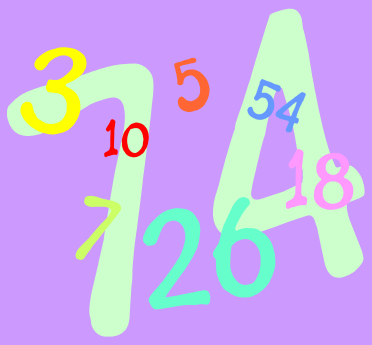
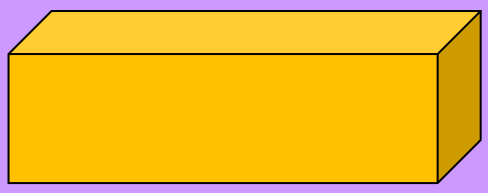
# Mathematics

## Key Stage 2 Revision Book



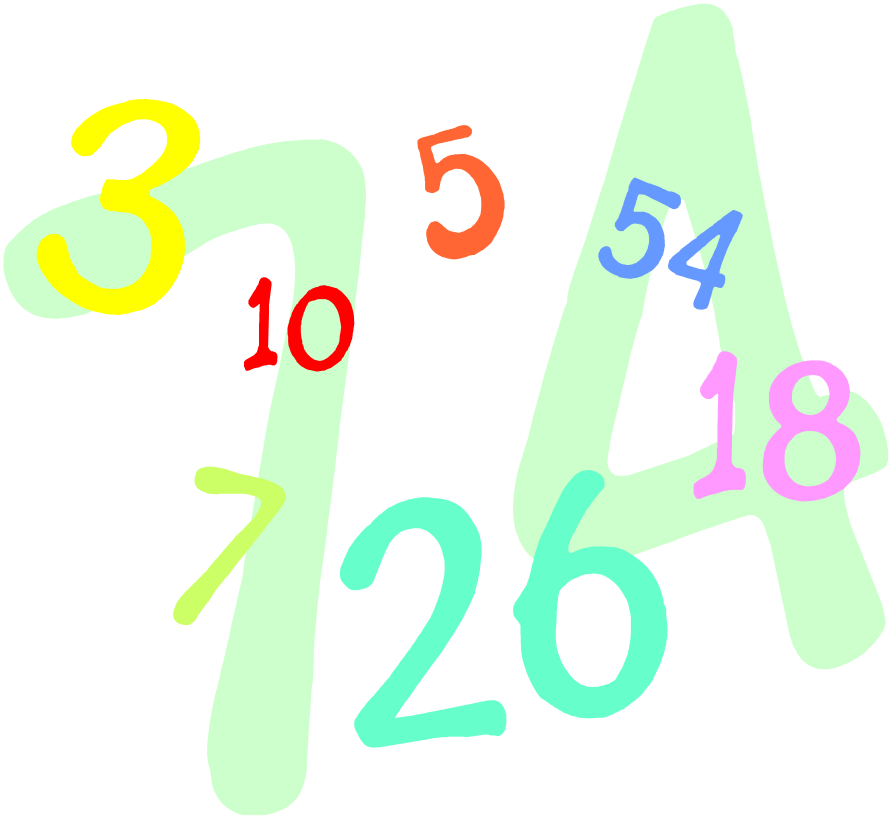



Reading a Data Table

| | Cars in Car Park | | | | |
|---|---|---|---|---|---|
| | Blue | Red | Green | Silver | Total |
| Snowsave | 12 | 14 | 2 | 20 | 48 |
| Quickmart | 16 | 10 | 7 | 31 | 64 |
| Stopby | 8 | 20 | 9 | 18 | 55 |
| Total | 36 | 44 | 18 | 69 | 167 |

Compiled by : Robert Thompson EA—SDS

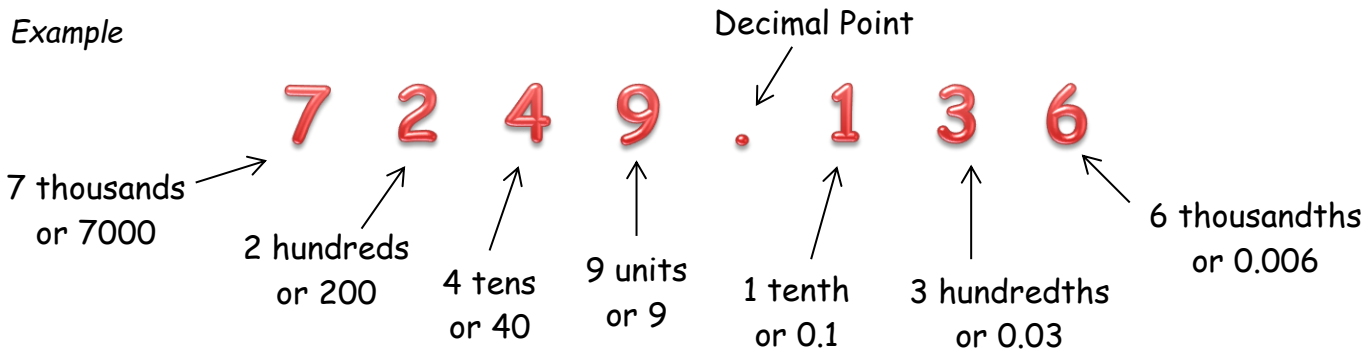
# Number



# PLACE VALUE

**PLACE VALUE** is the value of a digit within a number depending on its position within the number.

*Example*




## MULTIPLYING & DIVIDING BY 10, 100 AND 1000

| | | | | |
|---|---|---|---|---|
| x 10 | Move all digits ONE place to the LEFT | e.g. | 7.32<br>73.2 | (x 10) |
| ÷ 10 | Move all digits ONE place to the RIGHT | e.g. | 98.07<br>9.807 | (÷ 10) |
| x 100 | Move all digits TWO places to the LEFT | e.g. | 17.9<br>1790. | (x 100) |
| ÷100 | Move all digits TWO places to the RIGHT | e.g. | 394.8<br>3.948 | (÷100) |
| x 1000 | Move all digits THREE places to the LEFT | e.g. | 0.741<br>741. | (x 1000) |
| ÷ 1000 | Move all digits THREE places to the RIGHT | e.g. | 68.1<br>0.0681 | (÷ 1000) |

## ROUNDING NUMBERS

Being able to round numbers is very useful for ESTIMATING answers.

*Examples*

T
78 to the nearest 10 is 80

H
629 to the nearest 100 is 600

Th
2507 to the nearest 1000 is 3000

RULE: If the digit after the place to which you are rounding is 0, 1, 2, 3, 4 then ROUND DOWN.
If the digit after the place to which you are rounding is 5, 6, 7, 8, 9 then ROUND UP.

# EQUIVALENT FRACTIONS

**EQUIVALENT FRACTIONS** are fractions which have the same value. Equivalent fractions are formed when both the **NUMERATOR** and **DENOMINATOR** of a fraction are MULTIPLIED or DIVIDED by the same number.

*Examples*

NUMERATOR →
DENOMINATOR →

$$\frac{3}{4} \overset{\times}{=} \frac{9}{12} \quad (\times \text{ on both})$$

$$\frac{12}{20} \overset{\div 4}{=} \frac{3}{5} \quad (\div 4 \text{ on both})$$

A fraction can be **SIMPLIFIED** or expressed in **LOWEST TERMS** by finding the largest number which will divide exactly into both numerator and denominator.

*Examples*

$$\frac{12}{16} \overset{\div 4}{=} \frac{3}{4}$$

$$\frac{25}{40} \overset{\div 5}{=} \frac{5}{8}$$

A **MIXED NUMBER** is a number with both a WHOLE and FRACTIONAL part.

e.g. $2\frac{1}{3}$

Whole part — Fractional part

An **IMPROPER FRACTION** is a fraction whose numerator is bigger than its denominator and can be changed into a mixed number.

e.g. $\frac{11}{4} = 2\frac{3}{4}$

# FINDING FRACTIONS OF NUMBERS

Example:

(ii) Find $\frac{3}{4}$ of 36

First find $\frac{1}{4}$ (36 ÷ 4) = 9

Then find $\frac{3}{4}$ (9 x 3) = 27

$\frac{3}{4}$ of 36 = 27

(i) Find $\frac{5}{8}$ of 24

First find $\frac{1}{8}$ (24 ÷ 8) = 3

Then find $\frac{5}{8}$ (3 x 5) = 15

$\frac{5}{8}$ of 24 = 15

# PERCENTAGES

The words **PER CENT** mean **OUT OF 100**.

The symbol for percentage is **%**

To change a fraction to a percentage you must change it into a fraction with a denominator of 100.

e.g. $\frac{9}{25} \overset{\times}{\underset{\times}{\frown}} \frac{36}{100}$ **= 36%**

$\frac{122}{200} \overset{\div}{\underset{\div}{\frown}} \frac{61}{100}$ **= 61%**

To find percentages of numbers it is usual to change the percentage into a simple fraction if possible.

e.g. 25% of 80 = $\frac{1}{4}$ of 80 = 20

Finding 10% is often a useful step to finding other percentages

e.g. find 5% → first find 10% (÷ 10) then divide by 2 to find 5%
find 15% → find 10%, then find 5% and add together to make 15%

To find more "awkward" percentages such as 8% first find 1% (÷ 100) then multiply to the required percentage (x 8)

# FRACTIONS/DECIMALS/ PERCENTAGES

The following tables show a list of common equivalences of fractions, decimals and percentages.

| Fraction | Decimal | Percentage |
|---|---|---|
| $\frac{1}{2}$ | 0.5 | 50% |
| $\frac{1}{4}$ | 0.25 | 25% |
| $\frac{3}{4}$ | 0.75 | 75% |
| $\frac{1}{5}$ $(\frac{2}{10})$ | 0.2 | 20% |
| $\frac{2}{5}$ $(\frac{4}{10})$ | 0.4 | 40% |
| $\frac{3}{5}$ $(\frac{6}{10})$ | 0.6 | 60% |

| Fraction | Decimal | Percentage |
|---|---|---|
| $\frac{4}{5}$ $(\frac{8}{10})$ | 0.8 | 80% |
| $\frac{1}{10}$ | 0.1 | 10% |
| $\frac{3}{10}$ | 0.3 | 30% |
| $\frac{7}{10}$ | 0.7 | 70% |
| $\frac{9}{10}$ | 0.9 | 90% |
| $\frac{1}{3}$ | 0.333 | $33\frac{1}{3}\%$ |

A **MULTIPLE** is formed when any whole number is multiplied by another whole number.

e.g. MULTIPLIES of 3 are 3, 6, 9, 12, 15, 18, 21, etc.

MULTIPLES of 7 are 7, 14, 21, 28, 35, 42, 49, etc.

Multiples of 2 are called **EVEN** numbers.

All EVEN numbers end with 0, 2, 4, 6 or 8.

Numbers which are NOT multiples of 2 are called **ODD** numbers. All ODD numbers end with 1, 3, 5 ,7 or 9.

- Multiples of 5 all end with 0 or 5.
- Multiples of 10 all end with 0.
- Multiples of 3 can be recognised by adding the digits of the number. If the total is exactly divisible by 3 the number is a multiple of 3.

  *Example: 477 → 4 + 7 + 7 = 18 → multiple of 3*

A **FACTOR** is a number which divides exactly into another number without leaving a remainder.

*Examples: Factors of 12 are 1, 2, 3, 4, 6, 12*
*Factors of 30 are 1, 2, 3, 5, 6, 10, 15, 30*

A number with exactly TWO factors is called a **PRIME** number. The 2 factors will be 1 and the number itself. Example 13 → 1 and 13.

The following is a list of all the Prime Numbers less than 100.

**2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97**

**NOTE:** 1 is NOT a Prime Number as it has only ONE factor.

## SQUARE NUMBERS

$7^2$ means '7 squared' or $7 \times 7 = 49$

This way of writing '7 squared' is called ***INDEX NOTATION***

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| $1^2$ | = | $1 \times 1$ | = | 1 | $7^2$ | = | $7 \times 7$ | = 49 |
| $2^2$ | = | $2 \times 2$ | = | 4 | $8^2$ | = | $8 \times 8$ | = 64 |
| $3^2$ | = | $3 \times 3$ | = | 9 | $9^2$ | = | $9 \times 9$ | = 81 |
| $4^2$ | = | $4 \times 4$ | = | 16 | $10^2$ | = | $10 \times 10$ | = 100 |
| $5^2$ | = | $5 \times 5$ | = | 25 | $11^2$ | = | $11 \times 11$ | = 121 |
| $6^2$ | = | $6 \times 6$ | = | 36 | $12^2$ | = | $12 \times 12$ | = 144 |

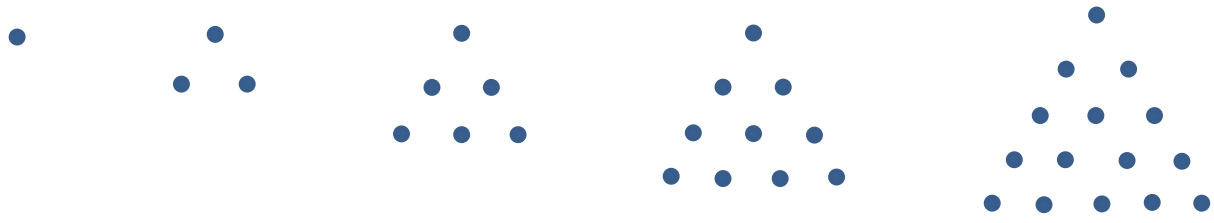
## CUBIC NUMBERS

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| $1^3$ | = | $1 \times 1 \times 1$ | = | 1 | $4^3$ | = | $4 \times 4 \times 4$ | = 64 |
| $2^3$ | = | $2 \times 2 \times 2$ | = | 8 | $5^3$ | = | $5 \times 5 \times 5$ | = 125 |
| $3^3$ | = | $3 \times 3 \times 3$ | = | 27 | $6^3$ | = | $6 \times 6 \times 6$ | = 216 |

$10^3 = 10 \times 10 \times 10 = 1000$

## TRIANGULAR NUMBERS

Triangular numbers are so called because they can be arranged in a triangle shape.



**1** **3** **6** **10** **15**

1, 3, 6, 10, 15, 21, 28, 36, 55……are triangular numbers

+2 +3 +4 +5 +6 +7 ← ***Notice this pattern***

## USING A LETTER FOR AN UNKNOWN NUMBER

In Algebra a letter can be used to stand for an unknown number. Here are some examples.

| | |
|---|---|
| $t + 7 = 12$ | $3a + 1 = 28$ |
| $t = 5$ | $3a = 27$ so $a = 9$ |

**NOTE:** '3a' means '3 multiplied by a'

# NUMBER SEQUENCES

A number sequence is formed when a rule or pattern is carried out on a number to make a new number.

Here are some examples:

a) 11, 14, 17, 20, 23….. (adding 3)

b) 8.9, 8.2, 7.5, 6.8 …… (subtracting 0.7)

c) 7, 8, 10, 13, 17, 22…. (+ 1, + 2, + 3, etc. ~ increasing the number added by 1 each time)

d) 3, 5, 8, 13, 21, 34, 55 …. (add two previous numbers to give the next in the sequence)

# FUNCTION MACHINES

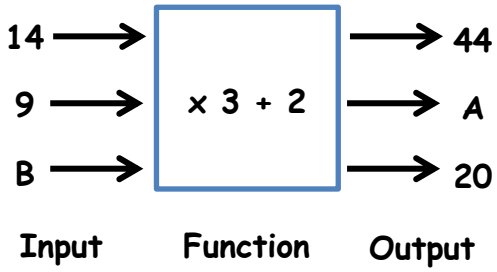
A function machine has:

an **INPUT** - a number put into the machine.

a **FUNCTION** - a rule or operation which is applied to the input.

an **OUTPUT** - the result when the function is carried out on the input.

*Example*




*The OUTPUT at A

is 9 x 3 + 2 = 29

*To find the INPUT at B you must reverse the order of the function and use the inverse operations

x 3 + 2 becomes - 2 ÷ 3

therefore (20 – 2) ÷ 3 = 6

**INVERSE OPERATIONS**

Addition and subtraction are inverse operations
(e.g. 7 + 3 – 3 = 7)
so are multiplication and division

# MONEY ON A CALCULATOR DISPLAY

If you add £4.39 and £1.81 on a calculator the display will show


This means £6.20 because a calculator doesn't display unnecessary zeros.

# Measures

# TIME – 12/24 Hour clock

When writing times in the 24 hour clock system **FOUR** digits are always used. Only 12 hour clock times are followed by am (before mid-day) or pm (after mid-day).

The following is a list of all "o'clock" times in both systems.

| 12 Hour | 24 Hour | 12 Hour | 24 Hour |
|---|---|---|---|
| Midnight<br>12.00 am | 0000<br>Or 2400 | Noon<br>12.00 pm | 1200 hrs |
| 1.00 am | 0100 hrs | 1.00 pm | 1300 hrs |
| 2.00 am | 0200 hrs | 2.00 pm | 1400 hrs |
| 3.00 am | 0300 hrs | 3.00 pm | 1500 hrs |
| 4.00 am | 0400 hrs | 4.00 pm | 1600 hrs |
| 5.00 am | 0500 hrs | 5.00 pm | 1700 hrs |
| 6.00 am | 0600 hrs | 6.00 pm | 1800 hrs |
| 7.00 am | 0700 hrs | 7.00 pm | 1900 hrs |
| 8.00 am | 0800 hrs | 8.00 pm | 2000 hrs |
| 9.00 am | 0900 hrs | 9.00 pm | 2100 hrs |
| 10.00 am | 1000 hrs | 10.00 pm | 2200 hrs |
| 11.00 am | 1100 hrs | 11.00 pm | 2300 hrs |

*Although midnight can be written two different ways in the 24 hour system 2400 hrs and 0000 hrs, times just after midnight can only be written in one way.

e.g. 1 minutes past midnight

0001 hrs

~~2401~~ hrs does not exist

# TIME FACTS

| | | |
|---|---|---|
| 60 seconds | = | 1 minute |
| 60 minutes | = | 1 hour |
| 24 hours | = | 1 day |
| 7 days | = | 1 week |
| 2 weeks (14 days) | = | 1 fortnight |

| | | |
|---|---|---|
| 12 months | = | 1 year |
| 365 days | = | 1 year |
| 366 days | = | 1 leap year |
| 10 years | = | 1 decade |
| 100 years | = | 1 century |

# THE CALENDAR

The following rhyme will help you remember the number of days in each month of the year.

*Thirty days has September*
*April, June and November*
*All the rest have thirty-one*
*Except February alone*
*Which has twenty-eight days clear*
*And twenty-nine in each leap year.*

**SEASONS**


March
April
May


June
July
August


September
October
November


December
January
February

A **LEAP YEAR** occurs every **FOUR** years.

2008, 2012, 2016 and 2020 are all leap years.

To find out if a year is a leap year, divide the last two digits of the year by 4. If there is no remainder then it is a leap year.

# CAPACITY

CAPACITY is the amount of space in a hollow container such as a bottle or bin. The standard unit for measuring capacity is the LITRE.

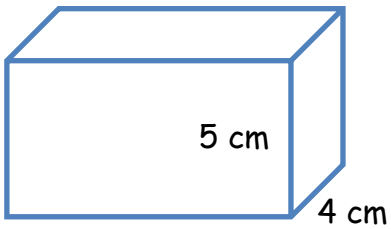
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | litre | = | 1000 ml | $\frac{3}{4}$ | litre | = | 750 ml |
| $\frac{1}{2}$ | litre | = | 500 ml | $\frac{1}{5}$ | litre | = | 200 ml |
| $\frac{1}{4}$ | litre | = | 250 ml | $\frac{1}{10}$ | litre | = | 100 ml |

- A standard size dinks can holds 330 ml.
- A medicine spoon holds 5 ml.

# VOLUME

**VOLUME** is the amount of space taken up by a solid object.

The volume of a solid is measured in CUBIC CENTIMETRES **cm³** or CUBIC METRES **m³**.




*(not drawn to scale)*

To calculate the volume of a CUBOID, multiply the length by breadth by height.

Volume = length x breadth x height

Volume = 8 x 4 x 5 = 160 cm³

# WEIGHT

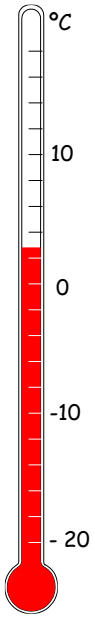
The weight of an object is measured in **GRAMS** or **KILOGRAMS**.

| | | | | | |
|---|---|---|---|---|---|
| 1 kg | = | 1000 g | $\frac{1}{4}$ kg | = | 250 g |
| $\frac{1}{2}$ kg | = | 500 g | $\frac{3}{4}$ kg | = | 750 g |

- A new born baby would weigh about 3 or 4 kg.
- A 10 -11 year old child would weigh 30 – 45 kg.
- A large adult would weigh about 100 kg.

# TEMPERATURE

**TEMPERATURE** is a measure of how hot or cold something is. A **THERMOMETER** is used to measure temperature. At 0°C water freezes. **NEGATIVE** numbers are used for temperatures lower than zero.




e.g. To work out the temperature change from 7°C to - 4°C use two steps

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| STEP 1: | 7°C | → | 0°C | is | 7°C | } | altogether |
| STEP 2: | 0°C | → | - 4°C | is | 4°C | } | 11°C |

# LENGTH

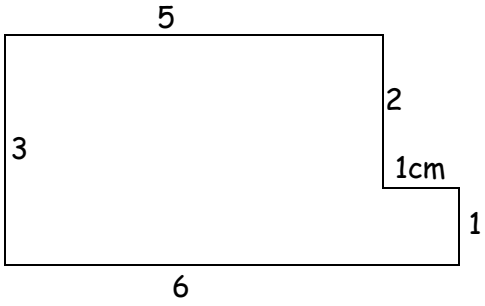
There are four metric units of length commonly used:

**MILLIMETRES, CENTRIMETRES, METRES AND KILOMETRES**

| | | |
|---|---|---|
| 10 mm | = | 1 cm |
| 100 cm | = | 1 m |
| 1000 mm | = | 1 m |
| 1000 m | = | 1 km |

- A standard ruler is 30 cm long
- Classroom door is approximately 2m high
- Average 10 – 11 year old is 130 – 150 cm tall
- It would take about 10 – 12 minutes to walk 1 kilometre
- An Olympic athlete can run 100 metres in 10 seconds

The distance round a shape is called the **PERIMETER**




The perimeter of the shape illustrated is 18 cm.

The perimeter of a square is four times its length.

# MEASURING INSTRUMENTS

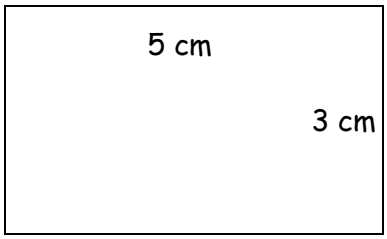
We use different measuring instruments depending on the length to be measured and how accurate we need to be.

- A **RULER** is suitable for measuring short lengths such as a width of a spelling book.
- A **METRE STICK** is suitable for measuring the width of the classroom.
- A **TRUNDLE WHEEL** is suitable for measuring longer distances such as the length of the corridor or playground.
- A **TAPE MEASURE** is suitable for measuring around curved objects such as a wastepaper bin or parts of the body.

# AREA

**AREA** is the amount of space in a flat surface. Area is usually measured in SQUARE CENTIMETRES **cm²**.

The area of a square or rectangle is calculated by multiplying the length by the breadth.




Area = length x breadth

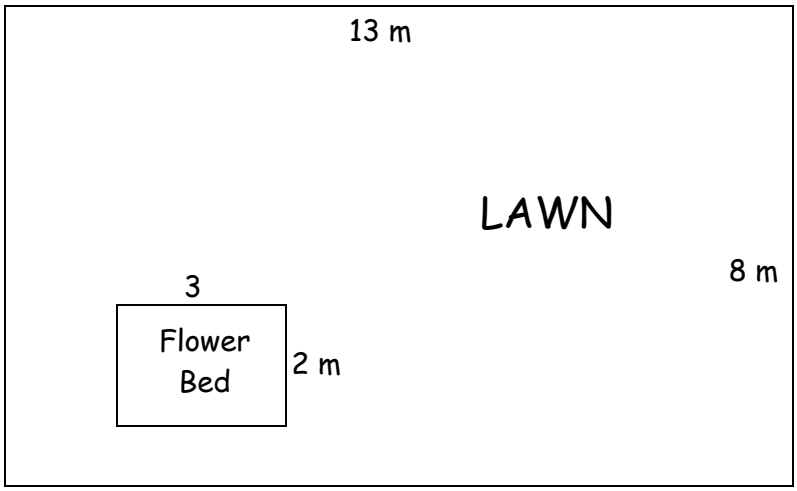
Area = 5 cm x 3 cm = 15 cm²

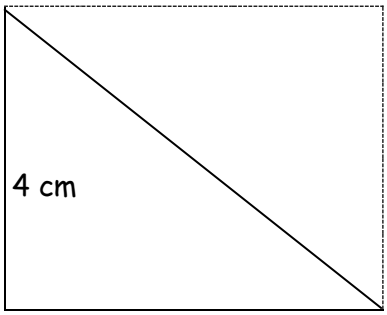
Calculate the area of the lawn.

Area of lawn =

Area of garden – Area of flower bed

(13 x 8) – (3 x 2) = 104 – 6 = 98 m²

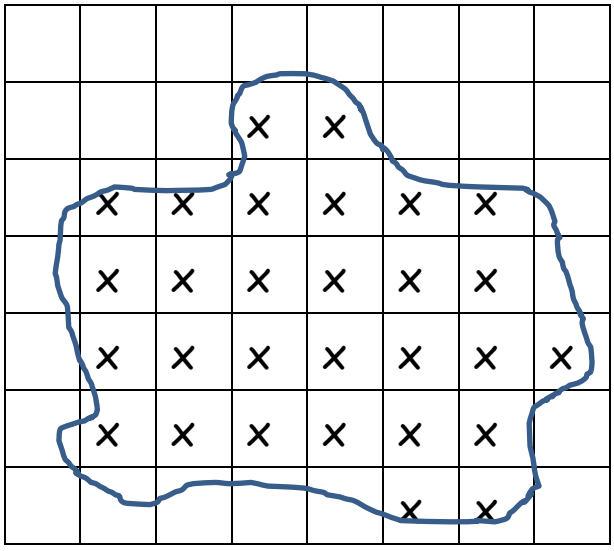



From this diagram you can see that the Area of a Triangle is half of the rectangle it fits inside.

Area = $\frac{1}{2}$ (5 cm x 4 cm)

= 10 cm²



You can calculate the APPROXIMATE area of an IRREGULAR shape by counting the WHOLE squares inside the shape and the squares that are half or more.

DO NOT COUNT the squares which are less than $\frac{1}{2}$ inside the shape.

Approximate Area = 29 cm²

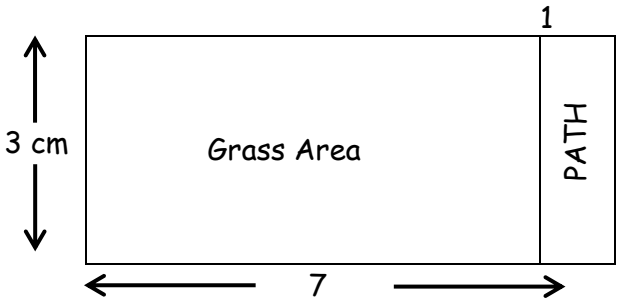
## CONVERTING FROM ONE METRIC MEASURE TO ANOTHER

| | | | | | |
|---|---|---|---|---|---|
| kg | → | g | (x 1000) | e.g. | 1.4 kg = 1400 g, 0.07 kg = 70 g |
| g | → | kg | (÷ 1000) | e.g. | 2070 g = 2.07 kg, 3g = 0.003 kg |
| l | → | ml | (x 1000) | e.g. | 0.8 l = 800 ml, 1.04 l = 1040 ml |
| ml | → | l | (÷ 1000) | e.g. | 1475 ml = 1.475 l, 93 ml = 0.93 l |
| cm | → | mm | (x 10) | e.g. | 1.3 cm = 13 mm, 0.7 cm = 7 mm |
| mm | → | cm | (÷ 10) | e.g. | 143 mm = 14.3 cm, 51 mm = 5.1 cm |
| m | → | cm | (x 100) | e.g. | 1.31 m = 131 cm, 0.6 m = 60 cm |
| cm | → | m | (÷ 100) | e.g. | 186 cm = 1.86 m, 5 cm = 0.05 m |
| km | → | m | (x 1000) | e.g. | 1.28 km = 1280 m, 0.01 km = 10 m |
| m | → | km | (÷ 1000) | e.g. | 2300 m = 2.3 km, 780 m = 0.78 km |

## SCALE DRAWING

A scale drawing is often used to represent, on paper, an object which is much larger in real life.

*Example:* Below is a scale drawing of a garden with a path along one side.




Scale 1cm : 3 m

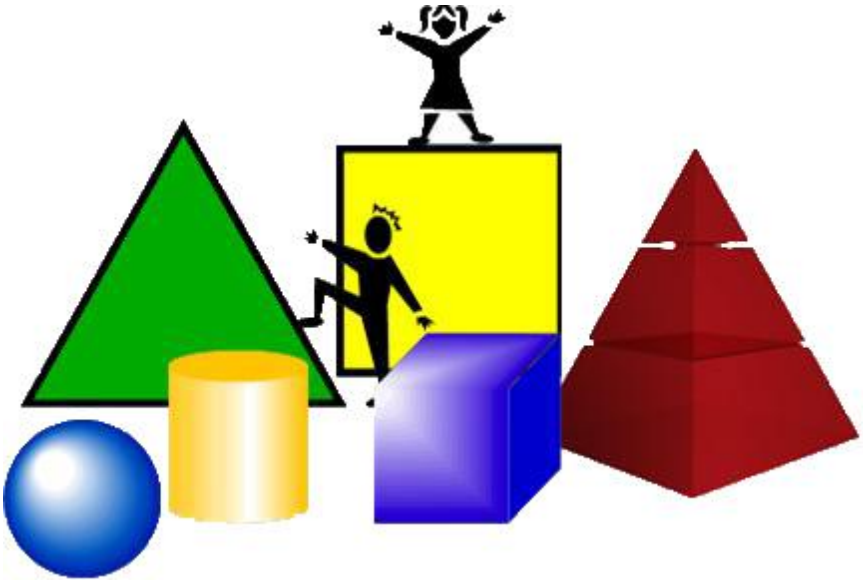
**or** 1 cm = 300 cm

*Actual measurements are 300 times larger than the scale drawing.*

| | | | | | |
|---|---|---|---|---|---|
| Grass area: | Actual length | 6 x 300 | = | 1800 m | (18 m) |
| | Actual width | 3 x 300 | = | 900 cm | (9 m) |
| Path: | Actual length | 3 x 300 | = | 900 cm | (9m) |
| | Actual width | 1 x 300 | = | 300 cm | 3 m) |

Actual perimeter of path (2 x 9 m) + (2 x 3 m) = 24 m

# Shape & Space



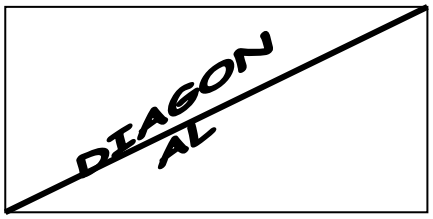
# LINES

## HORIZONTAL

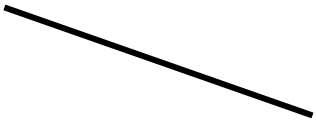
A line 'straight across' (parallel to the Earth's horizon)

## VERTICAL

A line straight 'up and down' (at right angles to the Earth's horizon)




A line joining opposite corners in a shape

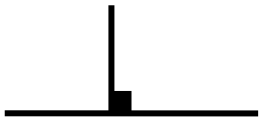


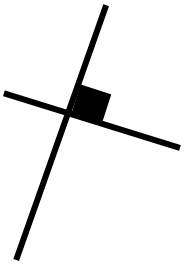
## OBLIQUE

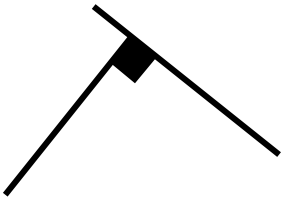
A sloping or slanted line

**PERPENDICULAR** lines meet or cross at right angles to each other

*Examples*

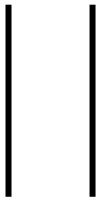


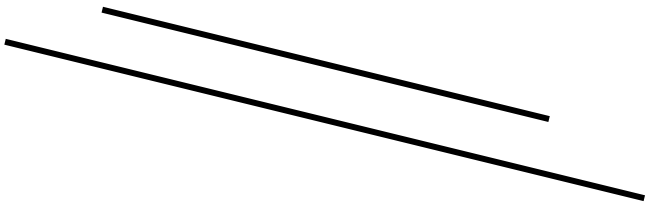




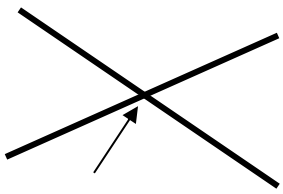
**PARALLEL** lines always remain the same distance apart and therefore never meet

*Examples*





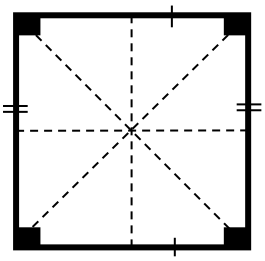
The point where lines meet or cross is the called the **INTERSECTION**



*INTERSECTION*

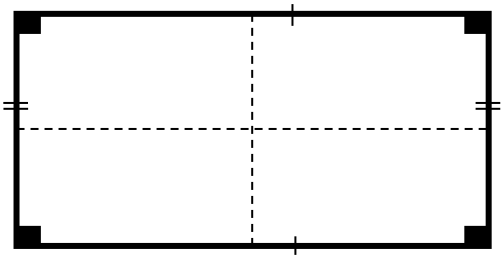
# QUADRILATERALS

**The QUADRILATERAL is a flat shape with four sides. The following shapes are quadrilaterals with special properties.**



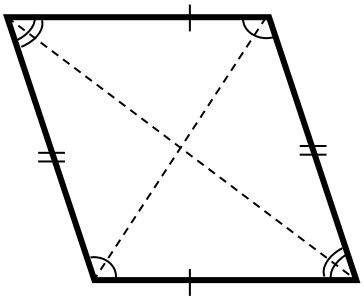
**SQUARE**

- All four sides are equal in length
- All four angles are right angles
- Opposite sides are parallel
- 4 lines of symmetry



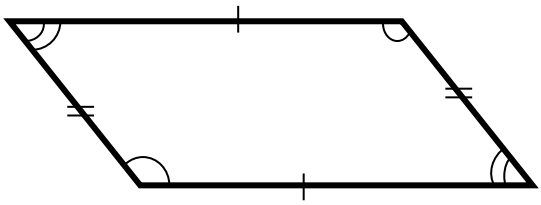
**RECTANGLE**

- Opposite sides are equal in length
- All four angles are right angles
- Opposite sides are parallel
- 2 lines of symmetry



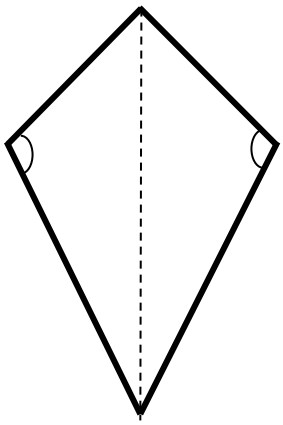
**RHOMBUS**

- All four sides are equal in length
- Opposite angles are equal
- Opposite sides are parallel
- 2 lines of symmetry



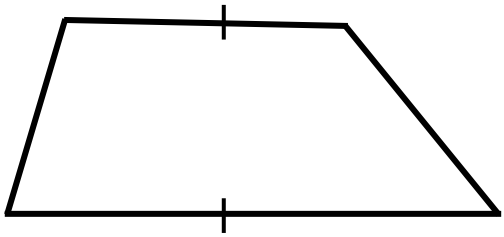
**PARALLELOGRAM**

- Opposite sides are equal in length
- Opposite angles are equal
- Opposite sides are parallel
- NO lines of symmetry



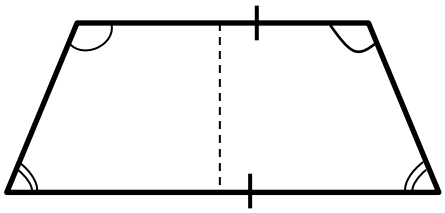
**KITE**

- 2 pairs of ADJACENT sides equal in length
- One pair of opposite angles are equal
- No parallel sides
- 1 line of symmetry



**TRAPEZIUM**

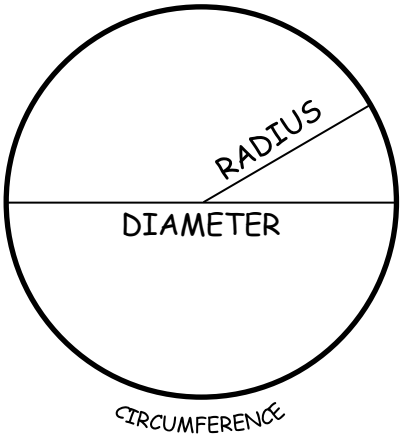
- No sides equal in length
- No equal angles
- One pair of parallel sides
- No lines of symmetry



**ISOSCELES TRAPEZIUM**

- One pair of sides equal in length
- Two pairs of adjacent angles equal
- One pair of parallel sides
- One line of symmetry

## CIRCLE

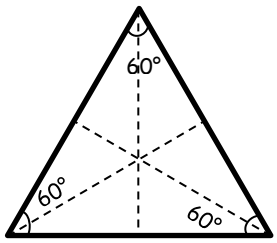



- The CIRCUMFERENCE is the outside edge of a circle
- A DIAMETER is a line which divides the circle into TWO SEMI-CIRCLES
- A RADIUS is a line from the centre to the circumference

* The RADIUS is always HALF the length of the DIAMETER

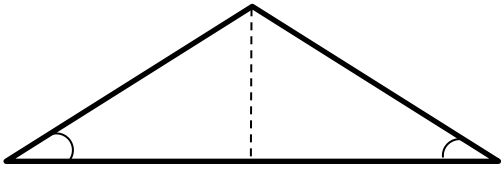
# TRIANGLES

**The TRIANGLE is a flat shape with three sides. The following are different types of triangle.**



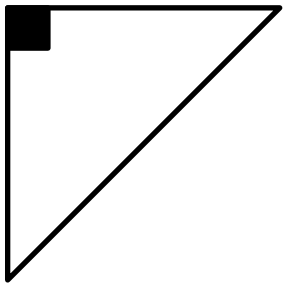

**EQUILATERAL**

- All three sides are equal
- All angles are 60°
- 3 lines of symmetry



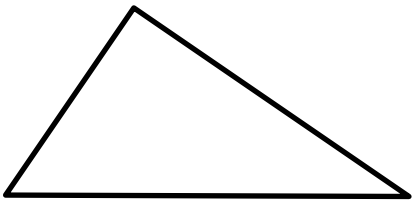
**ISOSCELES**

- Two sides equal in length
- Two equal angles
- One line of symmetry



**RIGHT-ANGLED**

- Contains one right angle



**SCALENE**

- All three sides are different lengths
- No equal angles
- No lines of symmetry

A **POLYGON** is a flat shape with three or more straight sides.

The following is a list of names of polygons and the number of straight sides they have.

**PENTAGON – 5 sides**
**HEXAGON – 6 sides**
**OCTAGON – 8 sides**

most common

**HEPTAGON – 7 sides**
**NONAGON – 9 sides**
**DECAGON – 10 sides**

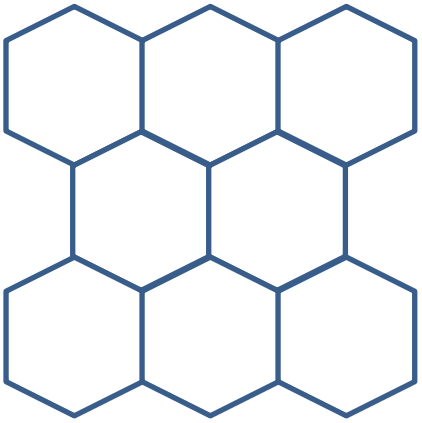
less common

A **REGULAR** shape has all its sides equal in length and all its angles are equal. A regular shape will have the same number of lines of symmetry as it does sides.

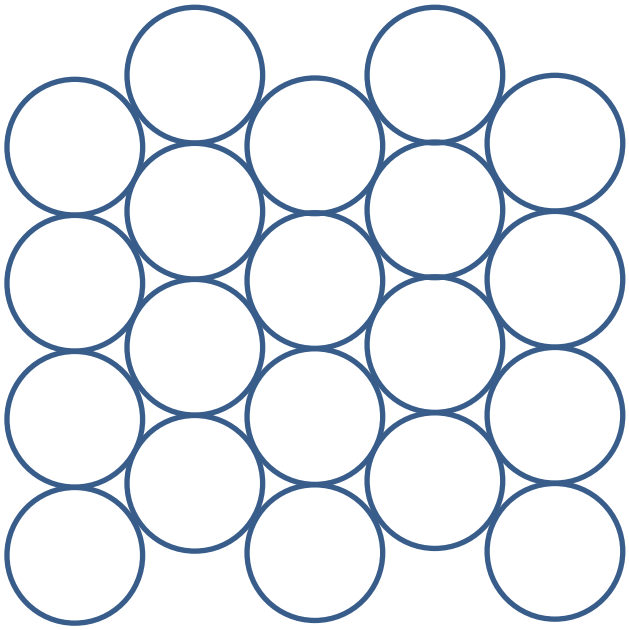
# TESSELLATION

Shapes TESSELLATE if they fit together without leaving any gaps.

- Squares, rectangles, equilateral triangles, regular hexagons will tessellate.
- Pentagons, circles and octagons do NOT tessellate.

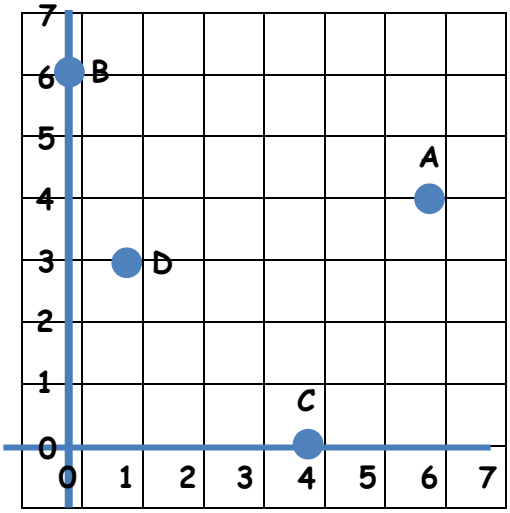


**REGULAR HEXAGONS tessellate**



**CIRCLES do not tessellate**

# CO-ORDINATES



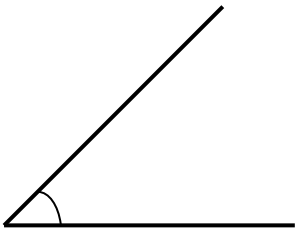

**THINGS TO REMEMBER**

1. Always read the horizontal axis first, then the vertical axis.
2. Co-ordinates should be written inside brackets and should be separated by a comma.

*Examples*

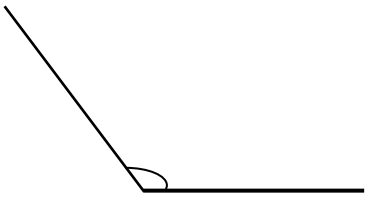
A is (6, 4)  C is (4, 0)
B is (0, 6)  D is (1, 3)

# ANGLES



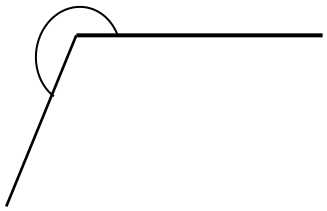
**ACUTE**
Angle
- Less than 90°

**RIGHT**
Angle
- Exactly 90°



**OBTUSE**
Angle
- Greater than 90° but less than 180°

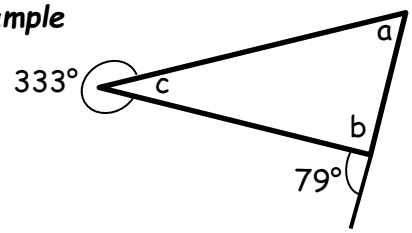
**STRAIGHT**
Angle
- Exactly 180°



**REFLEX**
Angle
- Greater than 180° but less than 360°

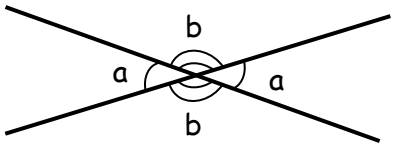
The three angles in a triangle add up to **180°**
The four angles in a quadrilateral add up to **360°**

***Example***




**Calculate angles a, b and c.**

| | | | |
|---|---|---|---|
| | ∠ b | = 180° - 79° = | 101° |
| | ∠ c | = 360° - 333°= | 27° |
| So | ∠ a | = 180° - (101° + 27°) = | 52° |

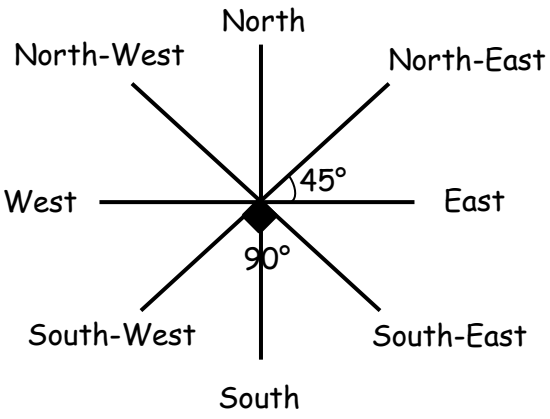


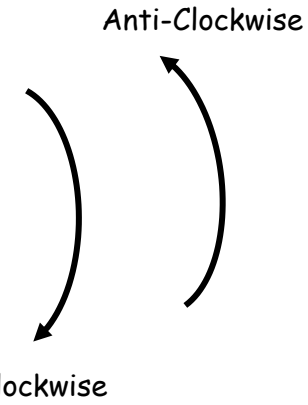

Where two lines INTERSECT, opposide angles are equal.

Also ∠ a + ∠ b = 180°

# DIRECTION

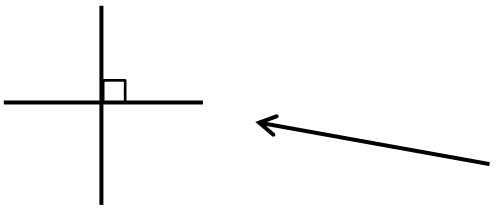
## 8 POINT COMPASS

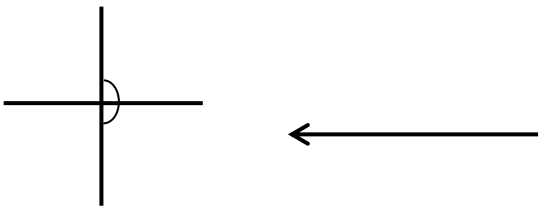


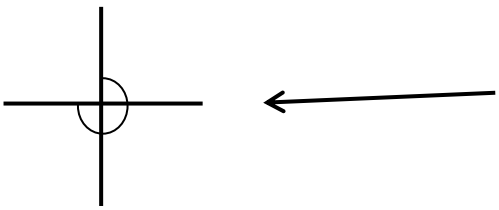




45° from one point on the compass to the next point.

# TURNING







$\frac{1}{8}$ turn = 45° = $\frac{1}{2}$ right angle

$\frac{1}{4}$ turn = 90° = 1 right angle

$\frac{3}{8}$ turn = 135° = $1\frac{1}{2}$ right angles

$\frac{1}{2}$ turn = 180° = 2 right angles

$\frac{5}{8}$ turn = 225° = $2\frac{1}{2}$ right angles

$\frac{3}{4}$ turn = 270° = 3 right angles

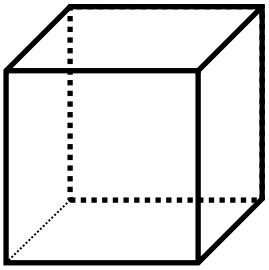
$\frac{7}{8}$ turn = 315° = $3\frac{1}{2}$ right angles

1 complete turn = 360° = 4 right angles

# SOLID SHAPES

Solid shapes are also called 3 – Dimensional or 3D shapes because they have 3 dimensions – length, width and height.

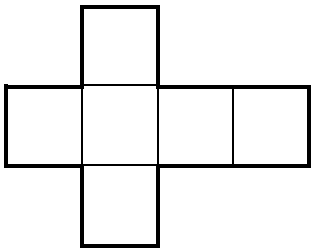
The following are 3D shapes and their properties.

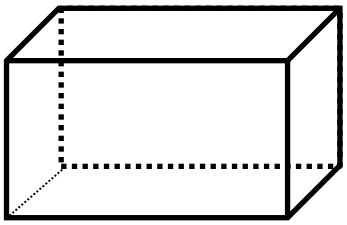


## CUBE

- 6 faces (all square)
- 8 vertices (or corners)
- 12 edges

NET →

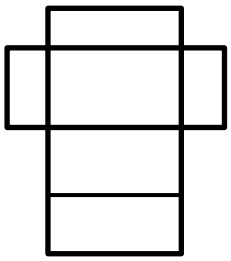


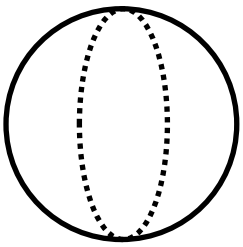


## CUBOID

- 6 faces (6 rectangles or 4 rectangles and 2 squares)
- 8 vertices (or corners)
- 12 edges

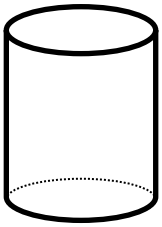
NET →





## SPHERE

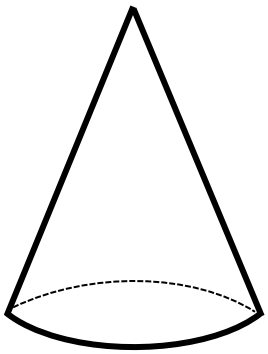
- A 'ball' shape
- One perfectly curved surface
- No vertices or straight edges
- Will roll



## CYLINDER

- 2 flat faces (circular)
- 1 curved surface
- 2 curved edges, no vertices
- Will roll

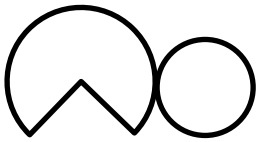
NET →

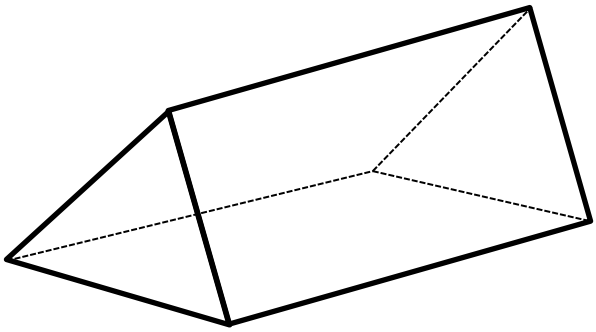


## CONE

- 1 flat circular face
- 1 curved surface
- 1 curved edge
- 1 vertex

NET →

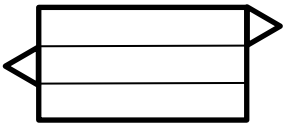


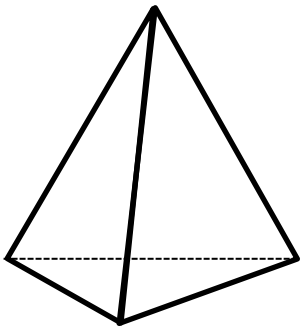


## TRIANGULAR PRISM

- 5 faces (3 rectangles and 2 triangles)
- 6 vertices
- 9 straight edges

NET →

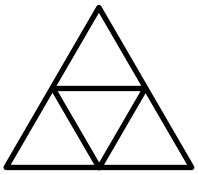


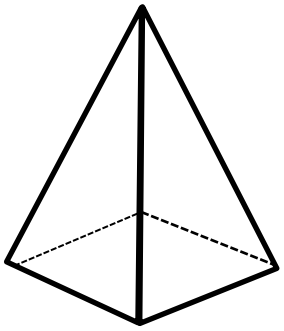


## TRIANGULAR BASED PYRAMID or TETRAHEDRON

- 4 faces (all triangles)
- 4 vertices
- 6 straight lines

NET →

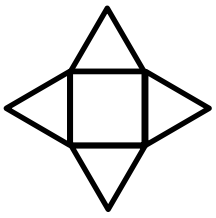




## SQUARE BADSED PYRAMID

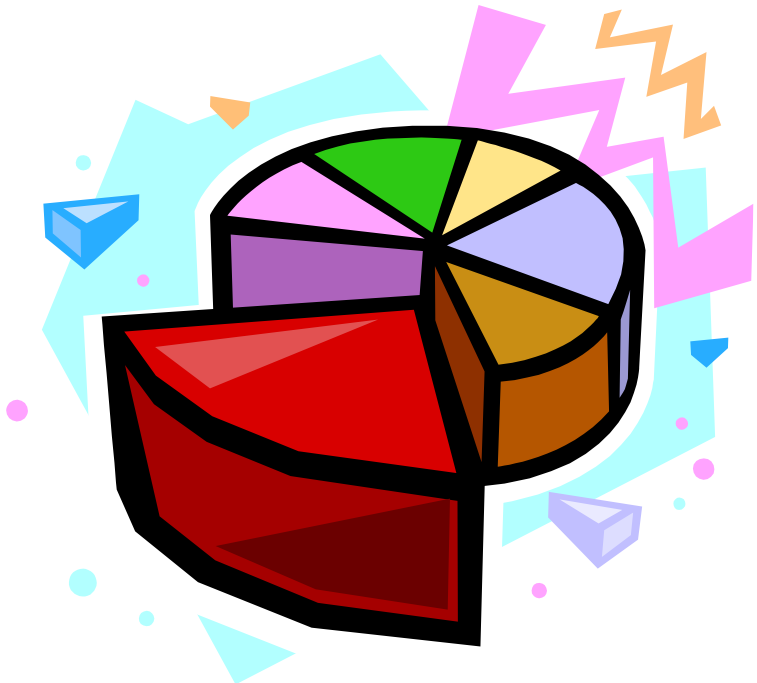
- 5 faces (4 triangles and 1 square)
- 5 vertices
- 8 straight edges

NET →



All these solid shapes (except the sphere) belong to either the prism or pyramid family.
A PRISM keeps its shape all along its length
A PYRAMID narrows to reach a point at the top.
Prism and pyramids get their names from the shape of their bases.

# Handling Data



# COLLECTING DATA

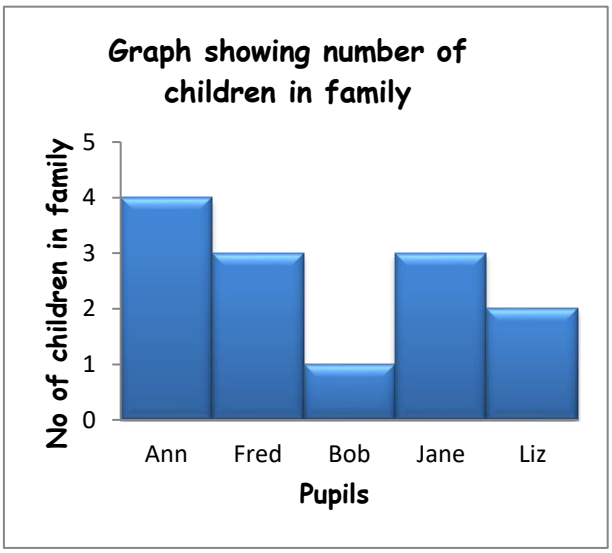
When collecting data or information **TALLY MARKS** are often used to record the data.

Tally marks are usually grouped in FIVES which make them easier to count.

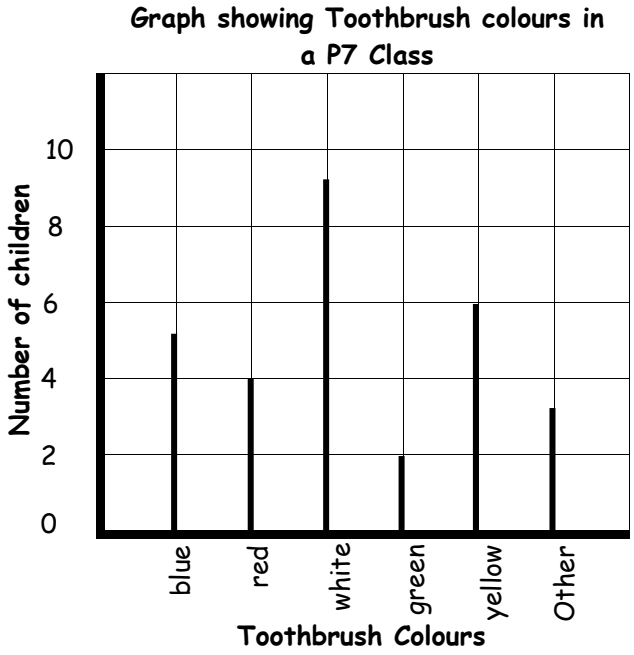
e.g. 𝍸 𝍸 𝍸 || (17) 𝍸 𝍸 𝍸 𝍸 |||| (24)

# PRESENTING DATA

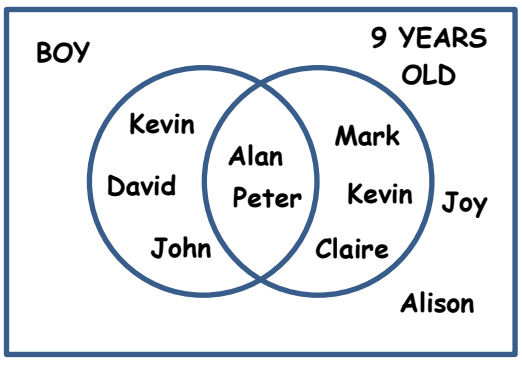
There are many ways to present data using **GRAPHS**, **CHARTS** or **DIAGRAMS**. The following is a variety of ways to present data.




**BAR GRAPH**



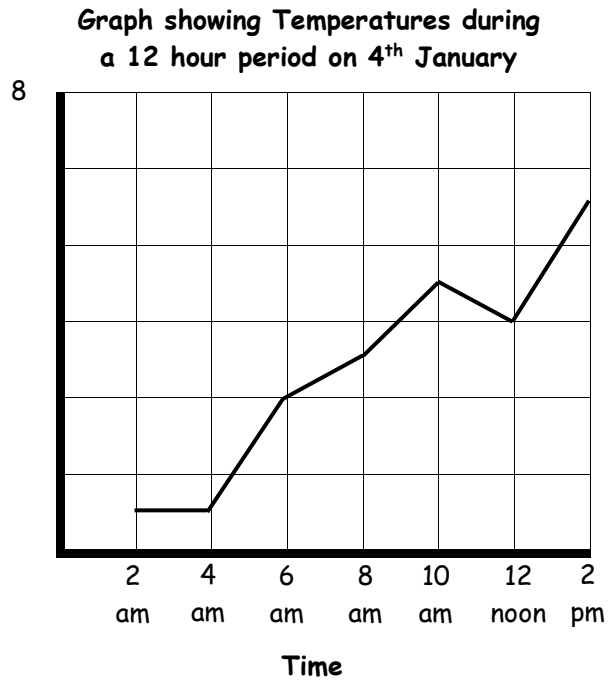

**BAR-LINE or SPIKE GRAPH**



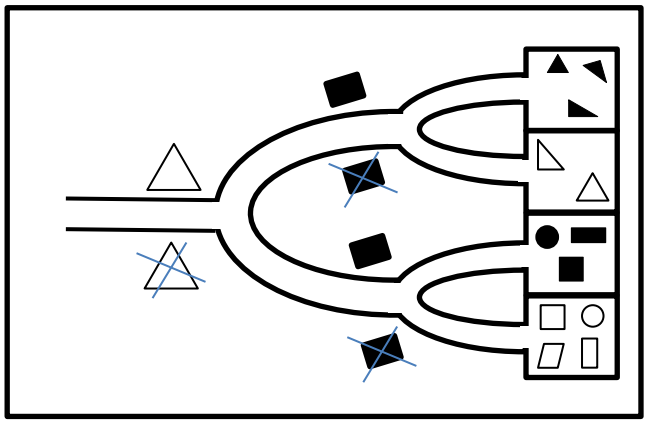

**VENN DIAGRAM**

| | Greater than 10 | Not greater than 10 |
|---|---|---|
| Even | 14, 16, 20 | 2, 10, 8 |
| Odd | 11, 19, 17 | 3, 9 |

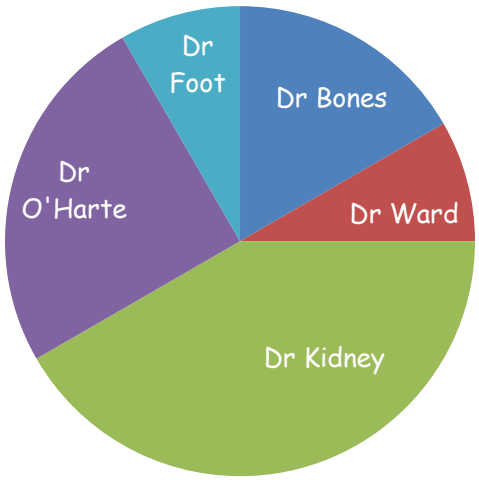
**CARROLL DIAGRAM**




**LINE GRAPH**



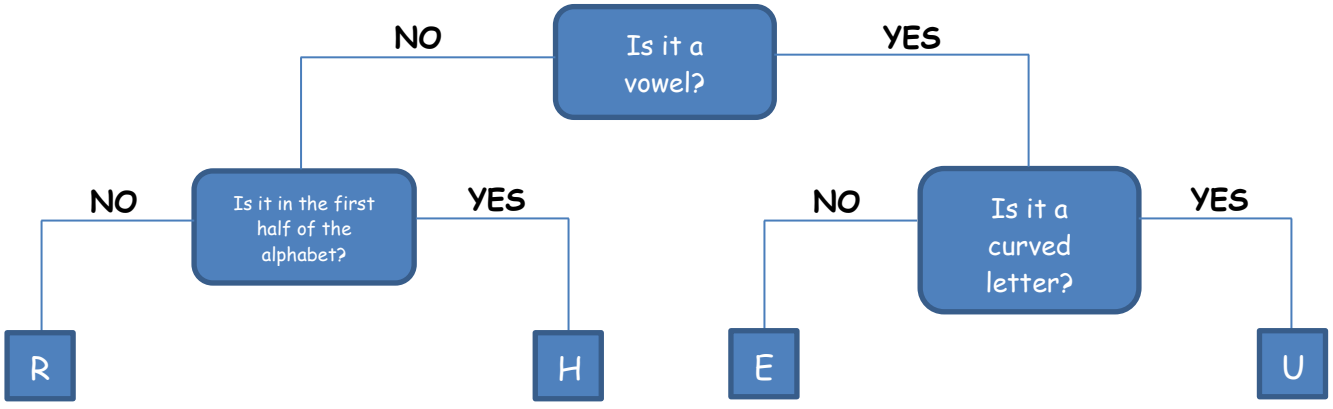
**TREE DIAGRAM**




**PIE CHART (with sample questions)**

On leaving a Health Centre, 36 patients were asked the name of their doctor. The pie chart shows the results.

1. What fraction of those surveyed were patients of Dr Bones?
2. How many were patients of Dr O'Harte?
3. To which doctor did 15 patients belong?
4. What percentage were patients of Dr Foot and Dr Bones together?
5. What fraction of the patients were not Dr Kidney's?
6. How many people were not patients of Dr Bones?




**DECISION TREE DIAGRAM**

To calculate the **MEAN** or **AVERAGE** of a set of numbers add them together and divide by how many numbers you have added together.

*Example:* Elaine's results in daily spelling tests of 20 words were as follows:

| | |
|---|---|
| **Monday** | **17** |
| **Tuesday** | **13** |
| **Wednesday** | **20** |
| **Thursday** | **18** |
| **Friday** | **17** |

***Mean*** $\quad \frac{17 + 13 + 20 + 18 + 17}{5} = \frac{85}{5} = 17$

The **RANGE** is the difference between the largest and smallest numbers in the set.

The range of Elaine's results is 20 – 13 = 7

## PROBABILITY

PROBABILITY is a judgement of how LIKELY or UNLIKELY an event is to happen.

Many words and phrases can be used to describe how likely it is for something to happen.

e.g. **CERTAIN, UNCERTAIN, IMPOSSIBLE, VERY UNLIKELY, POOR CHANCE, etc.**

- I will be younger next year ~ IMPOSSIBLE
- It will get dark tonight ~ CERTAIN
- I will meet the Queen next week ~ VERY UNLIKELY

If an event has the same chance of happening as not happening then we say the probability is an **EVEN CHANCE** or **FIFTY-FITFY CHANCE**.

*Examples:*

- Getting heads when you toss a coin.
- Throwing an even number on an ordinary dice.

N.B The probability of getting a six on an ordinary dice is **LESS THAN EVEN** while the probability of getting a number greater than two is **MORE THAN EVEN**.