MOUNTAIN ASH COMPREHENSIVE SCHOOL

YSGOL GYFUN ABERPENNAR

NUMERACY POLICY

Signed___ _____(Chair of Governors)

Date__09.07.25_____

Reviewed: July 2025

Next review date: July 2028

Index

Vision and rationale

Numeracy is about being able to understand and use numbers in a range of situations, for example when solving problems or making decisions in situations involving numbers. By addressing numeracy needs across the curriculum we are assisting learners to;

Function responsibly in everyday life and contribute effectively to society.

Handle numbers fluently in mental, oral and written work.

Exploit patterns within number when calculating and approximating.

Measure and calculate accurately and estimate.

In alignment with the curriculum for Wales.

Numeracy at MACS should be promoted and taught consistently across the curriculum. Numeracy strategies at MACS are underpinned by the Education Endowment Fund's (EEF) *Recommendations for Improving Numeracy in Secondary Schools* (Appendix A).

There is a focus on disciplinary numeracy, ensuring that the development of numeracy skills is not solely the responsibility of the Mathematics department.

MONITORING and EVALUATION

The monitoring and evaluation of numeracy across the curriculum will be conducted through means of testing and whole-school Teaching & Learning processes such as work scrutiny, lessons observations, pupil voice and 'bright spots' walks. In quality assurance processes, faculties are required to self-evaluate strengths and areas for improvement in numeracy by using whole-school literacy criteria and the Central South Consortium Numeracy Rubrics.

The Whole School Numeracy Lead is responsible for evaluating the results of testing and whole-school Teaching & Learning processes in order to establish and address numeracy priorities on a termly or half-termly basis as appropriate.

Testing (NNTs)

National numeracy tests are completed by pupils in KS3 in the summer term. Once the NNT testing is complete, the Whole School Numeracy Lead will analyse the data and provide staff with one-page summaries & class reports, including relevant data and recommendations. A summary report of NNTs will also be completed by the end of the academic year. NRT reports will be shared with parents and results will inform Numeracy priorities for the next academic year.

T&L processes

The Whole School Numeracy Lead is involved in whole-school quality assurance activities including work scrutiny, pupil voice, learning walks and lesson observations. The information gathered from these activities will inform numeracy priorities and allow the Whole School Numeracy Lead to tailor support for each faculty as necessary.

Appendix 1.

Topic index, examples

Number (Pages 6 – 35)

Geometry & measure (Pages 38 – 48)

Statistics (Pages 49 – 55)

Number

Read, Write and interpret numbers up to one million.

Each digit in a number has a **place value**. It shows the position of a digit in a number.

Numbers can be written as words using a place value table.

Example 1
Write 52 604 in words.

Millions	Hundred thousands	Ten thousands	Thousands	Hundreds	Tens	Units
		5	2	6	0	4

Fifty two thousand six hundred and four.

Saying the number may also help.

Example 2
Write the number five million, seven hundred and twenty-two thousand, six hundred and eight in figures.

Millions	Hundred thousands	Ten thousands	Thousands	Hundreds	Tens	Units
5	7	2	2	6	0	8

= 5 722 608 or 5,722,608

Putting a comma after every 3 digits from the right helps to break the number up making it easier to read or write.

Video: https://corbettmaths.com/2013/03/29/place-value/

Use the four operations with integers (Whole numbers)

Addition

Column method

Example 1

314 + 235

```
3 1 4
2 3 5  +
-------
5 4 9
-------
```

Example 2

454 + 68

```
4 5 4
0 6 8  +
-------
5 2 2
-------
1 1
```

Place value is important when setting up your columns.

Video: https://corbettmaths.com/2013/12/19/addition-video-6/

Subtraction

Column method

Example 1

367 - 242

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

Example 2

475 - 47

```
    6 1
  4 7 5
- 0 4 7
-------
  4 2 8
-------
```

Place value is important when setting up your columns.

Video: https://corbettmaths.com/2013/12/19/subtraction-video-304/

Multiplication

There are lots of methods for multiplying. If learners have a method that they can apply correctly, they can use this. Otherwise, please teach them the box method.

Box Method

Example 1

2 x 395

x	300	90	5
2	600	180	10

600
180
010 +
790

Example 2

25 x 637

x	600	30	7
20	12,000	600	140
5	3,000	150	35

12,000
03,000
00,600
00,150
00,140
00,035 +
15,925
1

Pupils may wish to use a multiplication grid to help them.

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

Video: https://corbettmaths.com/2013/12/20/multiplication-grid-method-video-199/

Division

Bus stop method

Example 1

$84 \div 3$

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

Example 2

$92 \div 4$

$$4\overline{)\,9^{1}2}\quad 2\ 3$$

Examples – dividing by a number greater than 10

Example 1

$154 \div 14$

$$14\overline{)\,1\ 5^{1}4}\quad 0\ 1\ 1$$

Example 2

$936 \div 26$

$$26\overline{)\,9^{9}3^{15}6}\quad 0\ 3\ 6$$

Writing out the multiples first may help!

Or instead of diving by 14 as in **Example 1** Learners can divide by 2 numbers that multiply together to make 14, e.g. 2 and 7 as shown below.

$154 \div 2$

$$2\overline{)\,1\ 5^{1}4}\quad 0\ 7\ 7$$

$77 \div 7$

$$7\overline{)\,7\ 7}\quad 1\ 1$$

Video: https://corbettmaths.com/2013/12/28/division-video-98/

Using inverse operations and applying known facts

If 8 + 12 = 20

Then 20 – 8 = 12
20 – 12 = 8

If 7 x 8 = 56

Then 56 ÷ 8= 7
56 ÷ 7 = 8

Example Task 1

Make 4 “Multiply and divide” sums from the cards 4, 5 and 20.

Example Task 2

Put the 4 cards into the boxes to make the sum correct

1 2 5 2

□□ + □□ = 37

Example task 3

Fill in the missing numbers

$$\begin{array}{r} 3\ \square \\ -\ \square\ 5 \\ \hline 1\ 9 \end{array}$$

Recall times tables up to 10 x 10

All pupils should have a timetable grid in their diary

X	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10
2	2	4	6	8	10	12	14	16	18	20
3	3	6	9	12	15	18	21	24	27	30
4	4	8	12	16	20	24	28	32	36	40
5	5	10	15	20	25	30	35	40	45	50
6	6	12	18	24	30	36	42	48	54	60
7	7	14	21	28	35	42	49	56	63	70
8	8	16	24	32	40	48	56	64	72	80
9	9	18	27	36	45	54	63	72	81	90
10	10	20	30	40	50	60	70	80	90	100

Example task

Fill in the missing numbers on the grid below

X	1	2	3	4	5	6	7	8	9	10
1				4	5		7		9	10
2	2	4			10		14	16	18	
3		6		12	15	18		24		30
4	4			16			28		36	40
5		10	15	20			35	40	45	50
6	6	12			30	36		48		60
7	7		21	28		42	49		63	
8		16		32	40			64	72	
9	9		27			54				90
10		20	30			60	70		90	

Using the 4 operations with decimals

Addition and subtraction

When adding and subtracting with decimals, remember to keep the decimal point in line in the question and the answer.

Example 1

Add 3.15 + 0.7

$$\begin{array}{r} 3.15 \\ +\ 0.70 \\ \hline 3.85 \end{array}$$

Example 2

Add 4 – 2.74

$$\begin{array}{r} {}^{3}\cancel{4}.{}^{9}\cancel{0}{}^{1}0 \\ -\ 2.74 \\ \hline 1.26 \end{array}$$

Video addition: https://corbettmaths.com/2013/03/28/adding-decimals/

Video subtraction: https://corbettmaths.com/2013/03/28/subtracting-decimals/

Multiplying

Example 1

3 x 0.6

- First multiply out the numbers, ignoring the decimal
  3 x 6 = 18
- Count how many numbers there are after the decimal point in the question 3 x 0.6
- There is one, so there needs to be one number after the point in the answer 3 x 0.6 = 1.8

Example 2

5 x 0.07

- Work out the sum without the decimals 5 x 7 = 35
- As we need 0.07 and not 7, write out each line moving the 7 over a decimal place each time.

5 x 7 = 35
5 x 0.7 = 3.5
5 x 0.07 = 0.35

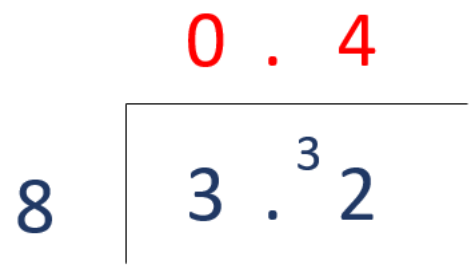
Video: https://corbettmaths.com/2013/02/15/multiplying-decimals-2/

Dividing a decimal by a whole number

The bus stop method can also be used here

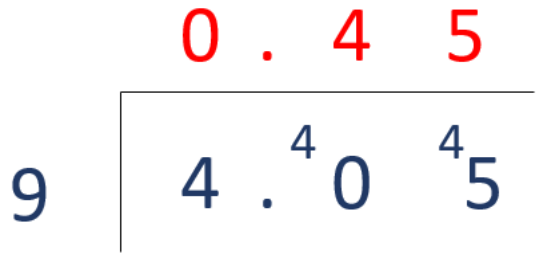
Example 1

3.2 ÷ 8



Example 2

4.05 ÷ 9



Video: https://corbettmaths.com/2012/08/21/dividing-decimals-by-whole-numbers/

Dividing by a decimal

Example 1

Workout 3 ÷ 0.6

- We would multiply these so both numbers are whole numbers
- 0.6 needs to be multiplied by 10 to get a whole number

Multiply both by 10 and we get 30 ÷ 6 = 5
Therefore 3 ÷ 0.6 = 5 too.

Example 2

Workout 18.9 ÷ 0.09

- We need to multiply 0.09 by 100 to get a whole number
- Both numbers would need to be multiplied by 100

1890 ÷ 9 = 210, so 18.9 ÷0.09 = 210

Video: https://corbettmaths.com/2013/02/15/division-by-decimals/

Multiplying and dividing whole numbers by 0.5, 0.2, 0.1

Multiplying

- Multiplying by 0.5 is the same as dividing by 2
- Multiplying by 0.2 is the same as dividing by 5
- Multiplying by 0.1 is the same as dividing by 10

This can be proven using the method in the "Multiplying and dividing decimals by whole numbers" section or learners can figure this out by first attempting the questions with a calculator.

Examples

1. 12 x 0.5 = 12 ÷ 2 = 6
   Proof: 12 x 5 = 60. Put the decimal point in = 6.0
2. 24 x 0.1 = 24 ÷ 10 = 2.4
   Proof: 24 x 1 = 24. Put the decimal point in = 2.4

Dividing

- Dividing by 0.5 is the same as multiplying by 2
  Think! How many 0.5s are there in 1? There are 2. So for every whole number there are two 0.5s
- Dividing by 0.2 is the same as multiplying by 5
  Think! How many 0.2s are there in 1? There are 5. So for every whole number there are five 0.2s
- Dividing by 0.1 is the same as multiplying by 10
  Think! How man 0.1s are there in 1? There are 10. So for every whole number there are ten 0.1s

Examples

1. 9 ÷ 0.5 = 9 x 2 = 18
2. 4 ÷ 0.2 = 4 x 5 = 20
3. 51 ÷ 0.1 = 51 x 10 = 510

Multiplying by 10, 100 and 1000

When you multiply by 10, 100 or 1000, the place value of the digits change. The number is getting larger so the digits move to the left.

Multiplying by 10.

When you multiply by 10 all digits move **one** place to the left.

Example 1

32 x 10 = 320

Hundreds	Tens	Units
	2	1
2	1	0

Example 2

3.2 x 10 = 32

Tens	units	.	Tenths
	3	.	2
3	2	.	0

Multiplying by 100

When you multiply by 100 all digits move **two** places to the left.

Example

32 x 100 = 3200

Thousands	Hundreds	Tens	units
		3	2
3	2	0	0

Multiplying by 1000

When you multiply by 1000 all digits move **three** places to the left.

Example

3.2 x 1000 = 3200

Thousands	Hundreds	Tens	units	Decimal	Tenths
			3	.	2
3	2	0	0	.	0

Video: https://corbettmaths.com/2013/06/06/multiplication-by-10-100-and-1000-2/

Dividing by 10, 100 and 1000

When you divide by 10, 100 or 1000, the place value of the digits change. The number is getting smaller so the digits move to the right.

Example 1

320 ÷ 10 = 32

Hundreds	Tens	units
3	2	0
	3	2

Example 2

32 ÷ 10= 3.2

Tens	units	Decimal	Tenths
3	2	.	0
0	3	.	2

Dividing by 100

3200 ÷ 100 = 32

Thousands	Hundreds	Tens	units
3	2	0	0
		3	2

Dividing by 1000

3200 ÷1000 = 3.2

Thousands	Hundreds	Tens	units	.	Tenths
3	2	0	0	.	
			3	.	2

Video: https://corbettmaths.com/2013/05/19/division-by-10-100-and-1000/

Types of number: Factors, multiples, primes and square numbers

Factors

Factors are the numbers that you can multiply to make the number

e.g 3 x 6 = 18, so 3 and 6 are factors of 18. Factors are numbers that divide exactly into another number.

The factors of 18 are; 1 x 18, 2 x 9, 3 x 6, so the factors are

1, 2, 3, 6, 9, 18

Video: https://corbettmaths.com/2012/08/24/factors/

Multiples

Multiples are the numbers that appear in that times table

e.g

The multiples of 3 are: 3, 6, 9, 12, 15,...

The multiples of 15 are: 15, 30, 45, 60, 75, ….

Video: https://corbettmaths.com/2012/08/11/1335/

Prime numbers

A prime number only has two factors; 1 and itself.

E.g Factors of 5 are 1 x 5 so 5 is a prime number.

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

Video: https://corbettmaths.com/2013/03/24/prime-numbers/

Square numbers and square roots

A square number is the name we give to the answer we get when we multiply a number by itself.

We represent squaring a number with a ^{2}.

Examples

1. $7^2 = 7 \times 7 = 49$
2. $3^2 = 3 \times 3 = 9$
3. $11^2 = 11 \times 11 = 121$

Video: https://corbettmaths.com/2012/08/11/1336/

The opposite of squaring a number is square rooting.

The symbol for square rooting is $\sqrt{}$

Example

What is the square root of 81?

In other words, what number squared is 81?

$9^2 = 81$ therefore $\sqrt{81} = 9$

Video: https://corbettmaths.com/2012/08/11/1338/

Verify calculations by using approximation methods

Estimation

Learners can use estimation to check if their answer is correct.

e.g 19 x 12

estimated = 20 x 10 = 200, so their answer needs to be around 200.

Example

Estimate the total amount

£1.98 £2.05 £7.48 £9.90 £4.53

Learners should round each value to a sensible amount. There will be range of possible answers.

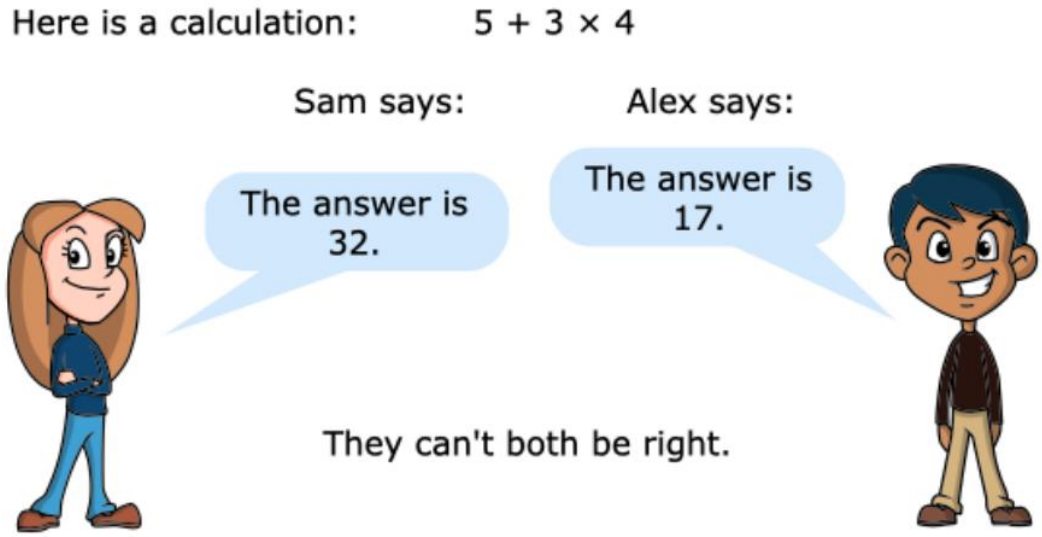
£1.98 £2.05 £7.48 £9.90 £4.53

2 + 2 + 7 or 7.50 + 10 + 4.50 or 5

= £25.50, £26 or £26.50

Video: https://corbettmaths.com/2012/08/21/approximation-to-calculations/

Order of operations (BIDMAS)



We need a rule to tell us which order to do the calculation in when there is more than one operation. We use `BIDMAS` to help us remember the order.

B – Brackets

I – Indices (squares, square roots, cube etc)

D – Division

M- Multiplication

A – Addition

S – Subtraction

When only **addition** and **subtraction** are left in the calculation, work them out in the order you find them – starting from the left of the calculation and workings towards the right.

In the example above we have **5 + 3 x 4**

Multiplication comes before addition so underline and do the multiplication first

4 + 3 x 2

4 + 6 = 10

Examples

1. 9 – 12 ÷ 4
   Division comes before subtraction so underline and do the division first.
   9 – 12 ÷ 4
   9 – 3 = 6

2. (3+2) x 5
   We have to do everything inside the bracket first
   (3+2) x 5
   5 x 5 – 25

3. 12 x 2 + 6 x 4
   There are two multiplications, but we can do them in any order. Don't forget to do them both before adding.
   12 x 2 + 6 x 4
   24 + 24 = 48

Video: https://corbettmaths.com/2013/06/08/order-of-operations/

Convert between fractions, decimals and percentages

A percentage is the same as a fraction out of 100.

Examples

1. 60 out of 100 = $\frac{60}{100}$ = 60% = 0.6 (or 0.60)

2. 40 out of 50 = $\frac{40}{50}$ = $\frac{80}{100}$ = 80% = 0.8 (or 0.80)

Multiply by 2

3. 2 out of 10 = $\frac{2}{10}$ = $\frac{20}{100}$ = 20% = 0.2 (or 0.20)

Multiply by 10

Make the fraction out of 100 first!

Change a fraction to a decimal

To change a fraction to a decimal, divide the top of the fraction by the bottom

The line in the fraction means divide. $\frac{1}{2}$ $means\ 2\ divided\ by\ 2.$

Example 1

What is $\frac{3}{8}$ as a decimal?

Use bus stop method!

$$
\begin{array}{r|l}
 & 0.375 \\
\hline
8 & 3.^{3}0\ ^{6}0\ ^{4}0
\end{array}
$$

If we have a recurring decimal we use dot notation. The dot above the number indicates which numbers recur. For example:

$0.6\dot{3}$ is equal to 0.6333333….

$0.\dot{4}\dot{5}$ is equal to 0.45454545…..

Example 2

What is $\frac{5}{6}$ as a decimal?

$$
\begin{array}{r|l}
 & 0.83333 \\
\hline
6 & 5.^{5}0\ ^{2}0\ ^{2}0\ ^{2}0\ ^{2}0
\end{array}
$$

$= 0.8\dot{3}$

Video: https://corbettmaths.com/2013/02/15/fractions-to-decimals/

Calculate percentage of amounts using non-calculator methods

- Always start by finding 10%
- You can halve your answer to find 5%
- You can multiply this answer by 2 for 20%, 3 for 30% etc
- To find 1% divide by 100

HINTS

To find:

10% = DIVIDE BY 10

5% = FIND HALF OF 10%

50% = DIVIDE BY 2 (halve the amount)

25% = DIVIDE BY 4 (halve the amount and then halve again)

Example 1

Find 10% of 160

160 ÷10 = 16

Example 2

Find 20% of 160

160 ÷10 = 16

16 x 2 = 32

Example 3

Find 5% of 160

160 ÷10 = 16

16 ÷2 = 8

Video: https://corbettmaths.com/2012/08/20/percentages-of-amounts-non-calculator/

Understand concept of ratio

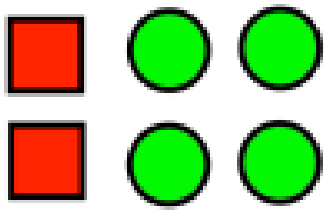
Writing as a ratio

A ratio shows how much of one thing there is compared to another.

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).

Example

What is the ratio of squares to circles?



The answer is 2:4

As squares come first in the question, the amount of squares must come first in the ratio (squares: circles)

Simplifying ratio

Example

Simplify the ratio 12:18

Both 12 and 18 can be divided by 2

$12 \div 2 = 6$

$18 \div 2 = 9$

So a simpler way to write 12:18 is **6:9**

The ratio can be simpler again, if we divide by 3

$6 \div 3 = 2$

$9 \div 3 = 3$

So an even simpler way to write 12:18 is **2:3**

Video: https://corbettmaths.com/2013/03/03/simplifying-ratio/

Sharing in a ratio

Example 1

Share 30 in the ratio 2:3

Number of parts = 2 + 3 = 5

1 part = 30 ÷ 5 = 6

2 parts = 2 x 6 = 12

3 parts = 3 x 6 = 18

CHECK: 12 + 18 = 30

Example 2

Anna and Mike are left some money in the ratio 3:8.

If Mike receives £56, how much does Anna get?

A: M

3 : 8

8 parts = 56

1 part = 56 ÷8 = 7

3 parts = 3 x 7 = £21

Video: https://corbettmaths.com/2013/03/03/ratio-sharing-the-total/

Make informed decisions relating to discounts and special offers (best buys)

Example 1

8 pens cost £2.16. Calculate how much 6 pens cost.

Divide both numbers by 8

8 pens = £2.16

$\div$ *both by* 8

1 pen = £0.27

Multiply both by 6

6 pens = £1.62

Example 2

If 2kg of basmati rice costs £2.68 and 500 g of long rice costs £0.95 which one represents the best value for money?

There are many ways to approach this problem:

- Calculate the cost of 500g in the 2kg bag
- Calculate the cost of 2kg worth of the 500g bags
- Calculate the cost of 1kg for each of the bags.

These are just a small number of ways in which this problem could be attempted.

For this solution the cost of 1kg for each of the bags will be calculated.

Price per kg for basmati rice:

2.68 ÷ 2 = £1.34

Price per kg for long grain rice

0.95 x 2 = £1.90

Therefore, the basmati rice has a better value for money

Video: https://corbettmaths.com/2013/03/26/best-buys/

Understand proportion (recipes)

Two quantities are in direct proportion when they increase or decrease in the same ratio.

Example

Here is a recipe for scones

Scones

Serves 8

Butter	60g
Flour	260g
Baking Powder	2 teaspoons
Buttermilk	180ml

How much of each ingredient would be needed to make scones for 2 people?

How do I get from 8 to 2? Divide by 4.

Butter

8 people = 60 ÷ 4 ÷ 4

÷ 4 ↓

2 people = **15g**

Flour

8 people = 260g

÷ 4 ↓ ÷ 4 ↓

2 people = **65g**

Baking Powder

8 people = 2 teaspoons

÷ 4 ↓ ÷ 4 ↓

2 people = **½ teaspoon**

Buttermilk

8 people = 180ml

÷ 4 ↓ ÷ 4 ↓

2 people = **45ml**

Video: https://corbettmaths.com/2013/05/16/recipes/

Understand maps and scales

Map scales can be written in ratios and tell you how manu units of length on land, or sea, are equal to one unit of length on a map.

Example 1

A map has a scale of 1cm : 3 miles.

How man miles does 7cm represent on the map?

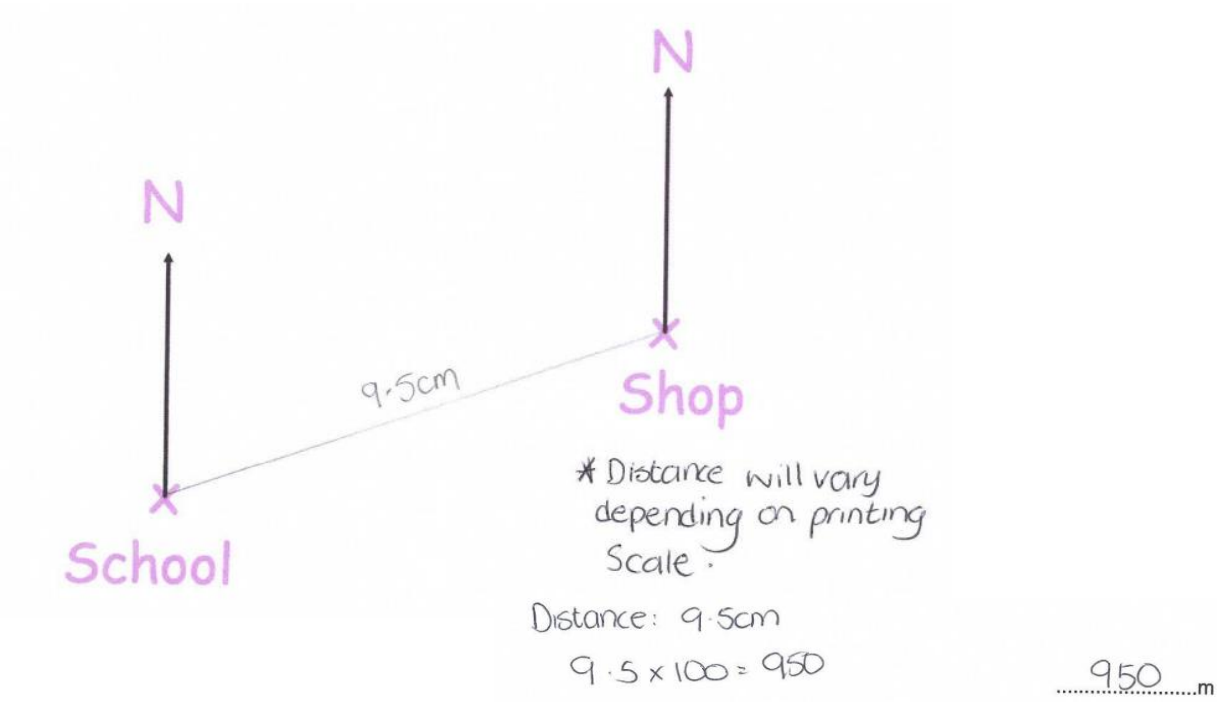
1cm	:	3 miles
x 7		x 7
7cm	:	21 miles

Example 2

The diagram shows part of a map. It shows the position of a school and a shop.

The scale of the map is 1cm = 100 metres.

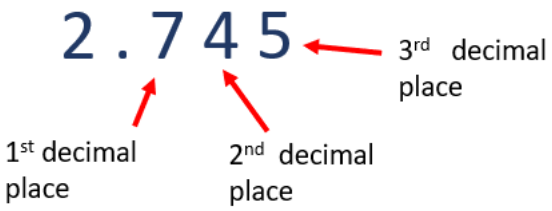
Work out the real distance between the school and the shop. Give your answer in metres



Video: https://corbettmaths.com/2013/11/13/maps-scales/

Rounding to decimal places

When we use calculators, sometimes the answer is a number with lots of numbers after the decimals point e.g. 3.1415673 so we round our answers to a certain number of decimal places.
Decimal places are counted from the decimal point.



Examples

1. Round 8.3274 to 2 decimal places

This means we need to keep digits after the decimal point.

Because the next digit 7, is more than 5, we round the 2 up.

8.3274 = 8.33 (2 decimal places)

2. Round 3.65 to 1 decimal place.
   = 3.7

To round to 1 decimal place:

1) Look at the first digit after the decimal point
2) Draw a vertical line to the right of it (Inbetween the 1st and 2nd digit)
3) Look at the 2nd digit
4) If its **5 or more,** increase the previous digit by one
5) If its 4 **or less**, keep the previous digit the same
6) Remove any numbers to the right of the line

3. Round 235.2983 to 1 decimal place

   235.2|983 to 1 decimal place is 235.3

4. Round 0.08514 to 1 decimal place.

   0.0|8514 to 1 decimal place is 0.`1

Video: https://corbettmaths.com/2013/09/07/rounding-to-1-or-2-decimal-places/

Rounding to significant figures

In maths, significant means `to have value`.

In the number 7,345 the 7 is the most significant digit, because it tells us that the number is 7 thousand and something.

However, in the number 0.035, the 3 is the most significant digit.

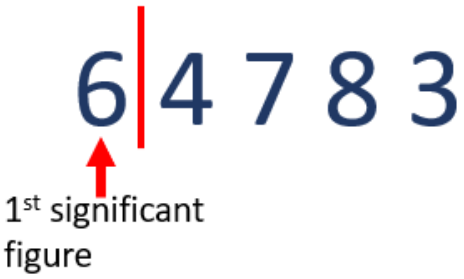
When we round to significant figures, we start counting as soon as we reach a number that is not zero.

These are the steps we follow:

1) Look at the first number bigger than 0
2) Draw a vertical line to the right of it.
3) Look at the next digit
4) If its **5 or more,** increase the previous digit by one
5) If its 4 **or less**, keep the previous digit the same
6) Fill any spaces to the right of the line with zeros to "hold" the value.

Example 1

Round 64,783 to 1 significant figure

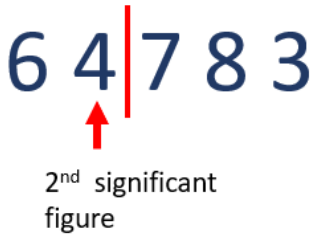


As the digit to the right of the line is 4. The 6 stays the same, the other digits become 0s.

64,783 rounded to 1 significant figure = 60,000

Example 2

Round 64,783 to 2 significant figures

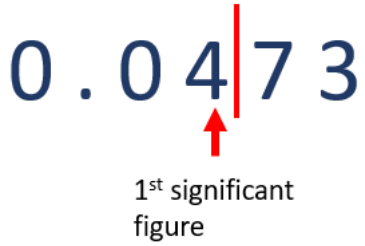


As the digit to the right of the line is 7. The 4 increase to 5, the numbers to the right of the line become 0s.

64,783 rounded to 2 significant figures = 65,000

Example 3

Round 0.0473 to 1 significant figure



As the digit to the right of the line is 7. The 4 increase to 5, the numbers to the right of the line become 0s or in this case as it's a decimal we don't need to write them.

0.0473 rounded to 1 significant figure = 0.05

Video: https://corbettmaths.com/2013/09/07/rounding-significant-figures/

Carry out calculations relating to profit and loss

Pupils need to remember what is meant by profit and loss, when solving problems, try to show what money is being spent (outgoings) and then find income.

Example

Darius buys bottles of lemonade to sell.

He buys 8 crates of bottles of lemonade. ← 8 crates purchased

Each crate contains 16 bottles.

Darius paid £12 for each crate. ← £12 per crate

He sold all the bottles of lemonade for £2 each. ← Bottles sold = £2 each

How much profit did Darius make?

Amount spent = 8 x £12 = £96

Total number of bottles = 8 x £16 = £128

Profit = £128 - £96 = £32

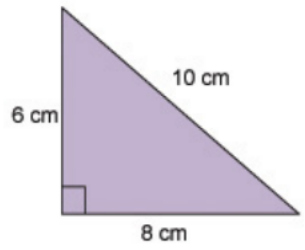
Video: https://corbettmaths.com/2021/12/01/money-profit-video/

Geometry & measure

Find the perimeter of 2D shapes

To work out the perimeter of a shape, add up all the sides. With perimeter units are written cm , mm , km etc

Example 1

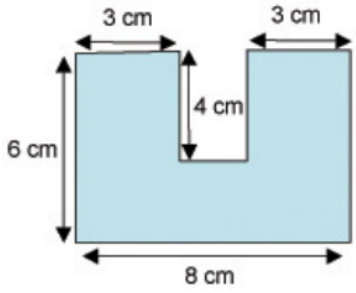


Perimeter = 10 + 6 + 8 = 24cm

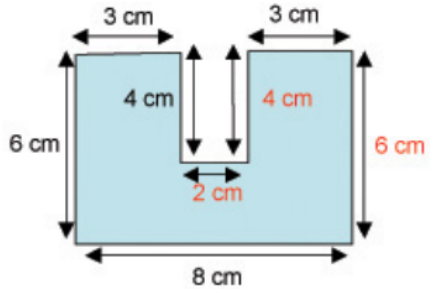
Example 2

Perimeter = 9 + 5 + 9 + 5 = 28cm

Example 3



First, work out the sides not given



Perimeter = 6 + 3 + 4 + 2 + 4 + 3 + 6 + 8 = 36cm

Video: https://corbettmaths.com/2012/08/02/perimeter/

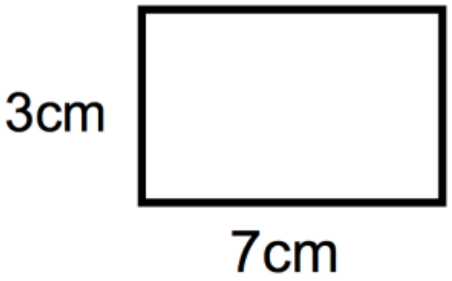
Use formulae for the area of triangles and rectangles

With area units are written cm^2, mm^2, km^2 etc

Area of a rectangle = length x width

Example 1

Calculate the area of this rectangle

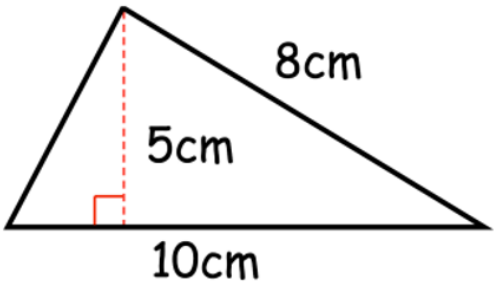


$7 \times 3 = 21cm^2$

Area of a triangle = $\frac{base \times height}{2}$

Example 2

Calculate the area of the triangle



We can ignore the 8 as its not the height or the base

Base = 10cm height = 5cm

$\frac{10 \times 5}{2} = \frac{50}{2} = 25cm^2$

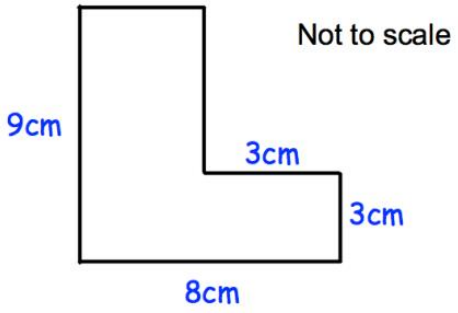
Video: https://corbettmaths.com/2013/12/20/area-of-a-rectangle-video-45/

Video: https://corbettmaths.com/2013/12/20/area-of-a-triangle-video-49/

A compound shape is a shape that has been made by putting two shapes together.

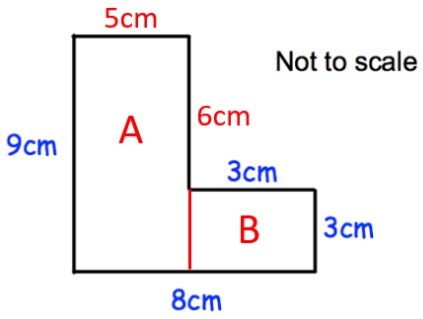
Look at the example below.

The shape has been made out of two rectangles joined together.

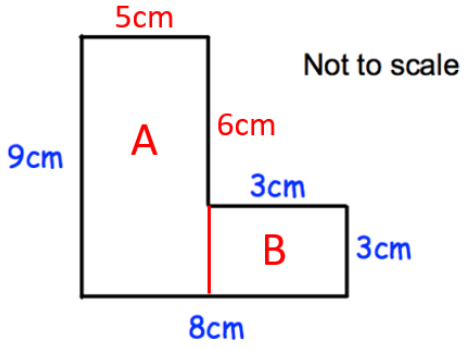


we can solve this by following these steps:

1. Split the shape up into two, find any missing lengths as we do when finding the perimeter.



2. Find the area of each shape (A and B) then add the 2 areas to find the total area.



Area of A = 5 x 9 = 45

Area of B = 3 x 3 = 9

Total areas = 9 + 45 = 54cm^2

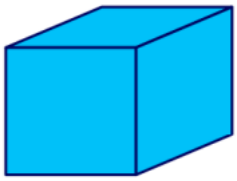
Video: https://corbettmaths.com/2012/08/02/area-of-compound-shapes/

Relate a 3D shape to its 2D net

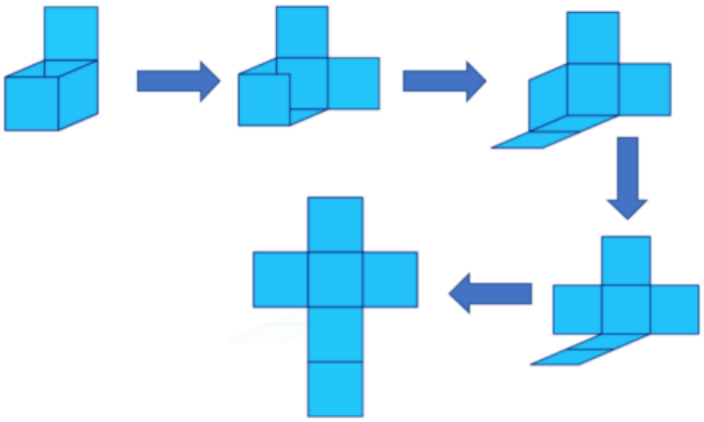
A net is the shape you would get if you were to unfold a 3D shape.

Example 1

Look at this picture of a cube

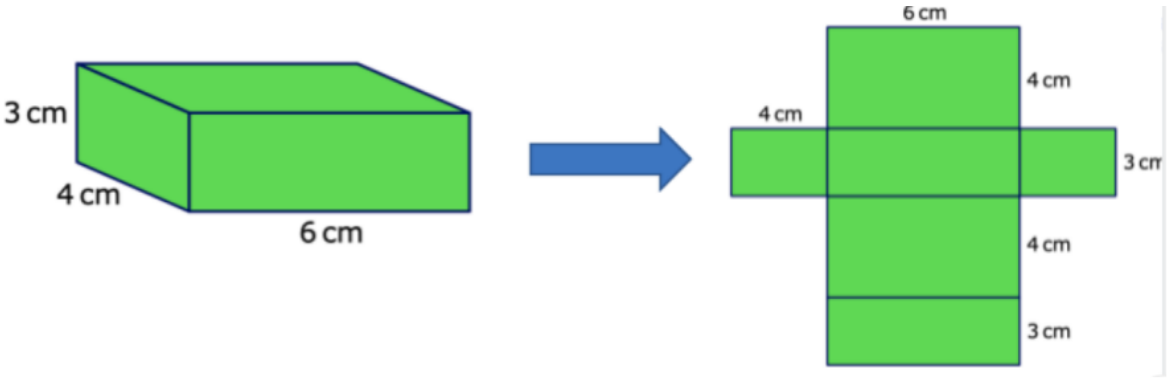


Imagine if we were to unfold it in stages, What pattern would we end up with?



Example 2

What would the net of the following cuboid look like?

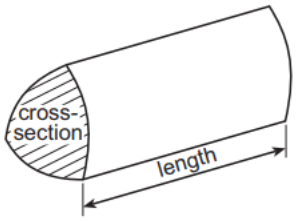


Video: https://corbettmaths.com/2013/12/23/nets-2/

Find the volume of a prism

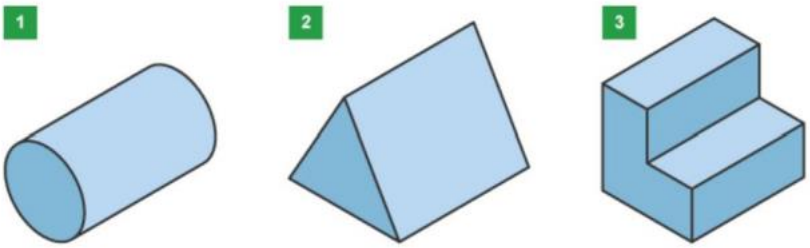
With volume units are written $cm^3, mm^3, km^3\ etc$

Volume of prism = area of cross-section × length



A cross section is the intersection of a figure in a 3-dimensional space with a plane. It is the face you obtain by making a "slice" through a solid object. The green part is the cross section.

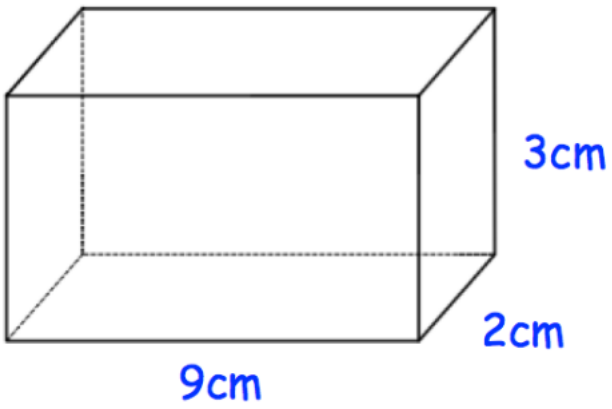
This formula works for all prisms:



1. volume-of-a-cylinder = area-of-circle × length
2. volume-of-triangular-prism = area-of-triangle × length
3. volume-of-L-shaped-prism = area-of-L-shape × length

Example 1

Find the volume of the following cuboid.

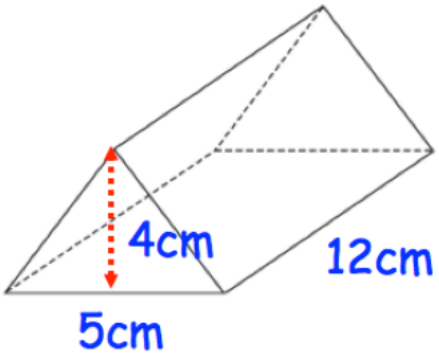


Volume = 2 x 3 x 9 = 54 cm^3

Video: https://corbettmaths.com/2012/08/09/volume-of-cuboids-and-cubes/

Example 2

Find the volume of the following prism



The cross section is a triangle

Area of a triangle = $\frac{base \times height}{2}$

Base = 5 Height = 4

Area of a triangle = $\frac{5 \times 4}{2} = \frac{20}{2} = 10$

Volume = 10 x 12 = 120 cm^3

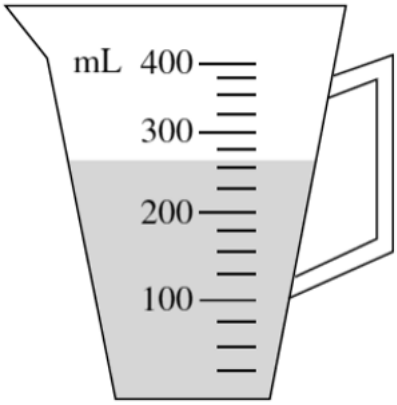
Video: https://corbettmaths.com/2013/04/20/volume-of-a-prism/

Read and interpret scales on a range of measuring instruments

Work out what the scale is going up/down in, before attempting any actual measurements.

Example 1

Find the amount of water in the jug



Difference between 300 and 200 = 100

There are 4 spaces between 200 and 300

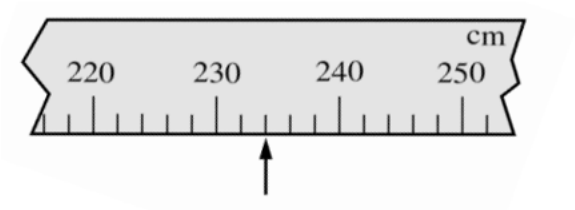
100 ÷ 4 = 25

Each line represents 25ml

The answer is 250ml

Example 2

What length is the arrow pointing at?



Difference between 230 and 240 = 10

There are 5 spaces between them

10 ÷ 5 = 2

Each line represents 2cm

The answer is 234cm

Video: https://corbettmaths.com/2013/04/27/reading-scales/

Measure and record time in hundredths of a second

Example

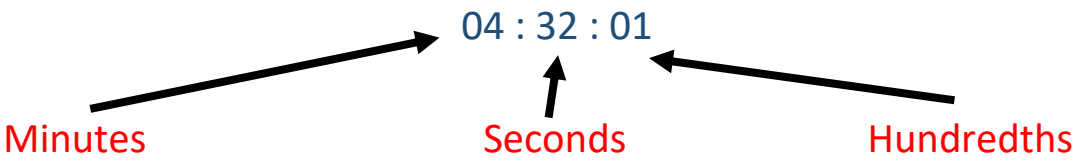
Emily runs 1km races.

Her best time in minutes, seconds and hundredths of seconds is 04:32:01

In her next race Emily is **three-hundredths** of a second **faster.**

What is her new best time?

Hundredth of a second is what you get when you split a second into 100 equal parts.



New best time = 04:31:98

Use time zones

Example

When it is 19:40 in Cardiff, it is 23:40 in Dubai.

(i) What time is it in Dubai when it is 13:30 in Cardiff?
Circle your answer. [1]

15:30 10:30 09:30 17:30 19:30

.....

.....

(ii) What time is it in Cardiff when it is 02:10 in Dubai?
Circle your answer. [1]

20:10 06:10 22:10 10:10 00:10

.....

- Work out the time difference

Dubai is 4 hours ahead of Cardiff.

1. Count ahead 4 hours from 13:30 = 17:30

2. Count back 4 hours from 02:10 = 22:10

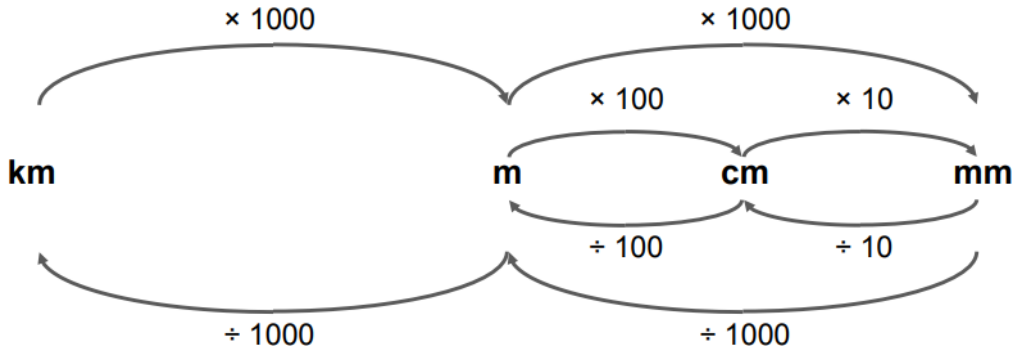
Converting between units of the metric system

Metric facts

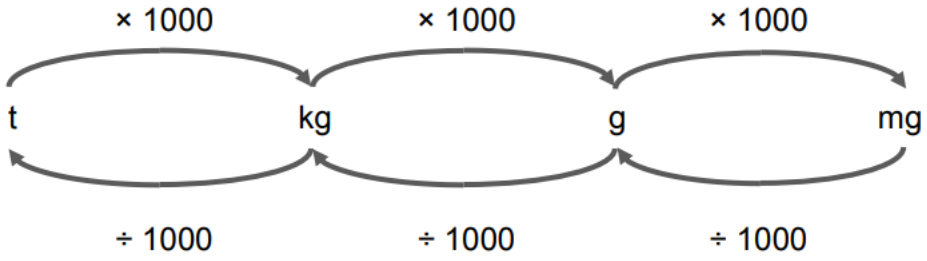
Quantity	Unit	Symbol	Converting between units
Length	millimetre centimetre metre kilometre	mm cm m km	1 cm = 10 mm 1 m = 100 cm = 1 000 mm 1 km = 1 000 m
Mass	milligram gram kilogram tonne	mg g kg t	1 g = 1 000 mg 1 kg = 1 000 g 1 t = 1 000 kg
Capacity *"How much can it hold"*	millilitre litre kilolitre megalitre	mL kL L ML	1 L = 1 000 mL 1 kL = 1 000 L 1 ML = 1 000 kL = 1 000 000 L

Unit conversions

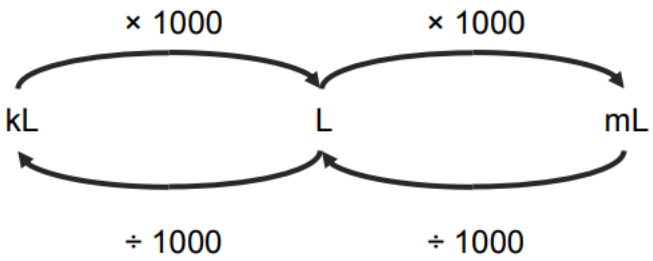
Length



Mass



Capacity



Video: https://corbettmaths.com/2014/01/16/metric-units-for-length/

Statistics

Collect and record data

When a lot of data needs to be sorted, one of the most efficient ways is to use a frequency table.

Example frequency table

Colour	Tally marks	Frequency
Black	|	1
Blue	𝍸	5
Pink	||	2
White	||||	4
		Total = 12

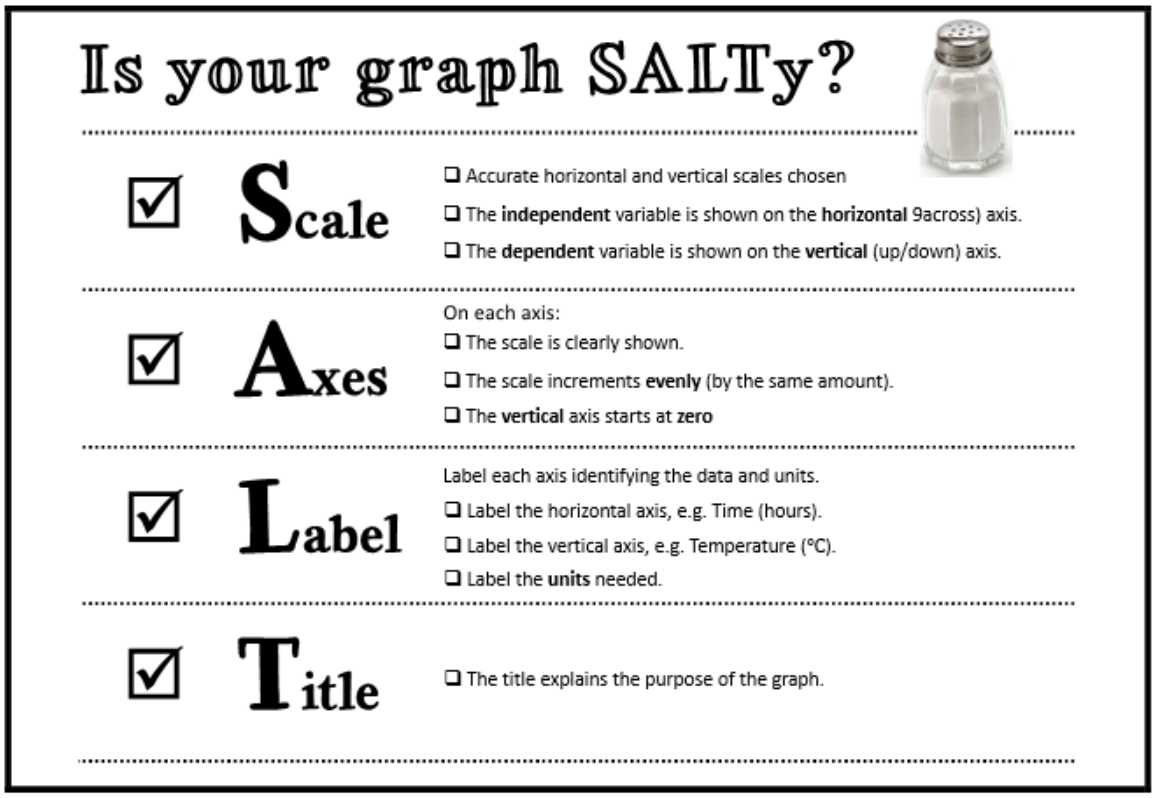
Example grouped frequency table

Groups	Tally	Frequency
1 to 10	𝍸 ||||	9
11 to 20	𝍸 |	6
21 to 30	||	2
31 to 40	|||	3
		Total = 20

The groups must not overlap!

Bar charts and scatter graphs

The school policy for pupils to use “SALT” to ensure their charts/graphs has all requirements and no information missing.



Is your graph SALTy?

☑ Scale
☑ Axes
☑ Label
☑ Title

Is your graph SALTy?

- ☑ **S**cale
- ☑ **A**xes
- ☑ **L**abel
- ☑ **T**itle

- ❑ Accurate horizontal and vertical scales chosen.
- ❑ The **independent** variable is shown on the **horizontal** (across) axis.
- ❑ The **dependent** variable is shown on the **vertical** (up-down) axis.

Is your graph SALTy?

- ☑ **S**cale
- ☑ **A**xes
- ☑ **L**abel
- ☑ **T**itle

On each axis:

- ❑ The scale is clearly shown.
- ❑ The scale increments **evenly** (by the same amount each grid box).
- ❑ The **vertical** axis starts at **zero**.

Is your graph SALTy?

- ☑ **S**cale
- ☑ **A**xes
- ☑ **L**abel
- ☑ **T**itle

Label each axis identifying the data and units.

- ❑ Label the horizontal axis, e.g. Time (hours)
- ❑ Label the vertical axis, e.g. Temperature (°C)
- ❑ Label the **units** needed.

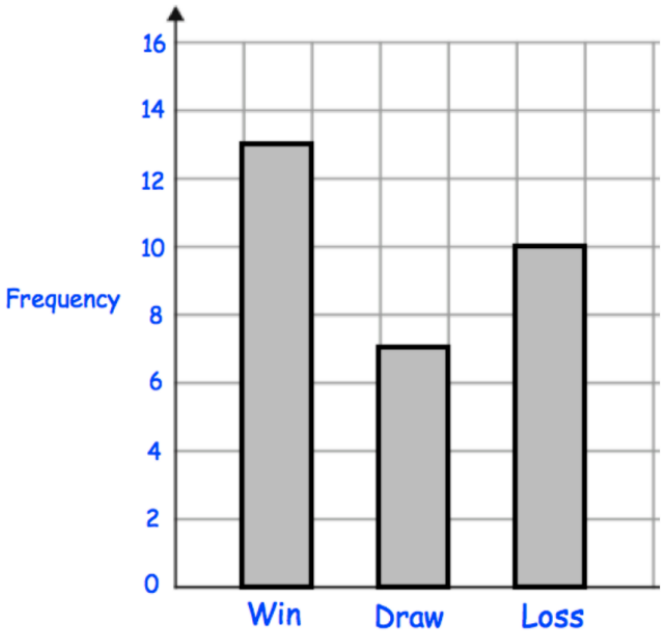
Is your graph SALTy?

- ☑ **S**cale
- ☑ **A**xes
- ☑ **L**abel
- ☑ **T**itle

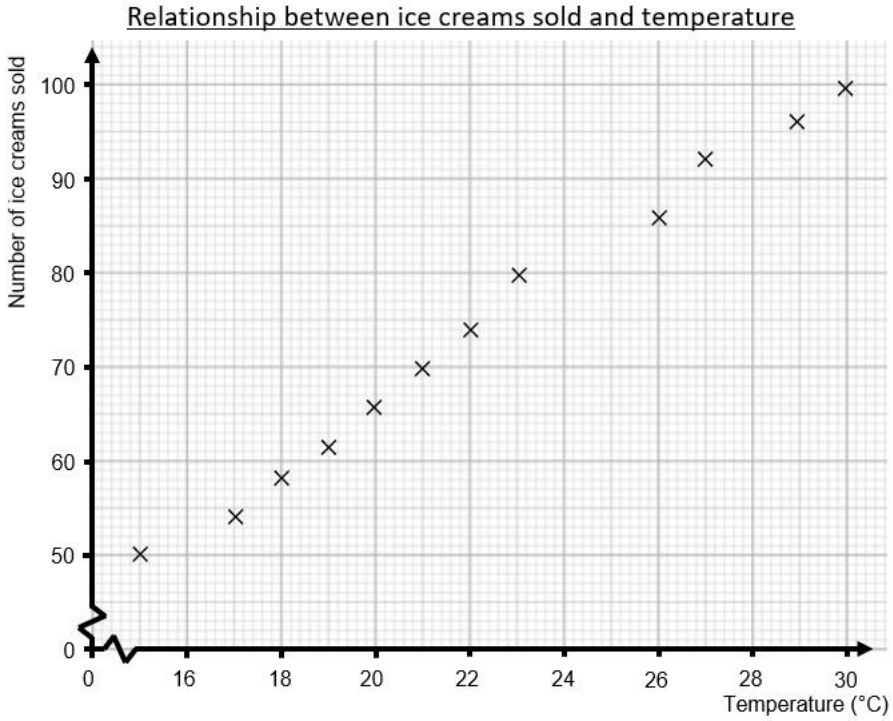
- ❑ The title explains the purpose of the graph.

Example of bar chart

A bar chart showing results for Newport United Football Club



Example of scatter graph



Video: https://corbettmaths.com/2013/04/15/drawing-bar-charts/
Video: https://corbettmaths.com/2012/08/10/scatter-graphs/

Pie charts

Drawing pie charts

Learners will need a pie chart template. They are not required to draw the circle.

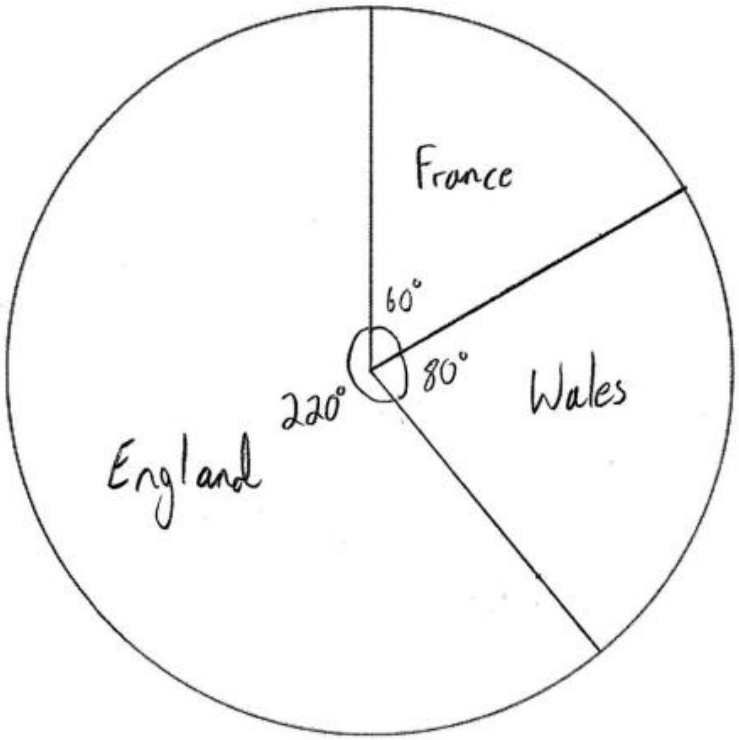
Example

Draw a pie chart to show the holiday destinations of 18 students in a class.

Country	Frequency		Angle
France	3	x 20	= 60°
Wales	4	x 20	= 80°
England	11	x 20	= 220°
	= 18		

Steps:

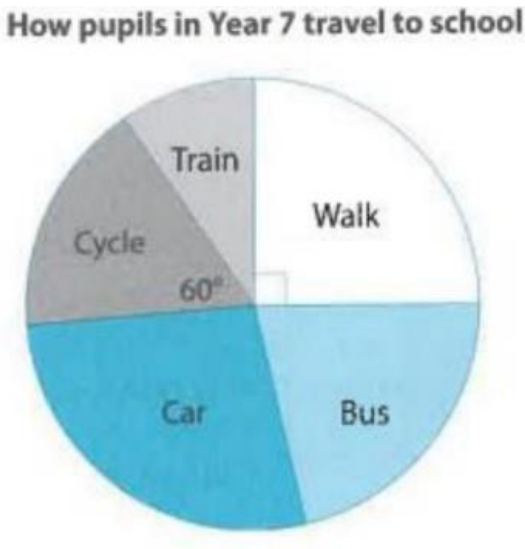
1. Add up the frequency.
   All angles in a pie chart add up to 360°.
2. 360 divided by 18 = 20°. So each person gets 20° of the pie chart.
3. Multiply the frequency by 20.



Video: https://corbettmaths.com/2013/02/27/drawing-a-pie-chart/

Interpret pie charts

Example



There are 120 pupils altogether.

1. How many of them walk to school?

   Walk is a right angle (90°) or a quarter of the pie chart.

   120 ÷ 4 = **30 pupils**

2. How many of them cycle?

   Cycling is 60° of the pie chart.

   60/360 can be simplified to 1/6.

   120 ÷ 6 = **20 pupils**

Video: https://corbettmaths.com/2013/05/25/interpreting-pie-charts/

Averages

Mean

The term 'average' usually refers to the mean.

To calculate the mean, the sum of the data values is divided by the number of data values.

$$\text{mean} = \frac{\text{sum of data values}}{\text{number of data values}}$$

For example, if the data is represented in simple form e.g. **6, 7, 8, 4, 6, 8**

The average is found by adding the data values (results) together and then dividing by how many data values there are.

Add the results together	**6 + 7+ 8 + 4 + 6 + 8 = 39**
How many data values are there?	**6**
Now find the mean	**39 ÷ 6 = 6.5**

Median

The median is the **middle** value when the data is arranged in order.

For the data, **6, 7, 8, 4, 6, 8**.

In order the data is **4, 6, 6, 7, 8, 8**.

The middle is between **6** and **7**, so the **median** is **$6\frac{1}{2}$.**

Mode

The data value that occurs the **most** often.

There may be more than one mode, or no mode at all.

For the data, **6, 7, 8, 4, 6, 8**, the mode is **6** and **8**.

Range

The range is the **difference** between the greatest and the least values.

Range = highest value – lowest value

For the data **4, 6, 6, 7, 8, 8**. The range is **8 – 4 = 4.**