ST ANNE'S NUMERACY BOOKLET

'Numeracy is the ability to understand and work with numbers'

This booklet has been produced to give parents/carers and pupils' guidance on how certain common Numeracy topics are taught throughout the school.

"St Anne's is committed to raising the standards of Numeracy of all its students. We want all our pupils to be confident and capable in the use of Numeracy to support their learning in all areas of the curriculum and to acquire the skills necessary to help achieve success in Further and Higher education, employment and adult life"

INTRODUCTION

Purpose of this booklet is:

- ✓ To develop, maintain and improve standards in Numeracy across our school
- ✓ To ensure consistency of methods and vocabulary used across subject areas
- ✓ To help pupils recognise the skills they need for their work which will ensure consistency in the methods they will need to use

At St Anne's, we intend that all of our pupils should:

- ✓ Be able to read and write numbers AND be able to order numbers in terms of size
- ✓ Be able to recall their times tables up to at least 12
- ✓ Be able to develop their skills in estimating and approximation and have strategies to check that their answers make sense
- ✓ Be able to explain their method and reasoning using consistent language and mathematical notation
- ✓ Be able to interpret, explain and make predictions from tables, graphs and charts
- ✓ Be able to measure using suitable units and be able to convert between various units
- ✓ Be able to read from a range of meters, dials and scales
- ✓ Be able to apply an appropriate method to help solve a problem using a mental or written method

Hyperlinked Contents: Page:

INTRODUCTION	2
READING AND WRITING NUMBERS	8
ROUNDING AND ESTIMATING	9
ADDITION	10
SUBTRACTION	11
MULTIPLICATION OF WHOLE NUMBERS (Mental)	12
MULTIPLICATION (Written Methods)	13
DIVISION	14
ORDER OF CALCULATION (BIDMAS)	15
ADDING AND SUBTRACTING NEGATIVE NUMBERS	16
MULTIPLYING AND DIVIDING NEGATIVE NUMBERS	17
FRACTIONS	18
PERCENTAGES	19
PERCENTAGES USING MENTAL METHODS	20
PERCENTAGES BY CALCULATOR	21
EXPRESSING AND AMOUNT AS A PERCENTAGE	22
RATIO	23
SIMPLIFYING RATIOS	24

SHARING IN A GIVEN RATIO	25
PROPORTION	26
ROUNDING MONEY	27
CALCULATIONS WITH MONEY	28
BEST BUYS	29
SALES PRICES & OFFERS	30
SALE PRICES & OFFERS (continued)	31
CALCULATING WITH FORMULAE	32
STANDARD FORM	33
TIME PERIODS	34
INTERPRETING TIMETABLES	35
READING SCALES	36
CONVERTING UNITS	37
Metric Conversions – LENGTH	38
Metric Conversions – MASS	38
Metric Conversions – CAPACITY	39
SCALE RATIO	40
MAP SCALES	41
BARGRAPHS	42

LINE GRAPHS	43
SCATTER GRAPHS	44
PIE CHARTS	46
INTERPRETING PIE CHARTS	47
AVERAGES	48
RANGE FROM THERMOMETER READINGS	49
REARRANGING EQUATIONS	50
PLOTTING COORDINATES	51
MATHEMATICAL KEYWORDS	52

WHAT NUMERACY LOOKS LIKE IN OTHER SUBJECTS

Here are some examples:

ART – Symmetry, use of paint mixing as a ratio, Scale

ENGLISH – comparison of texts & characters using tables or Venn diagrams

FOOD TECHNOLOGY – recipes in a ratio context, reading scales, time

DESIGN TECHNOLOGY – measuring, ratio, area & volume

GEOGRAPHY – representing data and interpreting data, scale ratios

HISTORY – timelines, sequencing events

ICT – representing data, spreadsheets, formulae

MFL – Dates, sequences and counting in other languages, use of basic graphs and surveys to practise foreign language vocabulary and reinforce interpretation of data

MUSIC – Counting beats, fraction bars

PE - Measuring & recording data, time-keeping, scoring, using percentages

RELIGIOUS STUDIES- Timelines, use of charts and graphs to make comparisons

SCIENCE - Measuring, recording and interpreting data, Units, Ratio & Percentages, Decimal & Fractions, Standard Form, Averages, Tables & Charts, Averages, 2D & 3D shapes, Area & Volume, Algebra Notation, Formulae, Equations

READING AND WRITING NUMBERS

You may find large numbers written with commas or spaces – both are correct. If you use commas, remember to work from the **end** of the number and place a comma **every three digits:**

Example: **3574** is written as **3,574** or **3 574** (Three thousand five hundred and seventy four)

48600 is written as **48,600** or **48 600 (**Forty eight thousand six hundred)

REMEMBER: THE FINAL THREE DIGITS ARE READ AS THEY ARE WRITTEN IN THE ORDER →HUNDREDS, TENS and UNITS

For larger numbers (remember the place values below)

Millions	Hundred Thousands	Ten Thousand	Thousands	Hundreds	Tens	Units
7	5	3	2	1	8	9

Writing this out gives us (remember to start from the end and insert a comma every three digits)

- 7532189 which written with commas is 7, 532, 189

This number reads as seven **million**, five hundred and thirty two **thousand**, one **hundred a**nd eighty nine.

Millions	Hundred Thousands	Ten Thousand	Thousands	Hundreds	Tens	Units
		6	2	4	3	1

- 62, 431 is read as sixty two **thousand** four **hundred** and thirty one

More examples:

- 564, 301 is read as five hundred and sixty four **thousand** three **hundred** and one
- 3, 074, 200 is read as three **million** seventy four **thousand** two **hundred**
- 9, 268 is read as nine **thousand** two **hundred** and sixty eight
- 52, 187, 245 read as fifty two **million** one hundred and eighty seven **thousand** two **hundred** and forty five

ROUNDING AND ESTIMATING

To the nearest 10: look at the last digit, if it is less than 5 round down, if it is more than 5 then round up to the next ten.
For example: 642 to the nearest ten is 640
3,479 to the nearest ten is 3,480

To the nearest 100: look at the last two digits, if they are less than 50 round down, if more than 50 round up
For example: 3,847 to the nearest 100 is 3,800
49,362 to the nearest 100 is 49,400

To the nearest 1000: look at the last three digits, if they are less than 500 round down, if more than 500 round up
For example: 4,213 to the nearest 1000 is 4000
283, 503 to the nearest 1000 is 284, 000

Which rounding should I choose to do a rough estimate ?

- If you have a 2 digit number then round to the nearest ten
- If you have a 3 digit number then round to the nearest ten or hundred
- If you have a 4 digit number then round to the nearest hundred or thousand

Example Tickets for a musical show were sold over 4 days. The number of tickets sold each day was recorded in the table below. How many tickets were sold in total?

Monday	Tuesday	Wednesday	Thursday
387	208	191	312

All 3 digit numbers so round to the nearest hundred to get a rough mental estimate

Estimate = 400 + 200 + 200 + 300 = **1100**

Actual 387+208+191+312 = 1098 Good estimate!

Example: A packet of crisps weighs 72 grams. There are 19 packets in a bag. What is the total weight of the bag? (Estimate by rounding to the nearest 10)
Estimate = 70 x 20 = **1400g**
Actual 72 x 19 = 1368g Good estimate!

Mental strategies ADDITION

There are a number of useful mental strategies for addition. Some examples are given below.

Example Calculate 63 + 39 ***Note: 63= 60+3 and 39=30+9**

Method 1 Add tens, then add units, then add together

60 + 30 = 90   3 + 9= 12   90 + 12 = 102

Method 2 Split up number to be added into tens and units and add separately.

63 + 30 = 93   93 + 9 = 102

Method 3 Round up the number **being added** to the nearest 10, then subtract

63 + 40 = 103 but 40 is 1 too much so subtract 1;
103 -1 = 102

Written Method

When adding numbers, ensure that the numbers are lined up according to place value. Start at end of the numbers and add, write down units, carry tens.

Example Add 3032 and 589

```
1)  3032        2)  3032        3)  3032        4)  3032
   + 589           + 589           + 589           + 589
       1              21             621            3621
       1              11             1 1
```

2 + 9 = 11   3+8+1=12   0+5+1=6   3 + 0 = 3

SUBTRACTION

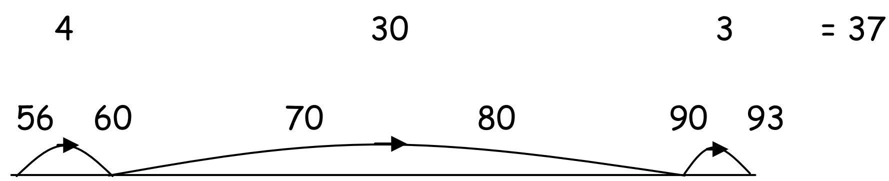
We use decomposition as a written method for subtraction (see below). Alternative methods may be used for mental calculations.

Mental Strategies

Example Calculate 93 - 56

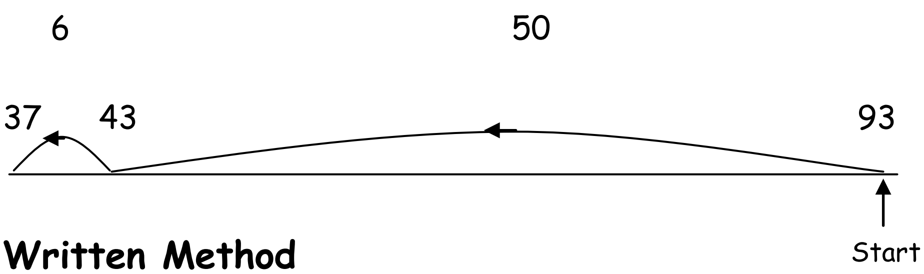
Method 1 Count on

Count on from 56 until you reach 93. This can be done in several ways e.g.



Method 2 Break up the number being subtracted

e.g. subtract 50, then subtract 6 93 - 50 = 43
43 - 6 = 37



Written Method

Example 1 4590 – 386

```
  8 1
 4590
- 386
 4204
```

The order is 'Top number minus the bottom number

Example 2 Subtract 692 from 14597

```
  3 1
 14597
-  692
 13905
```

MULTIPLICATION OF WHOLE NUMBERS (Mental)

It is essential that you know all of the multiplication tables up to 12. These are shown in the tables square below.

x	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11	12
2	2	4	6	8	10	12	14	16	18	20	22	24
3	3	6	9	12	15	18	21	24	27	30	33	36
4	4	8	12	16	20	24	28	32	36	40	44	48
5	5	10	15	20	25	30	35	40	45	50	55	60
6	6	12	18	24	30	36	42	48	54	60	66	72
7	7	14	21	28	35	42	49	56	63	70	77	84
8	8	16	24	32	40	48	56	64	72	80	88	96
9	9	18	27	36	45	54	63	72	81	90	99	108
10	10	20	30	40	50	60	70	80	90	100	110	120
11	11	22	33	44	55	66	77	88	99	110	121	132
12	12	24	36	48	60	72	84	96	108	120	132	144

Mental Strategies

Example Find 39 x 6

Method 1

30 x 6
= 180

9 x 6
= 54

180 + 54
= 234

Method 2

40 x 6
=240

40 is 1 too many
so take away 6x1

240 - 6
= 234

MULTIPLICATION (Written Methods)

Written strategies

Traditional method

$$\begin{array}{r} 2\,4\,5 \\ \underline{\times \quad 6\,3} \\ \mathbf{7_1\,3_1 5} \\ 14_2 7_3 0\,0 \\ \hline 15\,4\,3\,5 \\ \hline \end{array}$$

$7_1 3_1 5 \leftarrow 245 \times 3$

$14_2 7_3 0\,0 \leftarrow 245 \times 60$

Grid method:

Example: 245 x 63

Break down each number
245=200 +40+5 and 63=60+3

X	200	40	5	Total
60	12000	2400	300	14700
3	600	120	15	735
Total	12600	2520	315	**15435**

Remember: If there are 3 zeroes altogether in the calculation then there will be 3 zeroes in the answer. If there are 2 zeroes then the answer will have 2 zeroes and so on……..

- Eg 20 x 30 = 600 (do 2x3 then add 2 zeroes at the end)
- 400 x 20 = 8000

Example: 256 X 34

$$\begin{array}{r} 256 \\ \underline{\times\ 30} \\ \underline{7680} \end{array} \qquad \begin{array}{r} 256 \\ \underline{\times\ \ 4} \\ \underline{1024} \end{array} \quad \rightarrow \quad \begin{array}{r} 7680 \\ +\ \underline{1024} \\ \underline{8704} \end{array}$$

DIVISION

> Remember: The number you are dividing by goes outside the 'bus shelter' so for 245 ÷5 the 5 goes outside and 245 is placed inside

Written Method

Example 1 There are 192 pupils in first year, shared equally between 8 classes. How many pupils are in each class?

$$\begin{array}{r} 2\;4 \\ 8\,\overline{)\,1\;9^{3}2} \end{array}$$

There are 24 pupils in each class

Example 2 Divide 4.74 by 3

$$\begin{array}{r} 1\;.\;5\;8 \\ 3\,\overline{)\,4\;.\;^{1}7^{2}4} \end{array}$$

> **When dividing a decimal number by a whole number, the decimal points must stay in line.**

Example 3 A jug contains 2.2 litres of juice. If it is poured evenly into 8 glasses, how much juice is in each glass?

$$\begin{array}{r} 0\;.\;2\;7\;5 \\ 8\,\overline{)\,2\;.\;^{2}2^{6}0^{4}0} \end{array}$$

Each glass contains 0.275 litres

> **If you have a remainder at the end of a calculation, add a zero onto the end of the decimal and continue with the calculation.**

ORDER OF CALCULATION (BIDMAS)

Consider this: What is the answer to 2 + 5 x 8?

Is it 7 x 8 = 56 or 2 + 40 = 42

The correct answer is 42.

Calculations which have more than one operation need to be done in a particular order. The order can be remembered by using the mnemonic **BIDMAS**

The **BIDMAS** rule tells us which operations should be done first.
BIDMAS represents:

(B)rackets
(I)ndices **(meaning powers like 3^2 or 2^5)**
(D)ivide
(M)ultiply
(A)dd
(S)ubract

Scientific calculators use this rule, some basic calculators may not, so take care in their use.

Example 1	15 – 12 ÷ 4	BIDMAS tells us to divide first
	= 15 – 3	
	= 12	
Example 2	(8 + 5) x 6	BIDMAS tells us to work out the
	= 13 x 6	brackets first
	= 78	
Example 3	19 + 6 ÷ (5 - 3)	Brackets first
	= 19 + 6 ÷ 2	Then divide
	= 19 + 3	Now add
	= 22	

ADDING AND SUBTRACTING NEGATIVE NUMBERS

Addition & Subtraction:

When two signs are **next to each other** we change them into one sign, so
(-)(-) = + (+)(+) = + (-)(+) = - (+)(-) = -
So for example 3--5 becomes 3+5=8, also -4-+5 becomes -4-5=-9 (Note: the answer is not +9 as the rule about two minuses making a plus only applies when we multiply or divide numbers!)

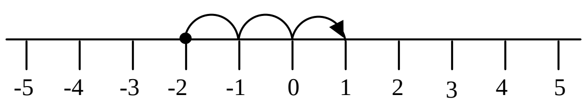
To **ADD**, count to the right.

To **SUBTRACT**, count to the left.

Examples:

1. -2 +3

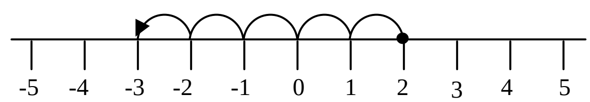
Start at -2
Move 3 places to the right



-2 +3 =1

2. 2+ (-5)

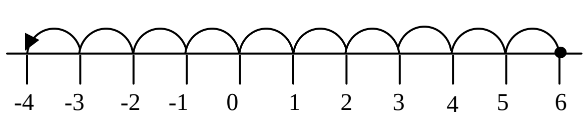
=2 -5
Start at 2
Move 5 places to the left



2 +(-5) = -3

3. 6 - 10

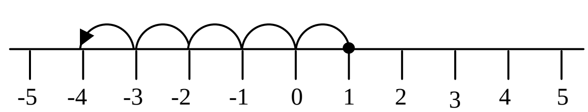
Start at 6
Move 10 places to the left



6 -10 = -4

4. **1**+ (-5)

= 1 - 5
Start at 1
Move 5 places to the left



1 + (-5) = -4

MULTIPLYING AND DIVIDING NEGATIVE NUMBERS

When the signs are **different** the answer is **negative** and when the signs are the **same** the answer is **positive:**

$$\left.\begin{array}{l} + \times - \\ - \times + \\ + \div - \\ - \div + \end{array}\right\} - \qquad \left.\begin{array}{l} + \times + \\ - \times - \\ + \div + \\ - \div - \end{array}\right\} +$$

Calculate:	**Solution:**
a) 5 x - 3	**a)** We have +5 and -3. The signs are **different**, so the answer will be **negative**. So, 5 x -3 = -15
b) -24 ÷ -8	**b)** We have -24 and -8. The signs are the **same**, so the answer will be **positive**. So, -24 ÷ -8 = +3
c) -6 x -2	**c)** We have -6 and -2. The signs are the **same**, so the answer will be **positive**. So, -6x-2=+12
d) -35 ÷ 7	**d)** We have -35 and 7. The signs are **different**, so the answer will be **negative**. So -35 ÷ 7 = -5

FRACTIONS

Simplifying Fractions

Equivalent fractions can be simplified as shown below:

The top of a fraction is called the numerator, the bottom is called the denominator.
To simplify a fraction, divide the **numerator** and **denominator** of the fraction by the same number.

Example 1

(a) $\frac{20}{25} \overset{\div 5}{\underset{\div 5}{=}} \frac{4}{5}$

(b) $\frac{16}{24} \overset{\div 8}{\underset{\div 8}{=}} \frac{2}{3}$

This can be done repeatedly until the numerator and denominator are the smallest possible numbers - the fraction is then said to be in its simplest form.

Example 2 Simplify $\frac{72}{84}$ $\quad \frac{72}{84} = \frac{36}{42} = \frac{18}{21} = \frac{6}{7}$ (simplest form)

Calculating Fractions of a Quantity

To find a fraction of an amount :

- Divide by the denominator (bottom number)
- Multiply the answer by the numerator(top number)
- You may sometimes get a whole number or a decimal answer

Example 1: Find $\frac{1}{5}$ of £150

$\frac{1}{5}$ of £150 = £150 ÷ 5 = £30 then £30x1= £30

Example 2: Find $\frac{3}{4}$ of 48

48 ÷ 4 = 12

So 3 x 12 = 36

Note again: Divide by the denominator (bottom number), then multiply the answer by the numerator (top number)

PERCENTAGES

- Percent means out of 100.
- A percentage can be converted to an equivalent fraction or decimal. Remember a decimal like 0.3 is the same as 0.30. Similarly with money, if you get an answer like £4.8 it means £4.80.

To change a percentage to a fraction put it over 100.
Eg 47% = $\frac{47}{100}$

To change a % to a decimal we divide by 100.

Eg 62%=62÷100=0.62

36% means $\frac{36}{100}$ which equals 36÷100 which equals 0.36

36% = $\frac{36}{100}$ which can be simplified to $\frac{9}{25}$ by dividing top and bottom by 4

Common Percentages

Some percentages are used very frequently. It is useful to know these as fractions and decimals.

Percentage	Fraction	Decimal
1%	$\frac{1}{100}$	0.01
10%	$\frac{1}{10}$	0.1 same as 0.10
25%	$\frac{1}{4}$	0.25
50%	$\frac{1}{2}$	0.5 same as 0.50
75%	$\frac{3}{4}$	0.75
20%	$\frac{1}{5}$	0.2 same as 0.20

PERCENTAGES USING MENTAL METHODS

There are many ways to calculate percentages of a quantity. Some of the common ways are shown below.

Non- Calculator Methods

Method 1 **Using Equivalent Fractions**

Example Find 25% of £640 (**Remember 25% is one quarter**)

25% of £640 $= \frac{1}{4}$ of £640 = £640 ÷ 4 = £160

Method 2

- First find 1% of the quantity (by dividing by 100)
- Then multiply this answer by the percentage to get the required value

Example Find 9% of 200g

1% of 200g = 200g ÷ 100 = 2g

so 9% of 200g = 9 x 2g = 18g

Method 3 **Using 10%**

- First find 10% (by dividing by 10)
- Then multiply this answer by the combination of 10 to get the required value

70% = 7x10% so multiply by 7 after dividing by 10

Example Find 70% of £35

10% of £35 $= \frac{1}{10}$ of £35 = £35 ÷ 10 = £3.50

so 70% of £35 = 7 x £3.50 = £24.50

PERCENTAGES BY CALCULATOR

Calculator Method

To find the percentage of a quantity using a calculator

- divide the percentage by 100
- then multiply this answer by the amount

Example 1 Find 23% of £15000

- **23% = 23÷100= 0.23**
- so 23% of £15000 = **0.23** x £15000 = £3450

Equally we could do $\dfrac{\text{Amount x Percentage}}{100}$

So 23% of £15000 = $\dfrac{23 \times 15000}{100}$ = £3450

Example 2 House prices increased by 19% over a one year period. What is the new value of a house which was valued at £236,000 at the start of the year?

19% = 0.19 so Increase = 0.19 x £236,000 = £44,840

Value at end of year = original value + increase
= £236,000 + £44,840
= £280,840

The new value of the house is £280,840

- When increasing by a percentage – we find the percentage of the amount then **ADD** this answer to the original number
- When decreasing by a percentage – we find the percentage of the amount then **SUBTRACT** this answer from the original number

EXPRESSING AN AMOUNT AS A PERCENTAGE

Expressing something as a percentage

To find a number as a percentage of another number:
- We make a fraction of both numbers
- Multiply this fraction by 100

Example 1 There are 30 pupils in Class 3M. 18 are girls.
What percentage of Class 3M are girls?

$$\frac{18}{30} = 18 \div 30 = 0.6 \times 100 = 60\%$$

Move the decimal point 2 places to the right
(100 has 2 zeroes)
0.6 means 0.60

OR $$\frac{18}{30} \times 100\% = \frac{18 \times 100\%}{30} = \frac{1800}{30} = 60\%$$

60% of 3M are girls

Example 2 James scored 36 out of 44 his biology test. What is his percentage mark?

Score = $\frac{36}{44} = 36 \div 44 = 0.8181\text{x}100 = 81.81\% = 82\%$ (nearest whole number)

OR $$\frac{36}{44} \times 100\% = \frac{36 \times 100\%}{44} = \frac{3600}{44} = 81.818..\% = 82\%$$

Example 3 In class 8J, 14 pupils had brown hair, 6 pupils had red hair, 3 had black hair and 2 had blonde hair.
What percentage of the pupils had red hair?

Total number of pupils = 14 + 6 + 3 + 2 = 25
6 out of 25 had red hair, so
$\frac{6}{25} = 6 \div 25 = 0.24$ $0.24 \times 100 =$ **24% had red hair**

RATIO

When quantities are to be mixed together, the ratio, or proportion of each quantity is often given. The ratio can be used to calculate the amount of each quantity, or to share a total into parts.

Writing Ratios

Example 1

To make a fruit drink, 4 parts water is mixed with 1 part of orange squash.
The ratio of water to squash is 4:1
(read as "4 to 1")
The ratio of squash to water is 1:4.

Example 2

Always read the question to ensure the ratio is written in the order given. If a bag has 2 yellow and 3 green balls then the ratio of yellow to green is 2:3 but green to yellow is 3:2

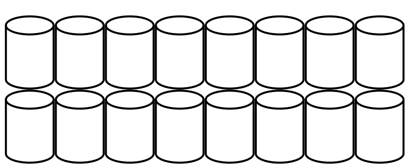
Simplifying Ratios

Ratios can be simplified in much the same way as fractions.

Example 1

Purple paint can be made by mixing 10 tins of blue paint with 6 tins of red. The ratio of blue to red can be written as 10 : 6

It can also be written as 5 : 3, as it is possible to split up the tins into 2 groups, each containing 5 tins of blue and 3 tins of red.



B B B B B R R R

B B B B B R R R

Blue : Red = 10 : 6
= 5 : 3

To simplify a ratio, divide each part by a number that goes into all parts of the ratio. Simplify until you get the simplest form:
12:18 = 6:9 = 2:3

SIMPLIFYING RATIOS

Simplifying Ratios (continued)

Example 2

Simplify each ratio: To save time, divide by the biggest number possible, or divide in a number of smaller steps

(a) 4:6 (b) 24:36 (c) 6:3:12

(a) 4:6
= 2:3

Divide each figure by 2

(b) 24:36
= 2:3

Divide each figure by 12 or ÷2,÷2 and then ÷3

(c) 6:3:12
= 2:1:4

Divide each figure by 3

Example 3

Concrete is made by mixing 30 kg of sand with 18 kg cement. Write the ratio of sand : cement in its simplest form

Sand : Cement = 30 : 18 divide by 2
= 15 : 9 divide by 3
= 5:3 simplest form

(Alternatively we could have divided by 6 to get the same answer)

Using ratios

The ratio of fruit to nuts in a chocolate bar is 2 : 3. If a bar contains 10g of fruit, what weight of nuts will it contain?

	Fruit	Nuts	
	2	3	
x5			x5
	10	**15**	

So the chocolate bar will contain 15g of nuts.

SHARING IN A GIVEN RATIO

Sharing in a given ratio

Method:

- **Add** the ratio parts
- **Divide** the amount by this sum
- **Multiply** each amount of the ratio by this answer

You can remember this as the **ADaM** (like the boy's name) ie **A**dd then **D**ivide then **M**ultiply

Example

Betsy and Brian work in a pizza restaurant. Betsy worked for 5 hours and Brian worked for 3 hours. They decide to share out the total tip according to the hours they worked. If the total tips amount was £56, how much do they each get?

Betsy hours : Brian hours gives the ratio as 5 : 3

Step 1 **Add** up the numbers to find the total number of parts

5 + 3 = 8

Step 2 **Divide** the total by this number to find the value of each part

56 ÷ 8 = 7

Step 3 **Multiply** this answer by each ratio amount

5 x £7 = £35
3 x £7 = £21

Step 4 Check that the total is correct

£35 + £21 = £56 √

Betsy received £35 and Brian received £21

PROPORTION

Two quantities are said to be in direct proportion if, when one changes, the other changes in the same way
e.g. if one quantity doubles the other also doubles.
We can use proportion to solve problems.

It is often useful to make a table when solving problems involving proportion.

Example 1
A factory produces 1200 phones in 40 days. How many phones would they produce in 120 days?

	Days	Phones	
	40	1200	
x3			x3
	120	**3600**	

The factory would produce 3600 phones in 120 days.

Example 2
5 adult tickets for the cinema cost £36.50. How much would 8 tickets cost?

Tickets	Cost
5	£36.50
1	£7.30
8	£58.40

Working:

Find the cost of 1 ticket

$$\begin{array}{r} £7.30 \\ 5\overline{)£36.50} \end{array} \qquad \begin{array}{r} £7.30 \\ {}_{2}\times\ 8 \\ \hline £58.40 \\ \hline \end{array}$$

The cost of 8 tickets is £58.40

ROUNDING MONEY

All calculations of money need to be written down to 2 decimal places. For example £6.8 on the calculator means £6.80.

For rounding we will use the rule of '**Five or more'** which says that: '**look at the next digit after the position you want to round to – if this digit is 5 or more (eg 5, 6, 7, 8 or 9) then add 1 to the previous digit. If it is less than 5 then leave the previous digit as it is'**

Example 1 Round £3.268 to 2 decimal places

The second digit after the decimal point is a 6 - check the next digit (the third number after the decimal point) which is an 8, as it's more than 5 we add 1 to 6 to make it 7.

£3.268
= £3.27 to 2 decimal places

Example 2 Round £13.432 to 2 decimal places

The second digit after the decimal point is a 3 - check the next digit (the third number after the decimal point) which is a 2 so as it's less than 5 we leave 3 as it is

£13.432 = £13.43 to 2 decimal places

CALCULATIONS WITH MONEY

Problem: You are working at a cake stall. There are two different ways for you to be paid. Either you can be paid PER HOUR, or you can receive a PERCENTAGE of the total profits.

OPTION 1: You work for three hours. The wage that they pay is £5 per hour.
OPTION 2: The total profits are £180. They offer you 10%.
Which option would you choose and why?

Option 1 £5.00 per hour.

Three hours in total.

5 x 3 = 15

So you would be paid £15.

Option 2
10% is the same as splitting 100% into 10 pieces:

10%+10%+10%+10%+10%+10%+10%+10%+10%+10%=100%

Therefore, 10% is the same as dividing by 10.

The Total Profits: £180

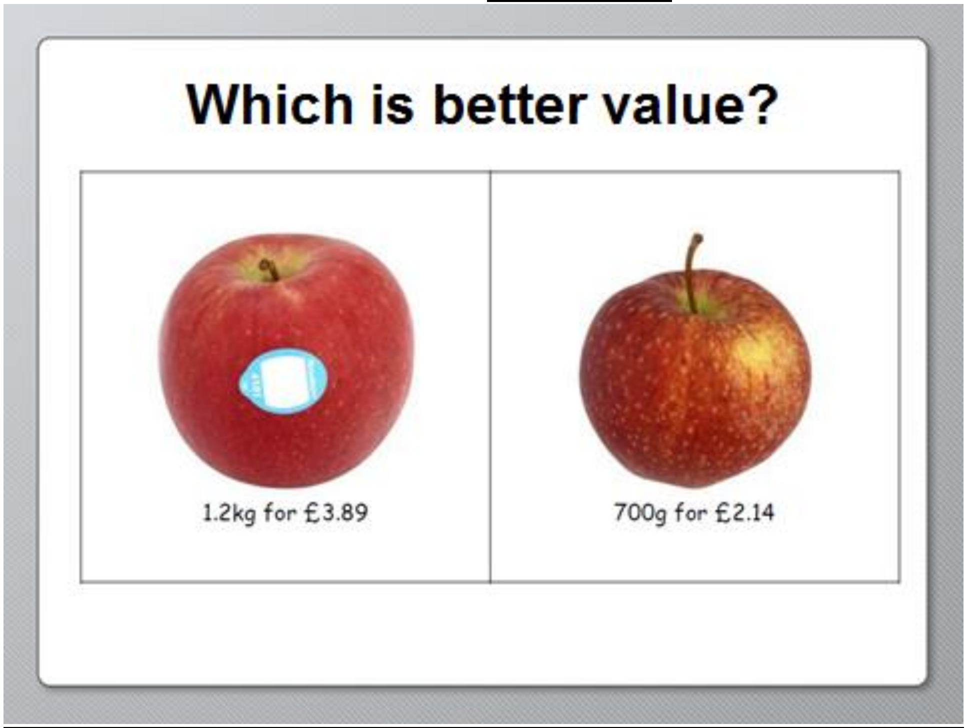
If we split that into 10 pieces (divide by 10), we will find out what 10% of 180 is.

£180 ÷ 10 = £18.

So you would be paid £18.

So OPTION 2 will give you £3 more than OPTION 1

BEST BUYS



FACT: 1 kg = 1000g and £1 = 100 pence

Find the cost of **1g** for each

1200g = 389 pence so **1g** = 389 ÷ 1200 we get **1g** = 0.32 pence
700g = 214 pence so **1g** = 214 ÷ 700 we get **1g** = 0.31 pence

So 700g for £2.14 is better value for money

Tekso supermarket have the following offer: A 500ml bottle costs £1.60 which they have on offer **BUY THREE FOR THE PRICE OF TWO**

Abda supermarket have the same shampoo on offer: A 300ml bottle costs £1.50 which they have on offer **BUY ONE GET ONE FREE**
Which one has the better offer ?

Tekso For 3 bottles we get 3 x 500ml which is 1500 ml for 2x£1.60 = £3.20
320 pence ÷1500ml = 21 pence for 1ml
Abda For 2 bottles we get 2x300 = 600ml for £1.50
150 pence ÷ 600ml = 25 pence for 1 ml
THIS MEANS TEKSO'S OFFER IS BETTER VALUE FOR MONEY !

SALES PRICES & OFFERS

Percentage Discounts

To find the sale price of an item:

- We find the percentage of the amount
- Subtract this answer from the original amount

Method 1 Using Equivalent Fractions

Example A Shirt usually costs £50 but is discounted by 25% in the sale. How much does it cost in the sale?

The shirt has 25% of its value taken away from its original price:

25% of £50 $= \frac{1}{4}$ of £50 $=$ £50 $\div 4 =$ £12.50

To divide by 4 we divide by 2 then divide that answer by 2

Take this away from the original price:

£ 50.00 - £12.50 = <u>£37.50</u>

Method 2 Using 1% method

In this method, first find 1% of the quantity (by dividing by 100), then multiply to give the required value.

Example A bicycle usually costs £300 but is discounted by 20% in the sale. How much does it cost in the sale?

1% of £ 300 = $\frac{1}{100}$ of £ 300 = £ 3

so 20% of £ 300 = 20 x £ 3 = £ 60

Take this away from the original price:

£ 200 - £ 60 = <u>£ 140</u>

SALE PRICES AND OFFERS (continued)

Method 3 Using the 10% method

Firstly find 10% by dividing the amount by 10
Multiply this answer by the combination of 10
For example to find 40% we divide by 10 then multiply the answer by 4 because 40% = 4 x 10%

Example A pair of football boots are reduced by 30 % in a sale. If their original price was £90, calculate the sale price:

10% of £90 = $\frac{1}{10}$ of £90= £90÷ 10 = £9

30% of £90 = 3 x £9 = £27

Take this away from the original price:

£ 90 - £ 27 = <u>£ 63</u>

Percentage Discounts: Calculator Method

Find the percentage of the amount by

- Divide the % by 100 then multiply by the amount
- Subtract this answer from the original amount

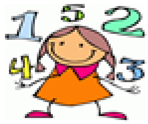
Example 1 A car usually costs £15000 but is reduced by 23% as part of a promotion for this week only. Calculate the cost of the car now.

23% = 0.23÷100=0.23
so 23% of £15000 = 0.23 x £15000 = £3450

Take this away from the original price:

£ 15 000 - £ 3450 = <u>£ 11 550</u>

CALCULATING WITH FORMULAE



To find a value of a **variable** (this is a letter whose value changes) in a given formula:

- Substitute the numbers we are given into the formula
- Use BIDMAS to calculate the answer

Example 1

Given the formula **V=U + AT** what is the value of V when U=3, A=2 and T=7

- Write the formula V = U + AT
- Substitute in numbers V = 3 + 2 x 7
- Use BIDMAS (x then +) V= 3 + 14
- Write down the answer V= 17

Example 2

Given the formula **Y=MX + C** what is the value of C when Y=15, M=2 and X=4

- Write the formula Y = MX + C
- Substitute in numbers 15 = 2x4 + C
- Use BIDMAS 15 = 8 + C
- Solve for C 15 – 8 = C

- (sign of term changes when you take it over the equals sign) REMEMBER THIS AS : "CHANGE SIDE, CHANGE SIGN"

- Write down the answer C = 7

Note: when calculating this we got 7 = C which is the same if we turn it around as C = 7

STANDARD FORM

Standard form is:

a number between 1 and 10 × a power of ten

*but **not** including 10* *positive or negative*

Example

The Jurassic Age began

199600000 years ago.

Write this in standard form.

1.996×10^{8}

The number we have is 199600000 – the decimal point is always at the end of a whole number. We have to move the decimal point until we get a number between 1 and 10. We had to move it 8 times so the power is 8 !
Moving left gives a positive power

Example

A DNA chain is approximately 0.0000022 mm in width.

Write this in standard form.

0.0000022

2.2×10^{-6}

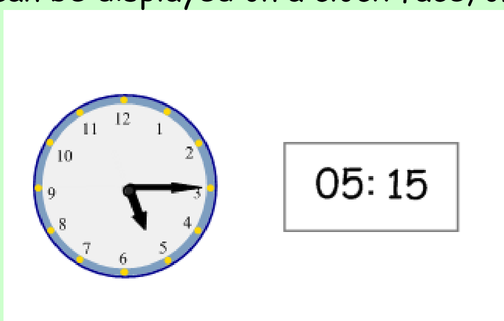
The number we have is 0.0000022 – we have to move the decimal point to the right this time to get a number between 1 and 10.
Moving to the right gives a negative power
As we had to move 6 times the power is -6

TIME NOTATION

Time may be expressed in 12 or 24 hour notation.
12 hour notation has am or pm written at the end.
24 hour notation does not ! eg 13:40 is 1.40pm

12-hour clock

Time can be displayed on a clock face, or digital clock.

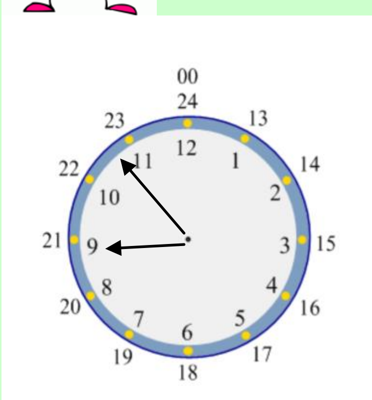


These clocks both show fifteen minutes past five, or quarter past five.

When writing times in 12 hour clock, we need to add a.m. or p.m. after the time.
a.m. is used for times between midnight and 12 noon (morning)
p.m. is used for times between 12 noon and midnight (afternoon / evening).

24-hour clock

For the 24 hour clock system the numbers are between 00 and 24. Midnight is 0:00 or 24:00.
After 12 noon the hours are numbered as follows:
1.00pm is 13:00
2.00pm is 14:00 (The colon : may not appear)
3.00pm is 15:00 etc (You may see h written as well)
Other ways you may see 24 hour clock times are 1420h which is the same as 14:20h (2.30 pm)



Examples

6.35 am → 06:35 h
3.40 pm → 15:40 h
11.45 am → 11:45 h
03:50 h → 3.50 am
20:45 h → 8.45 pm

TIME PERIODS

You need to know the time facts as follows:
1 minute = 60 secs, 1 hour = 60 mins, 1 day = 24 hours
1 week = 7 days, 1 year = 52 weeks not 48!!

Time Facts

In 1 year, there are: 365 days (366 in a leap year)
52 weeks
12 months

Also remember that 1 century = 100 years

The number of days in each month can be remembered using the rhyme:

"30 days hath September,
April, June and November,
All the rest have 31,
Except February alone,
Which has 28 days clear,
And 29 in each leap year."

- To change a 24 hour time into a 12 hour time we SUBTRACT 12 from the hours part if the hours are more than 12 which means it's after 12 noon

  Example: 18:40h → subtract 12 from 18
  18 – 12 = 6 so the time is 6.40 pm

  Example: 06:55→as the hours part is less than 12 then this is before midday (noon) so no need to subtract. This time is 6.55am in the morning

- Remember the equivalent notation for the 24 hour clock can be written in different ways:
- 16:30 or 16:30h is the same as 1630 or 1630h which is also the same as 16 30 or 16 30 hours (h or hours are the same !)

INTERPRETING TIMETABLES

Destination	Time	Time	Time	Time	Time	Time	Time	Time	Time
Thurso Business Park	0645	0745	0905	1005	1105	1205	1305	1405	1505
Olrig Street Job Centre	0650	0750	0910	1010	1110	1210	1310	1410	1510
Halkirk Sinclair Street	0705	0805	0925	1025	1125	1225	1325	1425	1525
Watten Post Office	0718	0818	0938	1038	1138	1238	1338	1438	1538
Haster Fountain Cottages	0725	0825	0945	1045	1145	1245	1345	1445	1545
Wick Somerfield bus terminal	0730	0830	0950	1050	1150	1250	1350	1450	1550
Wick Business park	0735	0835	0955	1055	1155	1255	1355	1455	1555
Wick Tesco Store	0736	0836	0956	1056	1156	1256	1356	1456	1556
Wick Airport Terminal	0741	0841	1001	1101	1201	1301	1301	1401	1601

Examples of Questions:

a) **I want to be at Wick Airport by 2.30pm. What time must I catch the bus at Olrig Street Job Centre?**

2.30pm is shown as 1430 h on the timetable
The most suitable bus arrives at Wick Airport at 1401
This leaves Olrig Street Job Centre at **1410 h**

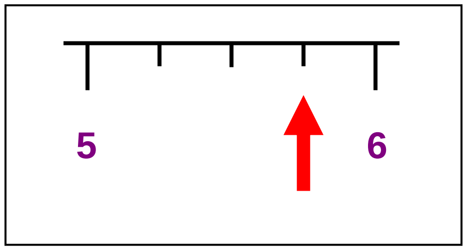
b) **The 0745 bus from Thurso Business Park is running 6 minutes late. What time does it reach Wick Tesco Store?**

Add 6 minutes to the arrival time at Wick Tesco Store
This is 0836 h. It arrives at **0842 h**

c) **How long does the first bus journey from Halkirk to Wick Business Park take?**
The bus leaves Halkirk at 0705 h and arrives at Wick Business Park at 0735 h.
The journey time is **30 minutes.**

READING SCALES

Scale 1



In this scale the difference between 5 and 6 is 1, and the space has been divided into 4, so each division represents 1 ÷ 4 = 0.25.

The arrow is pointing to 5 + 0.25 + 0.25 + 0.25 = 5.75

Scale 2 - a speedometer

The difference between 50 and 60 is 10 and the space has been divided into 2, so each division represents 10 ÷ 2 = 5.
The arrow is pointing to 50 + 5 = 55

So the Method is:

- SUBTRACT THE NUMBERS BETWEEN THE READINGS REQUIRED
- DIVIDE THE ANSWER YOU GET BY THE NUMBER OF DIVISIONS BETWEEN BOTH NUMBERS

CONVERTING UNITS

The table shows some of the most common equivalences between different METRIC units of measure. Make sure you know these **conversions**. Metric units are the modern day units.

Length	Weight	Capacity
	1 tonne = 1000kg	
1 km = 1000m	1kg = 1000g	
1m = 100cm = 1000mm	1g = 1000mg	1l = 100cl = 1000ml
1cm = 10mm		1cl = 10ml

METRIC & IMPERIAL UNITS

Imperial measures are old-fashioned units of measure. These days we have mostly replaced them with metric units, but despite our efforts to 'turn metric', we still use many imperial units in our everyday lives. It is therefore important that we are able to calculate rough equivalents between metric and imperial units.

Here are some conversions that you will need to know:

1 inch is about 2.5cm

1 foot is about 30cm

1 gallon is about 4.5 litres

1kg is about 2.2 pounds

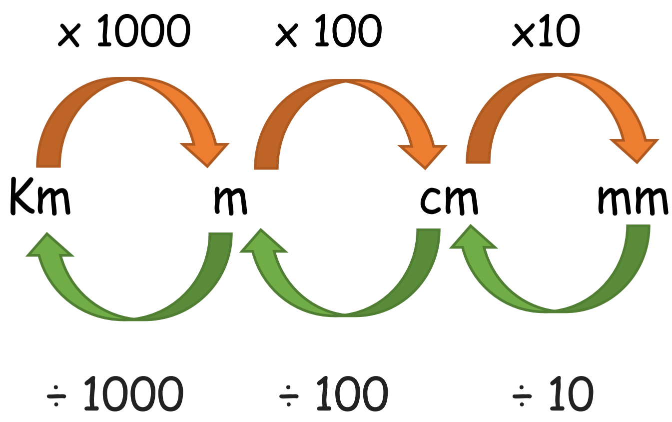
1 litre is about 1.75 pints

8km is about 5 miles

(1km is about 0.625 miles and 1 mile is about 1.6 km)

mm is millimetres	g is grams	ml is millilitres
cm is centimetres	kg is kilograms	cl is centilitres
m is metres		ℓ is litres
km is kilometres		

Metric Conversions – LENGTH

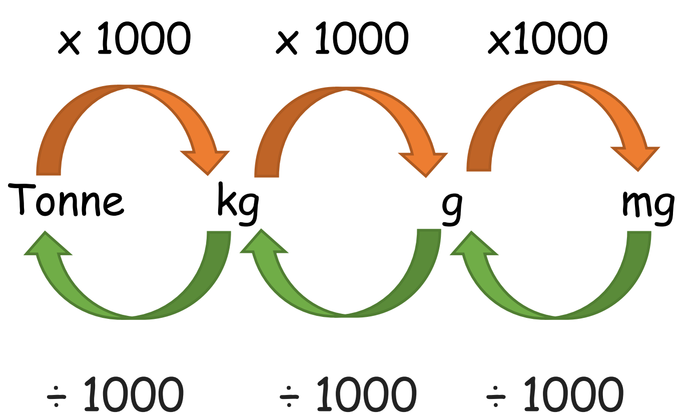


Examples:

- Convert 3m to cm.
  3m x 100 = 300cm
- Convert 5.7km to m.
  5.7km x 1000 = 5700m
- Convert 4cm to m.
  4cm ÷ 100 = 0.04m

Remember: To convert from a larger unit to a smaller one, **multiply**.
For example to change from **kilometres** to **metres** we **MULTIPLY**
To convert from a smaller unit to a larger one, **divide**.
For example to change to from **centimetres** to **metres** we **DIVIDE**

Metric Conversions – MASS

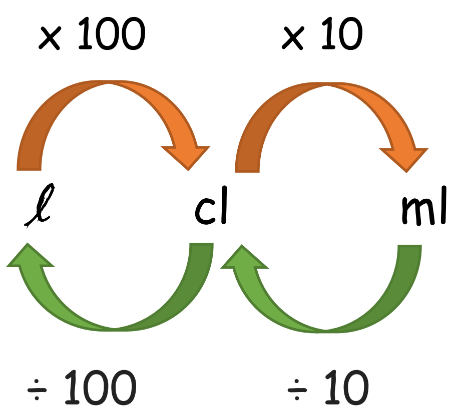


Examples:

- Convert 5g to mg.
  5g x 1000 = 5000mg
- Convert 2.9kg to g.
  2.9kg x 1000 = 2900g
- Convert 760g to kg.
  760g÷ 1000 = 0.760kg

-Convert 45mg to grams
45÷1000= 0.045g

Metric Conversions – CAPACITY



Examples:

- Convert 9ℓ to cl.

  9ℓ x 100 = 900cl

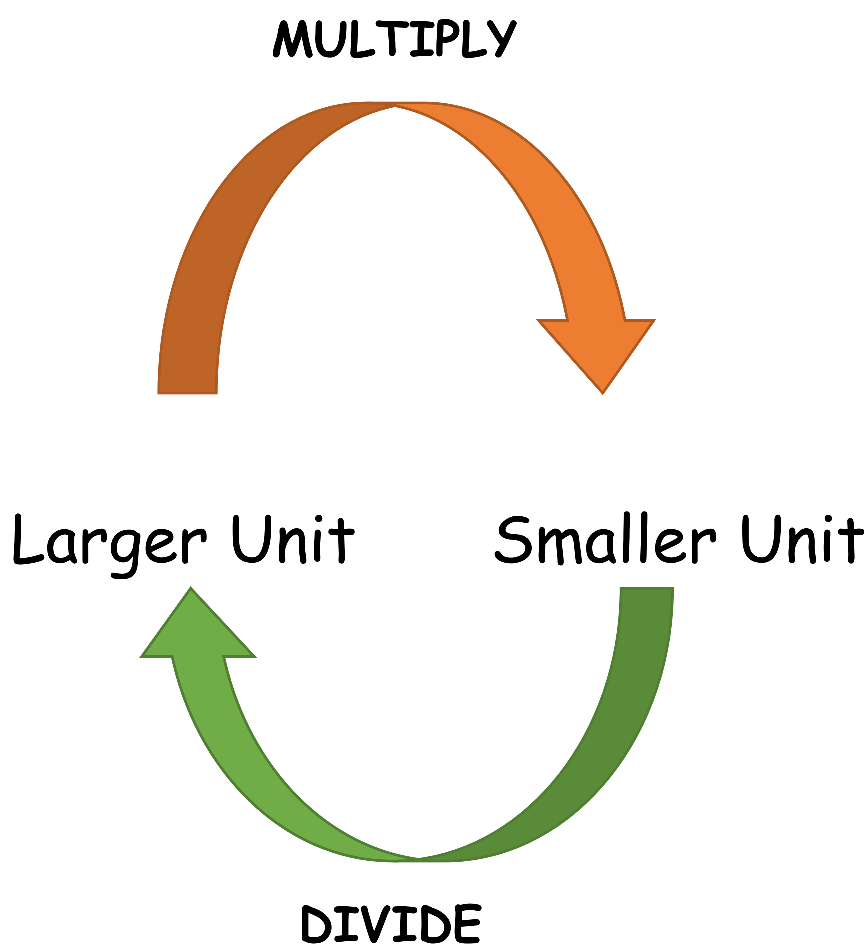
- Convert 90ml to cl.

  90ml ÷ 10 = 9cl

- Convert 15300ml to ℓ.

  15300ml ÷ 10 = 1530cl

  1530cl ÷ 100 = 15.3ℓ



SCALE RATIOS

Ratios are used in everyday life and can help you work out problems involving scale drawings and reading maps.

In a scale drawing, all dimensions have been reduced by the same proportion.

Example A model boat is made to a scale of **1:20** (read as 1 to 20) meaning 1cm measured on the model is 20cm on the actual boat.

a) If the **1:20** model boat is 15cm wide, how wide is the actual boat?
b) If the boat has a mast of height 4m, how high is the mast on the model?

The scale is **1:20**. This means that every cm on the model is equivalent to 20cm on the boat.

a) 1cm on the model = 20cm on the boat, so:
15cm × 20 = 300cm.
15cm on the model = **300cm** (which is 300÷100 = 3m on the boat)

Remember: Multiply to get the actual measurement

b) 20cm on the boat = 1cm on the model

Remember 1 metre = 100 centimetres
so mast height on real boat ÷ 20 = mast height on model
4m is 4x100cm=400cm on the boat = 400cm ÷ 20 = **20cm** on the model

Remember: Divide to get back down to the scale measurement

MAP SCALES

A map scale is given as 1:50000.

a) What is the actual distance in kilometres between Town A and Town B if the measurement on the map is 3 cm ?

The scale of 1:50000 means that 1 cm on the map represents 50000 cm in reality

Therefore 3cm it three times as much → **3 x 50000 = 150000 cm**

150000 cm = 150000 ÷ 100 metres = 1500 metres

1500 metres = 1500 ÷ 1000 km = **1.5 km between Town A and Town B**

b) If the actual measurement between Town C and Town D is 2.7 km, what distance in cm would this be on the map?

2.7 km= 2.7 x 1000m = 2700 metres

2700 x 100 cm = 270000 cm and every 1 cm equals 50000cm so we need to see how many of these we have → therefore we divide

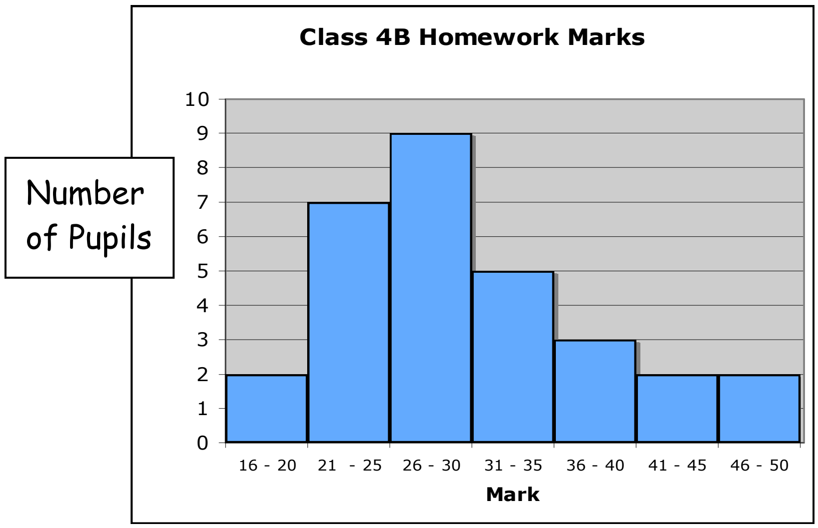
270000 ÷ 50000 = 5.4 cm on the map between Town C and Town D

- To scale up to the actual distance we MULTIPLY
- To scale down to the map distance we DIVIDE
- Ensure your units are in the right form before you multiply or divide

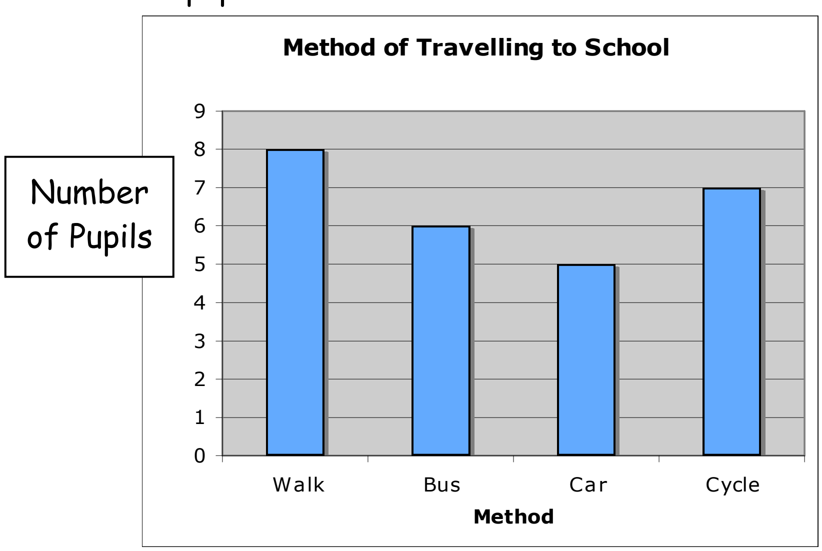
BAR GRAPHS

- Ensure both horizontal and vertical axes are labelled
- Ensure the graph has a title to explain the data

Example 1 The graph below shows the homework marks for Class 4B.



Example 2 How do pupils travel to school?

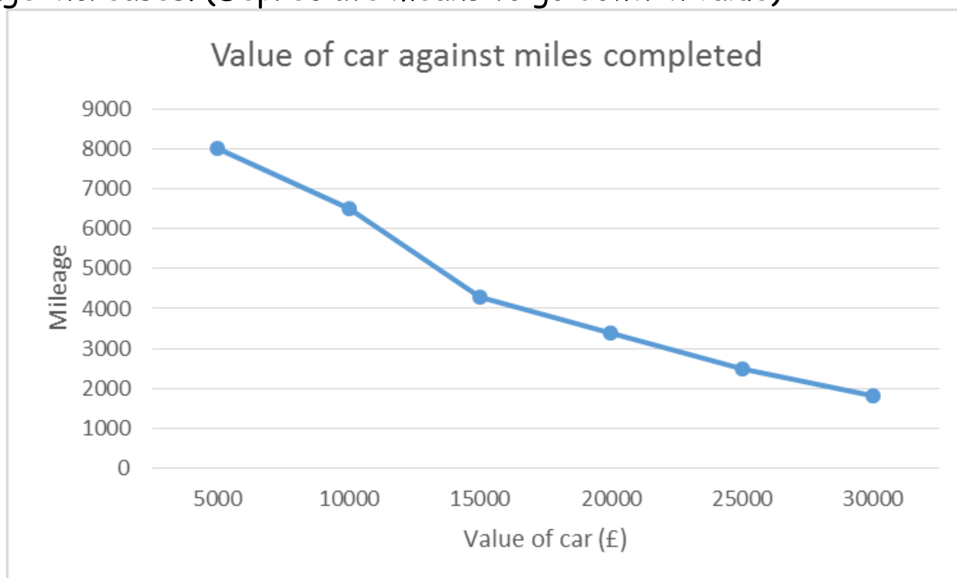


When the horizontal axis shows categories (worded data like colour, type of car etc) rather than grouped intervals, it is common practice to leave gaps between the bars.

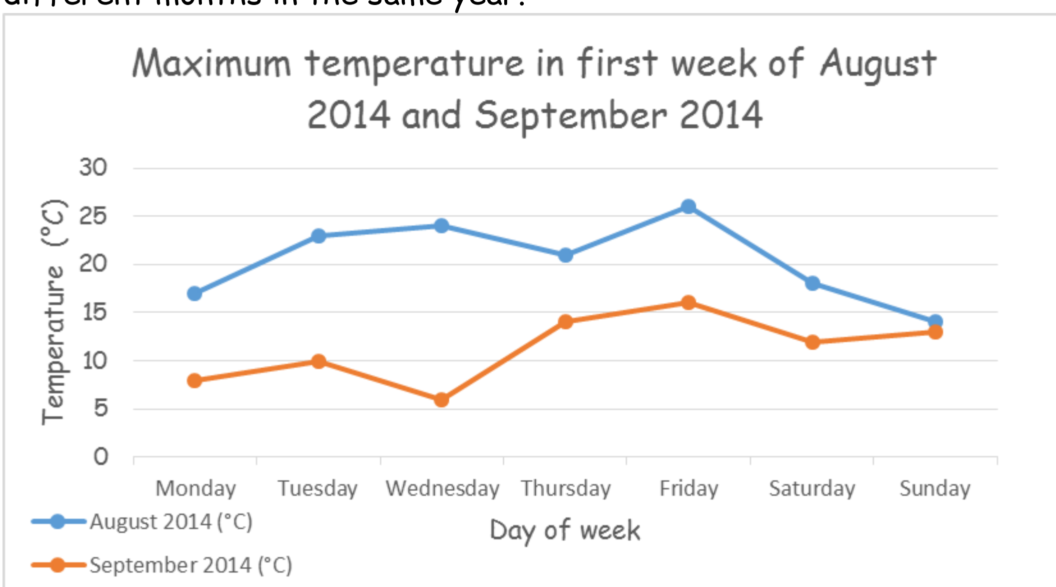
LINE GRAPHS

Line graphs consist of a series of points which are plotted, then joined by a line. All graphs should have a title, and each axis must be labelled. The trend of a graph is a general description of it.

Example 1 The graph below shows a car's value depreciating as it mileage increases. (Depreciate means to go down in value)



Example 2 Graph comparing temperatures of the first week of two different months in the same year.



SCATTER GRAPHS

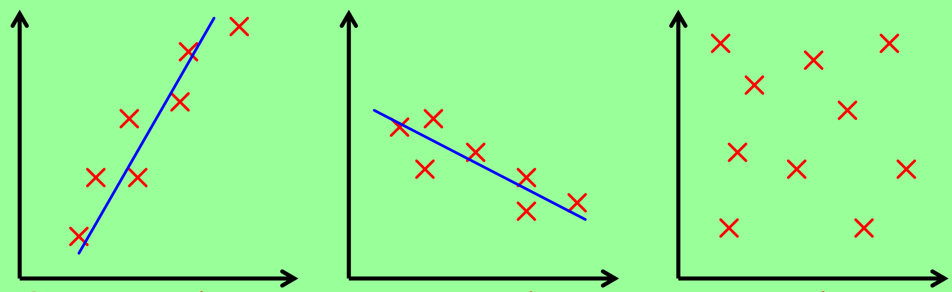
- A scatter diagram is used to display the relationship between two sets of data
- This relationship is called the '**correlation**'
- A straight line called a 'line of best fit' is used to estimate data

Scatter Graphs

- A line of best fit roughly follows the pattern of the points
- It does NOT have to go through any points or start on the axes

Positive correlation example: As the temperature increases the number of ice-creams sold increases

Negative correlation: As the age of a car increases, the value of it decreases

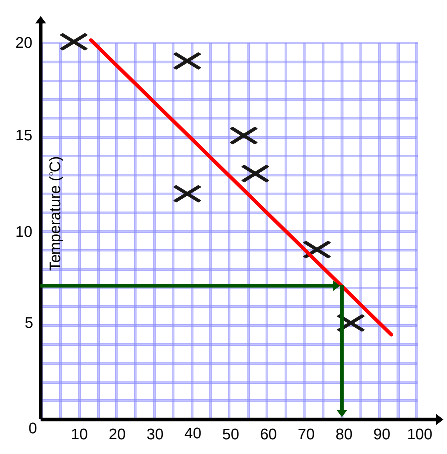


Positive Correlation → As one value increases, the other increases

Negative Correlation → As one value increases, the other decreases

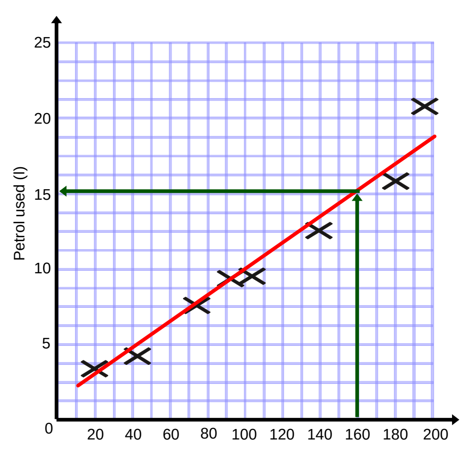
No Correlation → There is no pattern in the data (and therefore no line of best fit…)

Estimate, using your graph, how many scarves the shop would sell when the temperature was 7°C.



Answer: 80 scarves

Estimate, using your graph, how many litres of petrol the car would use on a journey of 160km.



Answer: 15 litres

PIE CHARTS

Drawing Pie Charts

METHOD

- Find the total of your data
- Put each amount over the total
- Multiply by 360°

Example: In a survey about eating, a group of people were asked what their favourite food was. Their answers are given in the table below. Draw a pie chart to illustrate the information.

Favourite food	**Number of people**
Pizza	28
Fish and Chips	24
Pasta and Salad	10
Burger and Chips	12
None	6

Total number of people = 80

Pizza $= \frac{28}{80} \rightarrow \frac{28}{80} \times 360° = 126°$

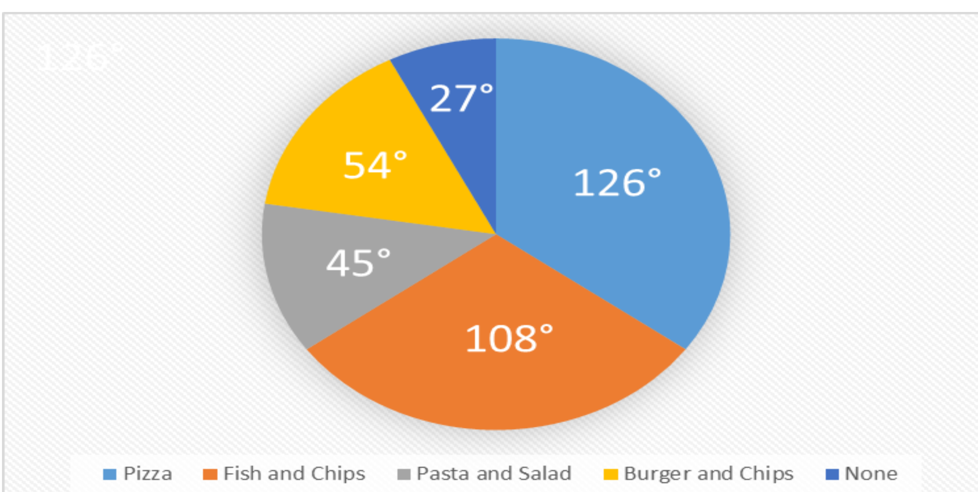
Fish & Chips $= \frac{24}{80} \rightarrow \frac{24}{80} \times 360° = 108°$

Pasta & Salad $= \frac{10}{80} \rightarrow \frac{10}{80} \times 360° = 45°$

Burger & Chips $= \frac{12}{80} \rightarrow \frac{12}{80} \times 360° = 54°$

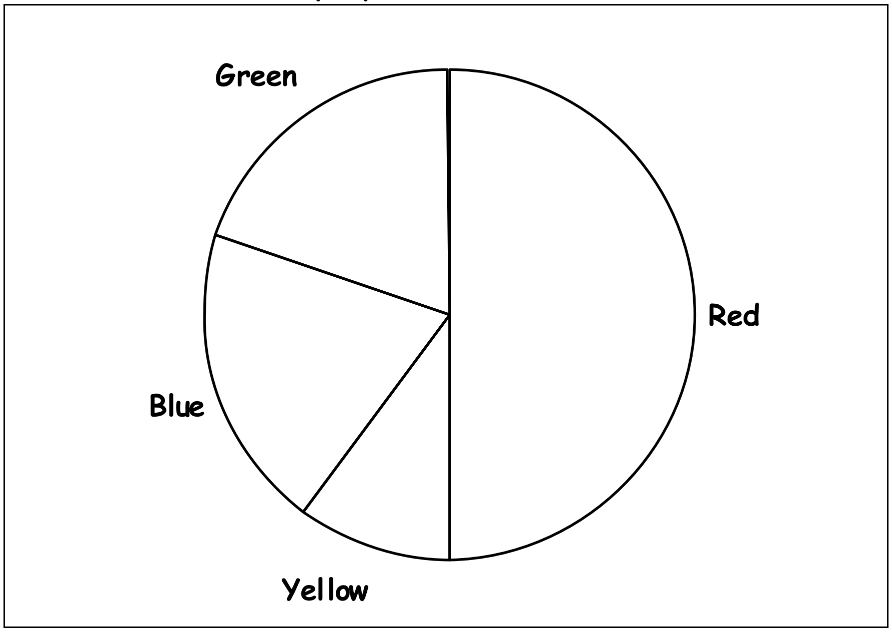
None $= \frac{6}{80} \rightarrow \frac{6}{80} \times 360° = 27°$

Check that the total = 360°
126°+108°+45°+54°+27° = 360°
Note: For decimals round to the nearest whole number



INTERPRETING PIE CHARTS

90 people's favourite colour



Favourite colour	Degrees	People
Red	180°	
Yellow	36°	
Blue	72°	
Green	72°	
Total		90

Method: $\dfrac{\text{Degrees in section}}{360^\circ} \times \text{Total}$

TOTAL = 90 people

RED = $\dfrac{180^\circ}{360^\circ} \times 90 = 45$ people

Check answers add to 90:
45+9+18+18 = 90

YELLOW = $\dfrac{36^\circ}{360^\circ} \times 90 = 9$ people

BLUE = $\dfrac{72^\circ}{360^\circ} \times 90 = 18$ people **so GREEN is also 18 people**

AVERAGES

There are 3 different types of averages

- Mean
- Median
- Mode.

Mean

The mean is found by adding all the numbers together and dividing by the number of values.

Median

The median is the middle value when all the data is written in numerical order (if there are two middle values, the median is found by adding the two middle numbers then dividing by 2).

Mode

The mode is the value that occurs most often. If there is more than one mode – we call these the **modal values**

Range This gives us an idea about the spread of the data

Range = Highest value – Lowest value

Example Mary got the following scores in a bowling competition

6, 5, 8, 4, 9, 9, 7, 10, 8, 5, 8, 2

$$\text{Mean} = \frac{6+5+8+4+9+9+7+10+8+5+8+2}{12}$$

$$= \frac{81}{12}$$

Mean = 6.8 to 1 decimal place

Ordered values: 2, 4, 5, 5, 6, 7, 8, 8, 8, 9, 9, 10

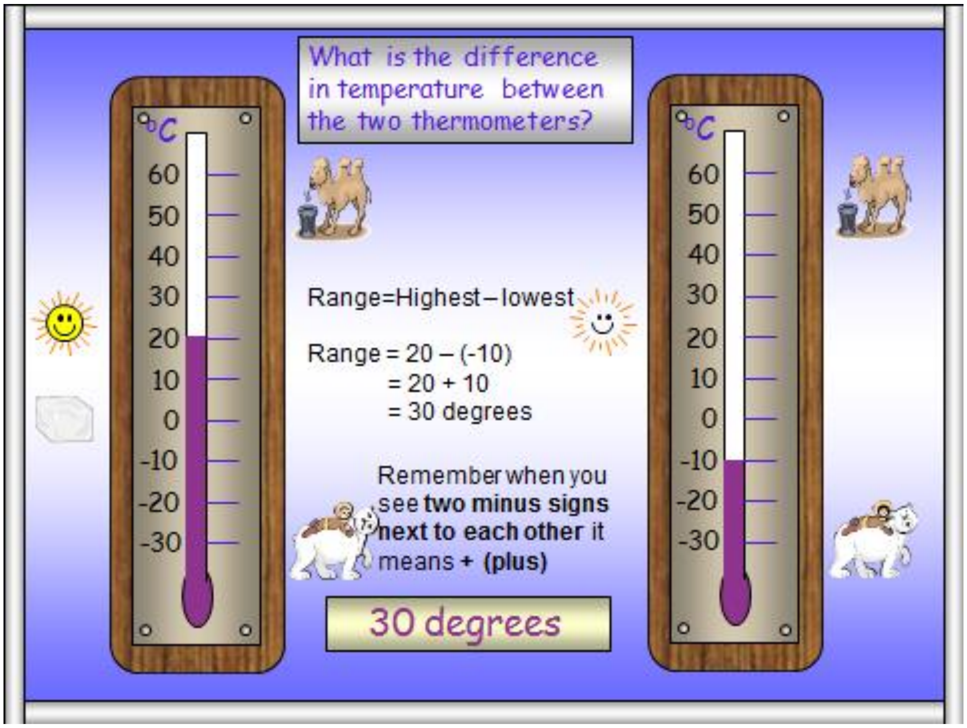
Median = (7+8 =15 so 15÷2=7.5)

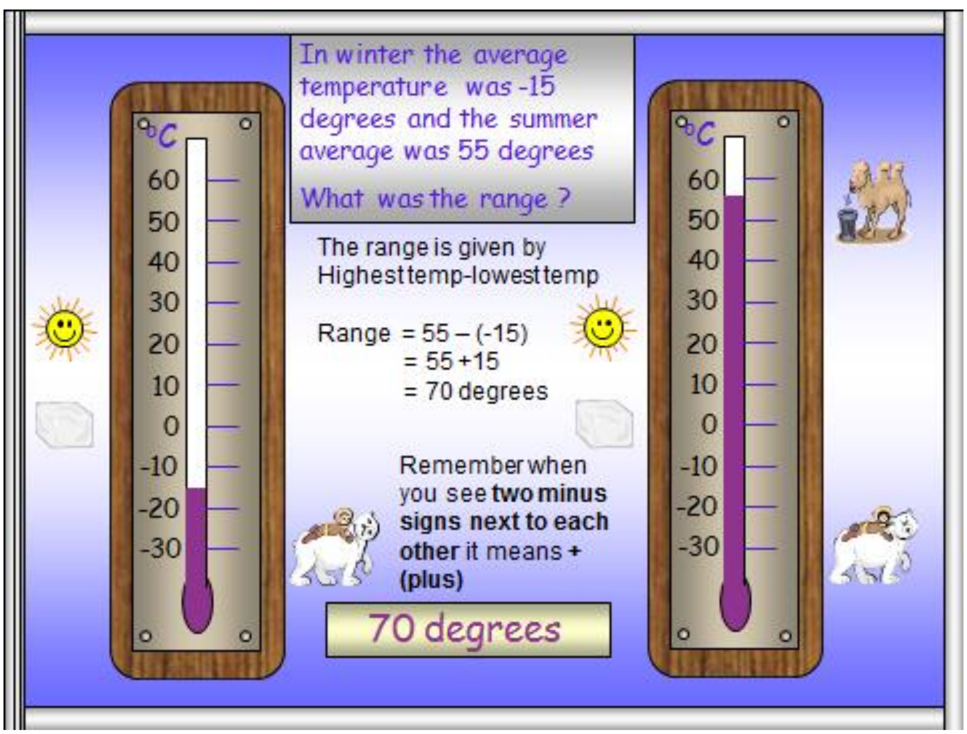
Median = 7.5

8 is the most frequent mark, so **Mode = 8**

Range = 10 – 2 = 8

RANGE FROM THERMOMETER READINGS





REARRANGING EQUATIONS

REARRANGING EQUATIONS

"The 'subject' is the letter at the front of the equation"

Change the subject in the following to make y the subject

$y + x - 3 = 0$ so moving x and 3 to the other side gives

$y = 3 - x$

When we move letters or numbers to the other side they change sign
REMEMBER: CHANGE SIDE, CHANGE SIGN !

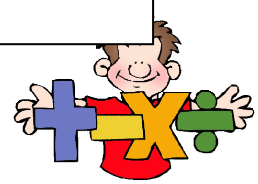
Rearrange the formula $v = u + at$ to make a the subject.

$v = u + at$	Move u first
$v - u = at$	Move t (by dividing)
$\frac{v - u}{t} = a$	

Rearranging is a bit like **solving** to find the letter you want to make the **subject**.

Rearrange the equation to make a the subject.

$a = u + at$	Move all a terms to one side
$a - at = u$	Factor out a
$a(1 - t) = u$	Moving(1-t) to the other side
$a = \frac{u}{1 - t}$	



Remember:

- Firstly decide what letter needs to be the **subject**
- Move all terms that are not needed to one side – remember to **change the sign** when taking terms over the equals sign (if they are being added or subtracted only !)
- The sign does not change for multiplying and dividing terms!
  Eg in the second example we divide by t not –t & in third example we divide by (1-t) not –(1 – t)

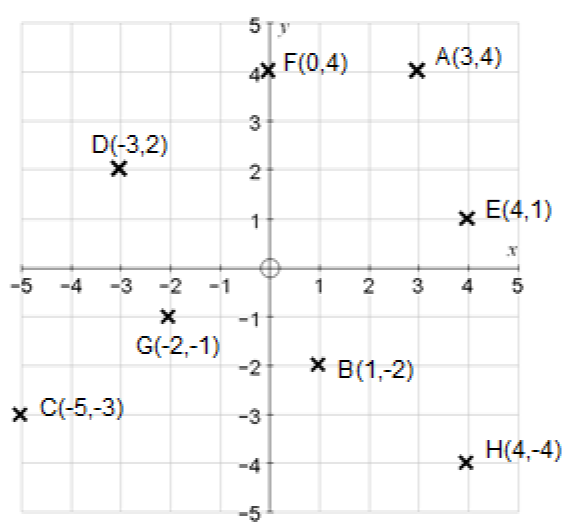
PLOTTING COORDINATES

- The **x axis** is the horizontal line **across**
- The **y axis** is the vertical line **up**

The **ORIGIN** is the point at the centre.
When plotting or reading coordinates we always:
1.Start at the origin
2.Go **across the x axis first** (the horizontal one) – right if positive or left if negative. You can remember this as 'along the corridor'
3.Then **go up (or down) the y axis** (the vertical one) – up if positive or down if negative. You can remember this as 'up/down the stairs'

'ALONG THE CORRIDOR AND UP/DOWN THE STAIRS'

Coordinates in all 4 quadrants



MATHEMATICAL KEYWORDS

Addition(+)	To combine 2 or more numbers together. The answer is called the SUM or TOTAL
a.m.	(meaning ante meridiem (Latin)) This refers to any time in the morning between midnight and 12 noon. Used in 12 hour clock notation.
Approximate	An estimated answer
Annual	Taking place yearly
Bar Chart	This is a graph showing the frequency of data using bars
Bearing	This is a clockwise angle measured from the North line (a 3 digit number)
Brackets	Used around calculations to show what needs to be calculated first
Co-interior angles	Angles inside parallel lines which always add to 180°
Coefficient	This is the number in front of a term eg 3x the coefficient of x is 3, $4x^2$ the coefficient of x^2 is 4
Congruent	2D shapes that are exactly the same shape and size
Cube	Any number or algebraic term to the power 3 eg 4^3 or a^3
Cuboid	Rectangular box eg like a shoe box or matchbox
Continuous Data	**Data** that can take any value (within a range) Example: People's heights could be any value (within the range of human heights)
Denominator	This is the bottom number in a fraction
Discrete Data	**Data** that can only take certain values. For example: the number of students in a class (you can't have half a student).
Difference	This is the answer when you subtract 2 numbers
Division	Sharing a number into equal parts. The answer is called the QUOTIENT
Equation	A statement that the values of two mathematical expressions are equal (indicated by the sign =).
Estimate	To make an approximation or rough answer to a calculation
Expand	To multiply out a bracket eg 3(a + 2) = 3a + 6
Factor	A number which divides exactly into another number eg factors of 6 are 1,2,3 and 6
Factorise	Used in Algebra to put brackets back in eg 6a + 9b = 3(2a + 3b)
Frequency	How often something happens eg how many red cars were seen
Greater than	In Maths greater than is shown by the symbol >
Mean	The average of a data set. Add numbers then divide by how many numbers there are
Median	Another type of average. Order the data set then find the middle number
Mode	Another type of average. This is the most frequent number(s)
Multiple	This is the times table of the number eg multiples of 3 are 3,6,9,12,15,18…
Multiply	To combine an amount a particular number of times. The answer is called the PRODUCT. Eg The product of 2x4 is 8
Negative Number	This is a number less than zero. Shown by a minus sign in the front Eg -6 and -3.7
Numerator	This is the top number in a fraction

Operation	Operations are addition, subtraction, multiplication and division
Parallel lines	Straight lines that are always the same distance apart and never meet
Percentage	Means per hundred eg 30% means 30÷100
Perimeter	This is the distance around a shape found by adding all the sides
Perpendicular	Straight lines that are at right angles to each other
Place value	The value of a digit which depends on its place in the number. For example, 356.8 the 5 has a place value of 50, 2389 the 3 has a place value of 300
p.m.	(meaning post meridiem(Latin)). Any time between 12 noon and midnight
Polygon	A side with many shapes eg pentagon (5 sides), hexagon (6 sides)
Prime factor	This is a factor of a number that is prime eg prime factors of 12 are 2 and 3 also prime factors of 30 are 2, 3 and 5
Prime Number	A number with only 2 factors – the number itself and 1 Note: 1 is **not** considered prime as it only has 1 factor and 2 is the only **even** prime number
Range	The difference between two sets of data. Range = Highest Value – Lowest Value
Ratio	This is way to express the sizes of quantities eg ratio of girls to boys in form 6B is 15:13 Shown by using a colon between the numbers
Rhombus	A four sided shape (quadrilateral) which has: • All equal sides • Opposite sides parallel
Trapezium	A four sided shape (quadrilateral) which has only **one** pair of parallel sides