

# Year 6

# MATHS REVISION NOTES

Name: \_\_\_\_\_

Make sure you ask if there is anything you are not sure about when you go through these notes.

## Useful websites

BBC Bitesize      <http://www.bbc.co.uk/bitesize/ks2/maths/>

Information, games and a quiz for all the different areas of maths.

Woodlands Junior School      <http://resources.woodlands-junior.kent.sch.uk/maths/index.html>

Maths Zone - Lots of links to games and activities for all areas of maths.

Reading Scales      [http://mathsframe.co.uk/en/resources/resource/124/reading\\_scales](http://mathsframe.co.uk/en/resources/resource/124/reading_scales)

Different levels for reading scales (temperature, capacity, weight)

Active Learn      Your own login is firstname6 and password: password. School code: sqa3

## Written calculation methods:

### Multiplication - The grid method (count columns separately)

	70	2	
40	2800	80	2880
	420	12	

$$\begin{array}{r}
 420 \quad 2960 \\
 +432 \\
 \hline
 3392
 \end{array}$$

$$\begin{array}{r}
 1 \\
 \hline
 6 \\
 + 80 \\
 2960 \\
 + 12 \\
 \hline
 432
 \end{array}$$

### Division - Chunking

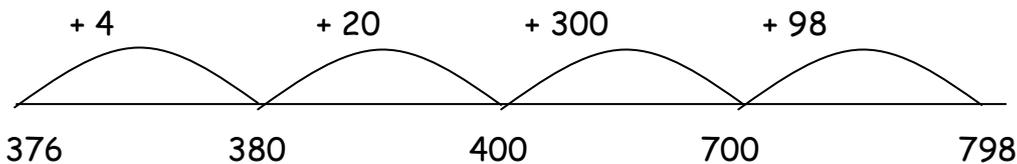
$$\begin{array}{r}
 127 \\
 \hline
 7 \overline{)81849}
 \end{array}$$

How many 7s in the 8 (800) there is 1 so write above in the 100s column. Remainder of 1 so write in front of the tens column. How many 7s in 18 (180) there are 2 with 4 remainder to . SO write 2 above to represent 20 and remainder of 4 with the 9 units. Finally, how many 7s in 49. There are 7 so write 7 above.

Or number line chunking - repeated subtraction of chunks of that number.

### Subtraction - number line

$$798 - 376 = 422$$



$$\begin{array}{r}
 11 \\
 300 \\
 98 \\
 20 \\
 + 4 \\
 \hline
 422
 \end{array}$$

Subtraction: Partitioning

$$135 - 96 =$$

0	120	
<del>100</del>	<del>30</del>	15
		6
	30	9

= 39

## Column addition

$$\begin{array}{r} 21 \\ 374 \\ \hline 456 \\ 1814 \\ \hline \end{array} \qquad \begin{array}{r} 3.6 \\ 984 \\ \hline 122 \\ 199.68 \\ \hline \end{array} \qquad \begin{array}{r} 74.08 \\ \hline \end{array}$$

When adding decimal numbers make sure the decimal points are lined up

## Key vocabulary



**difference** - to find the difference between 2 numbers, you need to take the smaller number away from the larger one. E.g. the difference between 10 and 4 is 6

**multiple** - The result of multiplying by a whole number.  
multiple of 4 and also of 5.

e.g.  $4 \times 5 = 20$  so 20 is a

These are some of the multiples of 3: 12, 15, 18, 21

**product** - The answer when something has been multiplied. e.g. the product of 3 and 4 is 12

**factor** - a number which divides into a number with no remainder  
the factors of 12 are 12, 1, 6, 2, 3, 4.

e.g.

**prime number** - a number which can only be divided by 1 or itself  
19 etc.

e.g. 2 3 5 7 11 13 17

Remember 1 is not a prime number (it only has one factor)

**square number** - a number which is a product of a number multiplied by itself  
e.g. 1 (1x1) 4 (2x2) 9 (3x3) 16 (4x4) 25 (5x5) etc.

**odd number** - a number which ends in 1, 3, 5, 7 or 9

**even number** - a number which ends in 2, 4, 6, 8 or 0

**inverse operation** If you have a sum with a missing gap, you can use the inverse operation to solve it.  
+ and - are the inverse of each other and  $\times$  and  $\div$  are the inverse of each other

To solve  $124 + \square = 200$

You could turn it to  $200 - 124 = 76$

## **Rounding numbers**

**Find your number.**

**Look right next door.**

**4 or less just ignore.**

**5 or more, add 1 more.**

Round to nearest whole number means there should be no decimal point

Round to nearest tenth/1dp means there should be 1 digit after decimal point

## **Money**

### **Useful tips for solving money problems:**

- Read the words of the problem carefully to decide whether to use addition, subtraction, multiplication or division.
- If some of the prices in the problem are in pence and some are in pounds, change some of them so they are either **all** in pounds or **all** in pence.
- Treat money problems just like normal number calculations, but remember to **put the decimal point and pound symbol in the right place.**
- Make sure your answer has 2 decimal places e.g. £3.50 not £3.5 Also leave off **p** if use **£**

### **TIMES TABLES**

Make sure you know your tables.

Multiplication and division facts!

What are the diagonal shaded numbers?

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

Use your tables with your understanding of place value to calculate e.g.

$30 \times 4$

$0.6 \times 8$

$5 \times 7000$

$800 \times 20$

### Divisibility Rules

- 2 Is it even?
- 3 Is its digit total a multiple of 3?
- 4 Is half of it even?
- 5 Is its unit digit 0 or 5?
- 6 Is it even and its digit total a multiple of 3?
- 8 Is it even? Half it, half it again. Is it still even?
- 9 Is its digit total a multiple of 9?
- 10 Is its units digit 0?
- 25 Are its last two digits 00, 25, 50 or 75?
- 100 Are its last two digits 00?

### Percentages

% means out of 100 so 20% is the same as 20/100.

Learn these:

$$50\% = \frac{1}{2} = 0.5$$

$$25\% = \frac{1}{4} = 0.25$$

$$75\% = \frac{3}{4} = 0.75$$

$$10\% = \frac{1}{10} = 0.1$$

$$1\% = \frac{1}{100} = 0.01$$

$$40\% = \frac{4}{10} = 0.4$$



To work out the percentage of this shape that is shaded, you must first work out what each part represents.

There are 20 equal parts, and 6 are shaded.  
As a fraction this is  $\frac{6}{20}$ .

Turn it into a percentage by multiplying by 5 because  $5 \times 20 = 100$ . (Each part is worth 5%)

6 of the parts are shaded, so 30% of the total shape is shaded.

$$6 \times 5\% = \mathbf{30\%}$$

### Converting between percentages and decimals

To change a percentage to a decimal, **divide by 100**.

Change 48% to a decimal:  $48 \div 100 = 0.48$

To change a decimal to a percentage, **multiply by 100**. Change

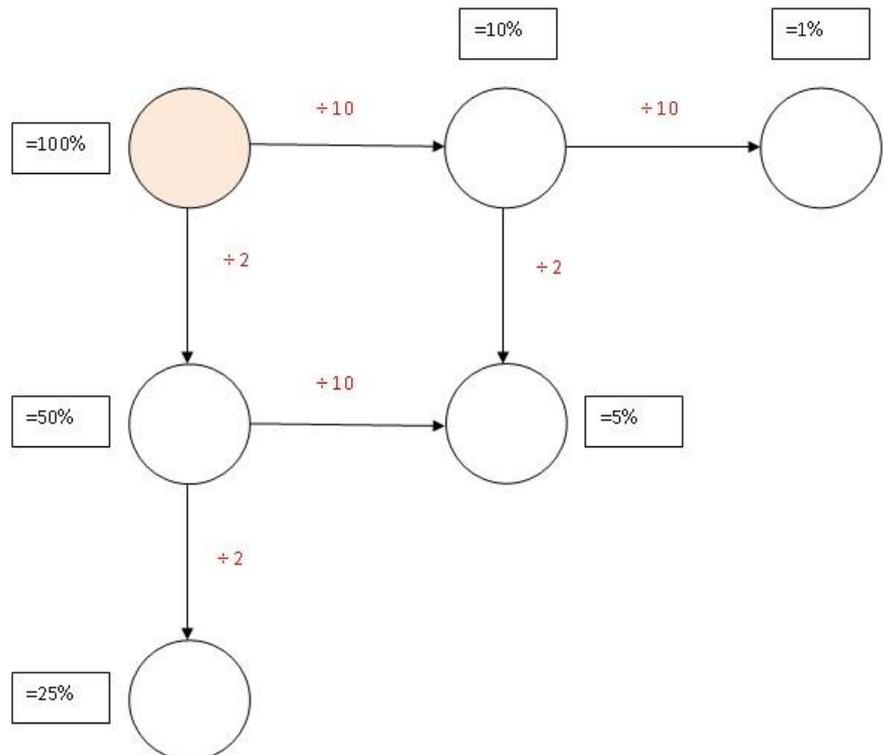
0.67 to a percentage:  $0.67 \times 100 = 67\%$

### Percentages of amounts To find a percentage of any number:

Fill in the value of each circle, beginning with the main number in the shaded area.

Work your way through all 6 circles by following the actions on each arrow.

Try 400 in the shaded circle.



## Fractions

A fraction is a part of a whole, for example  $\frac{1}{2}$ . while mixed fractions contain whole numbers and fractions.

In order to compare fractions, you need to change them so they have the same denominator. Fractions can be converted into decimals.

### Fractions of amounts - "Divide by the bottom and times by the top."

- Divide the quantity by the denominator
- Multiply the answer you get by the numerator

To find  $\frac{2}{5}$  of £15, for example:

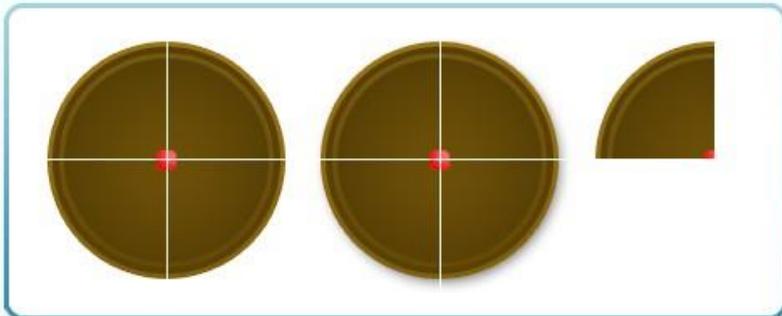
- Divide 15 by 5 (the denominator):  $15 \div 5 = 3$
- Multiply the answer 3 by 2 (the numerator):  $3 \times 2 = 6$  □ So  $\frac{2}{5}$  of £15 is **£6**

### Equivalent fractions - "Whatever you do to the bottom you do to the top."

Are fractions that look different but show the same amount. e.g.  $\frac{1}{2}$  and  $\frac{2}{4}$

### Improper and mixed fractions

An improper fraction has a numerator that is **bigger** than its denominator, for example  $\frac{10}{7}$   $\frac{9}{4}$  is an **improper** fraction. It means nine quarters. If you think of this as cakes, nine quarters are more than two whole cakes. It is  $2\frac{1}{4}$  cakes.



$2\frac{1}{4}$  is a **mixed fraction** because it has a whole number and a fraction together.

### Adding and subtracting fractions

Make sure the denominator (bottom number) is the same so that they can be compared.

$$\frac{3}{8} - \frac{1}{4} = \frac{1}{4} = \frac{2}{8} \quad \text{so } \frac{3}{8} - \frac{2}{8} = \frac{1}{8}$$

### Multiplying two fractions

When you have 2 fractions, you do not need to change the denominator. Multiply the top numbers and multiply the bottom numbers.

$$\frac{3}{4} \times \frac{2}{6} = \frac{6}{24} \text{ (simplified} = \frac{1}{4})$$

$$\frac{2}{4} \times \frac{3}{5} = \frac{6}{20} \text{ (simplified} = \frac{3}{10})$$

## Multiply fraction by whole number

$$\frac{2}{3} \times 6 =$$



So I have  $12/3$ .

$12/3$  means 12 divided by 3 so how many 3s in 12. = 4

## Dividing fraction by whole number

$$\frac{1}{3} \div 12 = \frac{1}{36}$$



Split each third ( $1/3$ ) into 12 pieces:



Each person out of that 12 want a piece each.

There are now 36 pieces altogether so they get  $1/36$  each

The quick method is multiply the denominator by the whole number and the numerator stays the same:

$$3 \times 12 = 36 \text{ so } \frac{1}{36}$$

$$\frac{1}{4} \div 5 = \frac{1}{20}$$

$$\frac{2}{5} \div 7 = \frac{2}{35}$$

$$\frac{3}{8} \div 4 = \frac{3}{32}$$

## Decimals

A decimal is a way of writing a number that is not whole. Decimal numbers are 'in-between' numbers. For example, 5.25 is **in between** the numbers 5 and 6. It is **more** than 5, but **less** than 6.

## Reading decimal numbers

Take care when reading the values of decimal numbers.

The numbers 4.2 and 4.20 have the **same value**:

- 4.2 means 4 and 2 tenths.
- 4.20 means 4 and 2 tenths and 0 one-hundredths. The last zero does not need to be there.

The numbers 4.2 and 4.02 **do not have the same value**:

- 4.2 means 4 and 2 tenths.
- 4.02 means 4 and 0 tenths and 2 one-hundredths.

To find out exactly what a decimal number represents, use place value headings, that is tenths, hundredths etc.

Units	Tenths	Hundredths	Thousandths
0	• 4	5	9
0	• 4	9	5

The numbers to the **left** of the decimal point are whole numbers.

The numbers to the **right** of the decimal point are **parts** of whole numbers.

## Ordering decimals

Ordering decimals means putting them in order from smallest to largest or from largest to smallest. Write down the numbers in a column and **make sure the decimal points line up**. Compare the digits in each column, starting on the left. Write down place value headings if it helps you.

Compare 0.459 and 0.495 to see which is bigger:

Units	Tenths	Hundredths	Thousandths
0	• 4	5	9
0	• 4	9	5

- Both numbers have 0 units. So look in the tenths column.

- Both numbers have 4 tenths. So look in the hundredths column.

- 0.495 has 9 in the hundredths column whereas 0.459 only has 5 in the hundredths column. (There is no need in this example to compare the thousandths column.) □ **So 0.495 is bigger than 0.459.**

Remember the Decimal Point **DOESN'T** move

To multiply by 10 the numbers move one place to the left: Don't forget the place holders ←

To divide by 10 the numbers move one place to the right →

When multiplying/dividing by 100 move 2 places and 3 places for 1000.

## Rounding Decimals

Find your number.

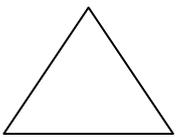
Look right next door.

4 or less just ignore.

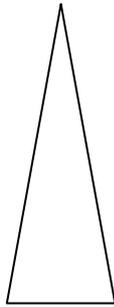
5 or more, add 1 more.

**SHAPE** - Make sure you know the names of these shapes and their properties

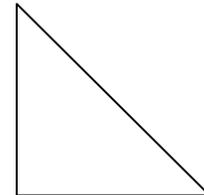
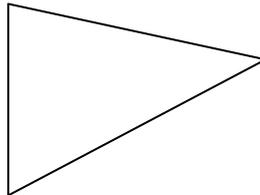
### Triangles



**right**



**angle triangle**



**scalene**

**equilateral**

3 equal sides

-3 equal angles  
triangle

**isosceles**

-2 equal sides

-2 angles equal

-3 different length sides

-3 different angles

-may be right angle scalene

-has one right angle

-may be an isosceles

Angles in a triangle add up to 180 degrees.

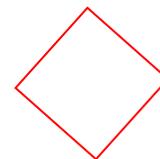
180		
72	48	?

Use the bar model to help you find missing angles:

### **REMEMBER**

**Shapes may be drawn in different ways - 'upside down' etc.**

**Beware of tilted squares! They are still squares... NOT diamonds.**



### Quadrilaterals and their properties

**Quadrilateral** Has 4 sides

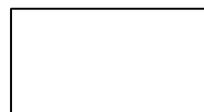
Angles in a quadrilateral add up

360 degrees

**Rectangle** Opposite sides are equal length

Opposite sides are parallel

4 right angles



to

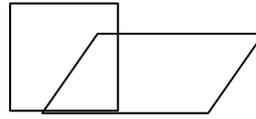
**Square** All 4 sides are equal length

Opposite sides are parallel

4 right angles

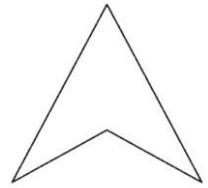
NB a square is also a rectangle

**Parallelogram** Opposite sides are equal length  
Opposite sides are parallel



**Arrowhead**

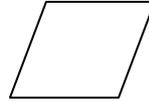
No right angles Has a reflex angle



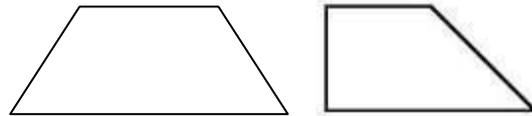
Opposite angles are equal

Adjaent sides may be equal

**Rhombus** All 4 sides are equal length  
Opposite sides are parallel  
No right angles  
Opposite angles are equal  
NB a rhombus is also a parallelogram



**Trapezium** Has one pair of parallel sides  
May be a right angle trapezium

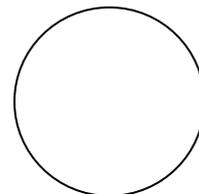
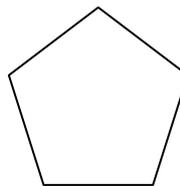
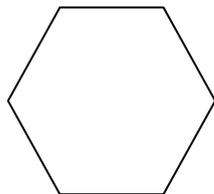
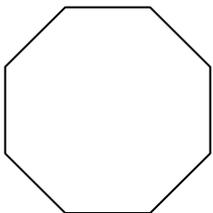


**Kite** Adjacent sides are equal in length  
Diagonals are perpendicular



### Other 2D shapes

**Regular shapes** - have all sides and angles the same. The 2D shapes below are regular.



octagon (any shape with 8 sides)

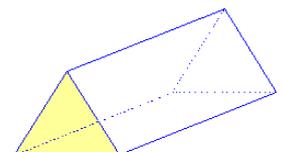
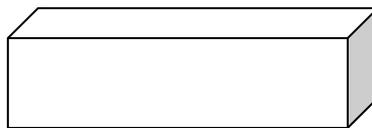
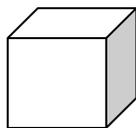
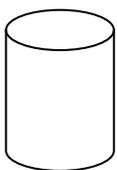
hexagon (any shape with 6 sides)

heptagon (any shape with 7 sides)

pentagon (any shape with 5 sides)

circle (has 1 side)

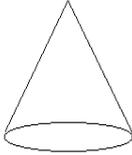
### 3D shapes



cube                      cuboid                      sphere                      triangular

prism cylinder

pyramids (e.g. triangular pyramid, hexagonal pyramid)

cone 

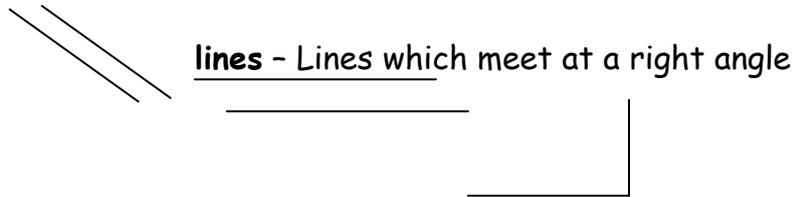
**Face** - a surface of a shape e.g. a cube has 6 faces

**Edge** - two faces meet at an edge e.g. a cuboid has 12 edges

**Vertex** - two or more edges meet at a vertex or corner e.g. a triangular prism has 6 vertices

**Parallel lines** - Lines which stay the same distance apart and do not meet or cross

**Perpendicular**



**Diagonal** - a straight line joining any two vertices or corners in a 2D or 3D shape

**Angles**

A right angle = 90 degrees

A straight line angle = 180 degrees (NB 2 right angles)

The 3 angles in a triangle add up to 180 degrees

The 4 angles in a quadrilateral add up to 360 degrees

Angles at a point add up to 360°

Acute angle - an angle which is less than 90°

Right angle - an angle which is 90°

Obtuse angle - angles greater than 90° but less than 180°

Reflex angles - angles greater than 180°

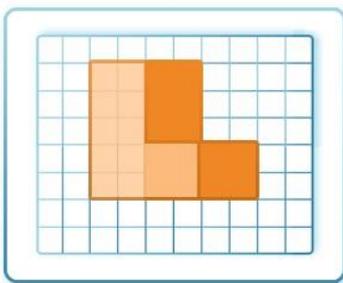
## Moving Shapes

### Translation

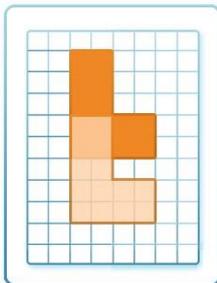
Translation is when a shape **slides from one place to another**, without turning.

Here are some example translations:

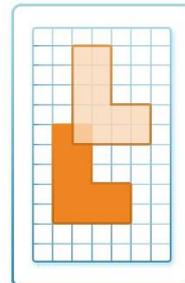
2 squares to the left



3 squares down



1 square to the right and four squares up

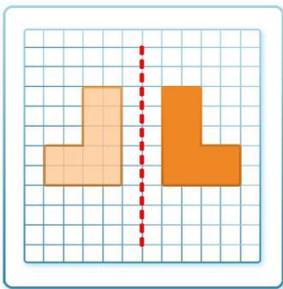


## Reflection

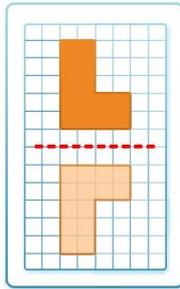
When a shape is reflected in a mirror line (the line of symmetry) , the reflection is the same distance from the mirror line as the original shape.

Here are some mirror lines:

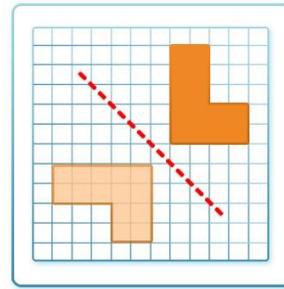
Vertical mirror line



Horizontal mirror line



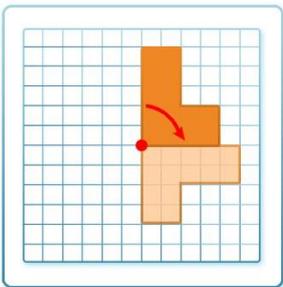
Diagonal mirror line



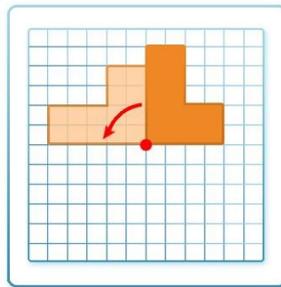
## Rotation

A shape can be rotated (turned) clockwise or anticlockwise about a **point**, called the centre of rotation. The distance from any point on the shape to the centre of rotation never changes.

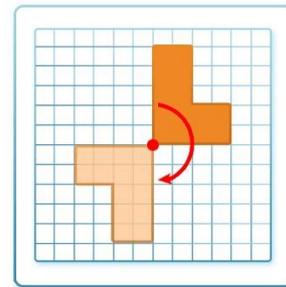
1. 90° clockwise



2. 90° anti-clockwise



3 180°



## MEASURES

**Money** - £1 = 100p

Amounts of money in pounds must have 2 decimal places e.g. £2.07 £145.99

Coins: 1p 2p 5p 10p 20p 50p £1 £2 Notes: £5 £10 £20 £50

**Time** -

1 hour = 60 minutes

1 minute = 60 seconds

1 week = 7 days

1 day = 24 hours

1 year = 12 months

1 year = 52 weeks

1 year = 365 days

1 leap year = 366 days

1 decade = 10 years

1 century = 100 years

**Weight** 1 kilogram (kg) = 1000 grams (g)

**Capacity** 1 litre (l) = 1000 millilitres (ml)

**Length** 1 kilometre (km) = 1000 metres (m)  
1 metre (m) = 100 centimetres (cm)  
1 centimetre (cm) = 10 millimetres (mm)

**Perimeter** The distance around the edge of a shape. Measured in units of length e.g. m, cm

**Area** The space covered by a shape. Measured in square units e.g.  $\text{cm}^2$   $\text{m}^2$

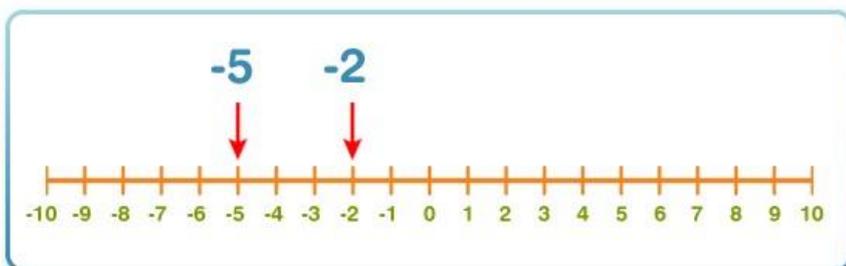
Area of a rectangle = length  $\times$  width

Area of a right angled triangle =  $\frac{\text{length} \times \text{width}}{2}$

Reading Scales:

- Find the first number on the scale after 0
- Count the number of steps (intervals) between 0 and the first number
- Divide the first number by the number of steps to find the value of each interval

To calculate negative numbers draw a number line! Then it is easier to work out the difference between them.



## DATA HANDLING

### Average (Mean and Range)

#### Mean

The mean is when all the numbers are added then divided by how many numbers there were eg:

The mean of 12, 17, and 15 is  $12+17+15=36$

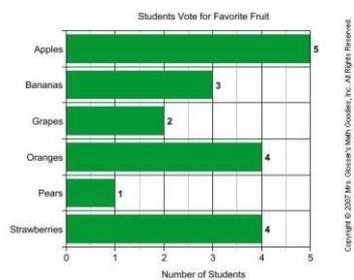
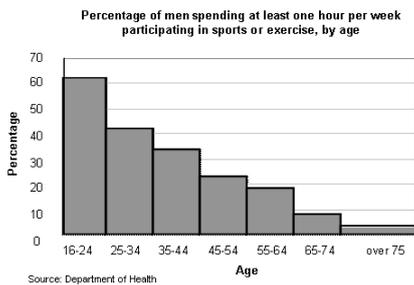
Mean = 36 divided by 3 = 12

## Range

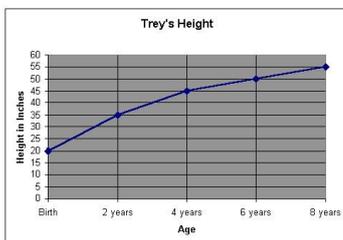
The range is the difference between the highest and the lowest value of the thing being measured. e.g. if the most number of times a week a child reads to a parent is 7, and the least is 1, the range is between 7 and 1. There is a range of 6 numbers.

## Graphs, Charts and Tables

Bar graphs - Work out the intervals on the scale. May have grouped data.



Line graphs - Work out the intervals on the scale.  
- May need to calculate the values between points.



Pictograms - Check the value of each symbol

Favorite Pets	
Cat	🐾 🐾 🐾 🐾 🐾
Dog	🐾 🐾
Hamster	🐾 🐾 🐾

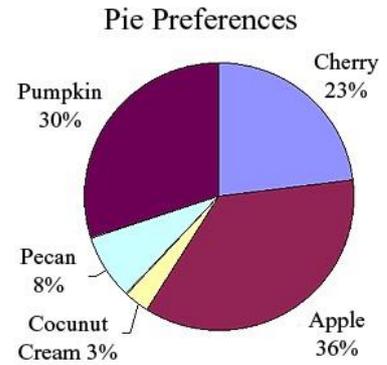
Each 🐾 stands for 2 votes.

Tally chart

Favorite Pets		
Pet	Tally Marks	Number
🐱		10
🐶		4
🐹		6

## Pie charts

- check the total number represented by the pie chart
- give amounts as fractions or percentages
- you can use tracing paper to help compare sections



## Tips for SATs graph questions:

- Read the question carefully
- Underline any key words (e.g. How many, total, difference between, how many fewer...)
  - Work out what numbers need to go on the scale (Count up from 0 to the first number. Divide by the number of intervals.)
- Write on the graph (totals, the number in columns etc)
- Draw STRAIGHT lines to the scales to help you read values between numbers. (Use a ruler!!)

## Carroll diagrams

Criteria	Even numbers	Not even numbers
Multiples of 3	6 12 18	15 21 39
Not multiples of 3	8 20 40	5 29 35

**Venn diagrams** - remember numbers that don't fit any category may also be outside the diagram

