Write percentage statement. • Use division or multiplication to get back to 100%.

Percentage Multipliers (Calculator Method)		
13	Multiplier	Decimal used to calculate a percentage increase or decrease.
14	Increase multiplier	$\frac{100 + \%\ increase}{100}$
15	Decrease Multiplier	$\frac{100 - \%\ decrease}{100}$
16	Reverse percentage	$Original\ Value = \frac{New\ value}{Multiplier}$

Common Fraction, Decimal, Percentage Equivalents				
		Fraction	Decimal	Percentage
	17	$\frac{1}{1}$	1	100%

Learn these common equivalents Use these to help you find percentages or fractions of amounts. For example 25% is $\frac{1}{4}$ so easy way of finding 25% of 80 is to do $\frac{1}{4}$ x 80 = $\frac{80}{4}$ = 20 Note: a (0) in a bracket means that you do not need it.	18	$\frac{1}{2}$	0.5	50%
	19	$\frac{1}{10}$	0.1(0)	10%
	20	$\frac{1}{4}$	0.25	25%
	21	$\frac{3}{4}$	0.75	75%
	22	$\frac{1}{5}$	0.2(0)	20%
	23	$\frac{2}{5}$	0.4(0)	40%
	24	$\frac{3}{5}$	0.6(0)	60%
	25	$\frac{4}{5}$	0.8(0)	80%
	26	$\frac{1}{100}$	0.01	1%

Words And Definitions in Maths

Prime	A number with exactly two factors 1 and itself
Square (x^2)	The result when an integer is multiplied by itself
Integer	A whole positive or negative number
Cube Number (x^3)	A number multiplied by itself 3 times (2x2x2=8)
Area	The space inside a 2d shape
Perimeter	The distance around a shape (Add all the sides)
Mode	The most common value
Median	The middle value (List values in order first)
Mean	Add all the values together and then divide by the number of values you have
Range	Biggest value subtracts smallest value
Numerator	The top number of a fraction

Denominator	The bottom number of a fraction
Improper Fraction	A fraction where the top number is bigger than the bottom number
Mixed Number	A number written as a whole number and a fraction ($\frac{11}{5} = 2\frac{1}{5}$)
BIDMAS	The order of operations that we have to follow in maths B (brackets) I (indices) D (division) M (multiplication) A (addition) S (subtraction)
Kilo	Means a thousand
Cent	Means a hundred
Mm	Millimetre
Cm	Centimetre
M	Metre
Km	Kilometre

Operational Words

Addition	Subtraction	Division	Multiplication
Add	Subtract	Divide	Lots of
More	Minus	Divided by	Times
Plus	Leave	Divided into	Multiply
Sum	Take away	Share	Groups of
Total	Difference	Share equally	Product
Altogether	Fewer than	Equal groups of	Multiplied by
Increase	Deduct	Goes into	Multiple of
Increased by	Decreased by	Quotient	Repeated addition
More than	Less		Array