



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
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
6	420	12

$$\begin{array}{r} 1 \\ 2880 \\ + 80 \\ \hline 2960 \end{array}$$

$$\begin{array}{r} 420 \\ + 12 \\ \hline 432 \end{array}$$

$$\begin{array}{r} 1 \\ 2960 \\ + 432 \\ \hline 3392 \end{array}$$

Division - Chunking

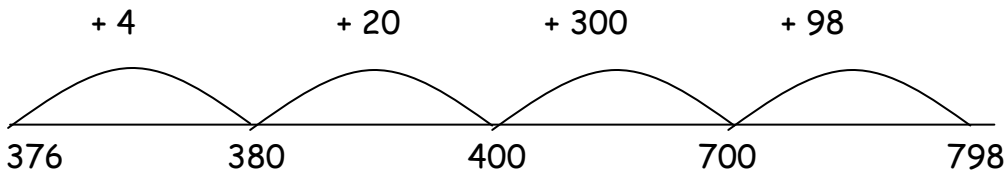
$$\begin{array}{r} 127 \\ 7 \overline{)8189} \end{array}$$

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	
100	30	15
30	90	6
	30	9

= 39

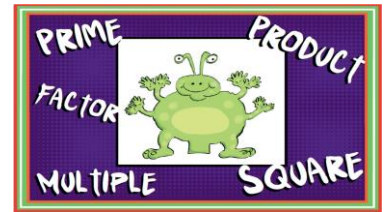
Column addition

$$\begin{array}{r} 21 \\ 374 \\ 984 \\ 456 \\ \hline 1814 \end{array}$$

$$\begin{array}{r} 3.6 \\ 74.08 \\ 122 \\ \hline 199.68 \end{array}$$

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.
e.g. $4 \times 5 = 20$ so 20 is a multiple of 4 and also of 5.
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
e.g. the factors of 12 are 12, 1, 6, 2, 3, 4.
- prime number -** a number which can only be divided by 1 or itself
e.g. 2 3 5 7 11 13 17 19 etc.
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?

×	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

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

30×4

0.6×8

5×7000

800×20

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:

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

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

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

$$10\% = 1/10 = 0.1$$

$$1\% = 1/100 = 0.01$$

$$40\% = 4/10 = 0.4$$



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 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: $0.67 \times 100 = 67\%$

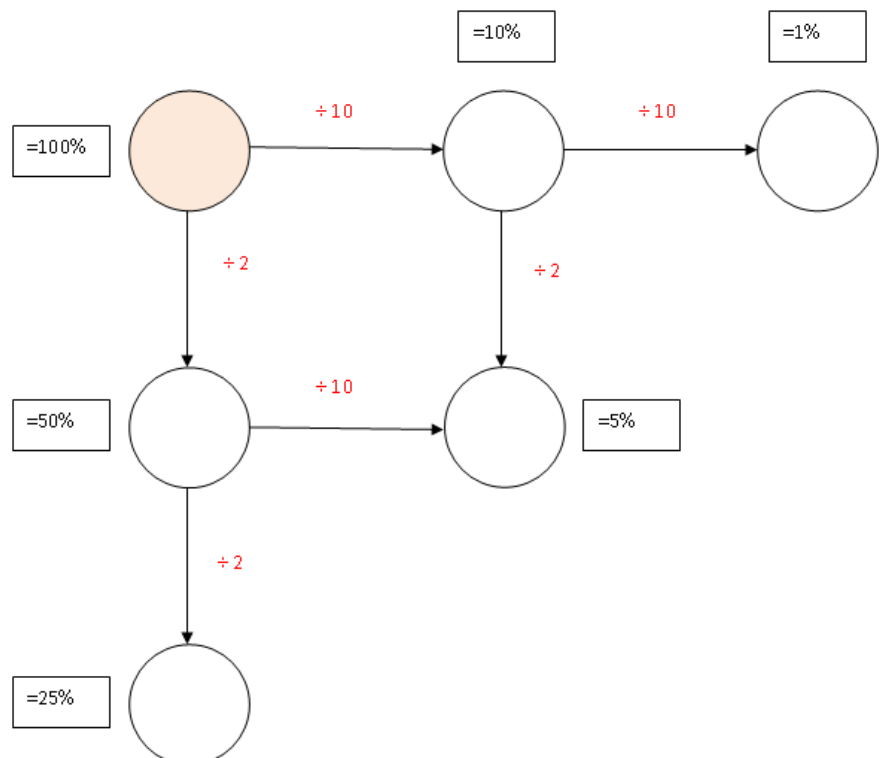
Percentages of amounts

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:

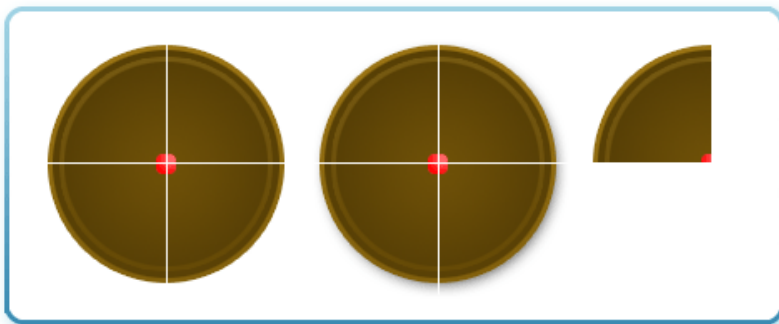
- Divide 15 by 5 (the denominator): $15 \div 5 = 3$
- Multiply the answer 3 by 2 (the numerator): $3 \times 2 = 6$
- So $\frac{2}{5}$ of £15 is **£6**

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.

$$\frac{3}{4} \times \frac{2}{6} = \frac{6}{24} \quad (\text{simplified} = \frac{1}{4}) \qquad \frac{2}{4} \times \frac{3}{5} = \frac{6}{20} \quad (\text{simplified} = \frac{3}{10})$$

Multiply fraction by whole number

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

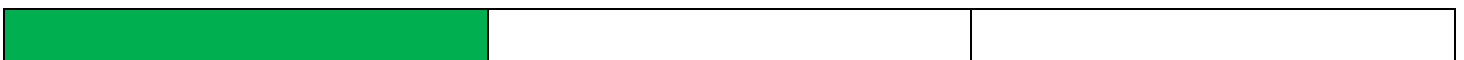


So I have 12/3.

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.

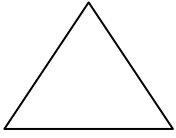
Look right next door.

4 or less just ignore.

5 or more, add 1 more.

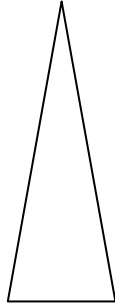
SHAPE - Make sure you know the names of these shapes and their properties

Triangles



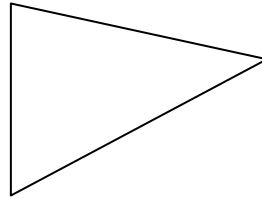
equilateral

- 3 equal sides
- 3 equal angles



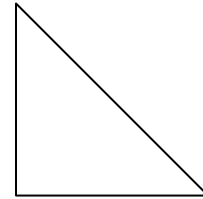
isosceles

- 2 equal sides
- 2 angles equal



scalene

- 3 different length sides
- 3 different angles
- may be right angle scalene



right angle triangle

- has one right angle
- may be an isosceles triangle

Angles in a triangle add up to 180 degrees.

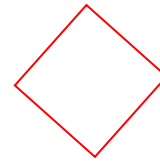
Use the bar model to help you find missing angles:

180		
72	48	?

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 to 360 degrees

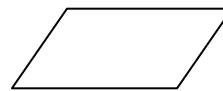
Rectangle Opposite sides are equal length
Opposite sides are parallel
4 right angles



Square All 4 sides are equal length
Opposite sides are parallel
4 right angles
NB a square is also a rectangle

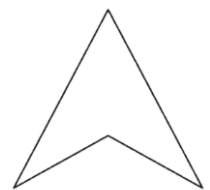


Parallelogram Opposite sides are equal length
Opposite sides are parallel
No right angles
Opposite angles are equal

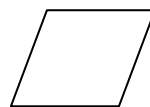


Arrowhead

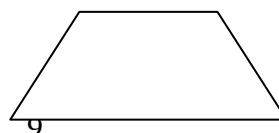
Has a reflex angle
Adjacent sides may be equal



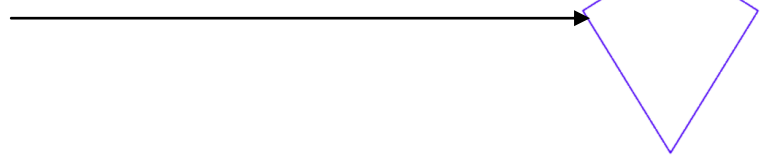
Rhombus All 4 sides are equal length
Opposite sides are parallel
No right angles
Opposite angles are equal
NB a rhombus is also a parallelogram



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

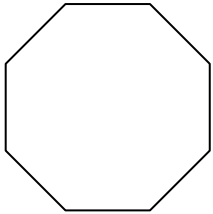


Kite Adjacent sides are equal in length
Diagonals are perpendicular

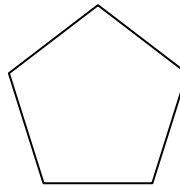
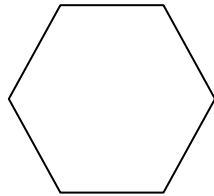


Other 2D shapes

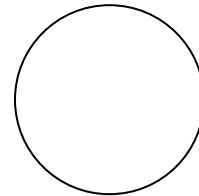
Regular shapes - have all sides and angles the same. The 2D shapes below are regular.



octagon (any shape with 8 sides)
hexagon (any shape with 6 sides)

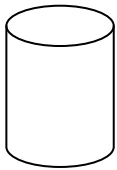


heptagon (any shape with 7 sides)
pentagon (any shape with 5 sides)

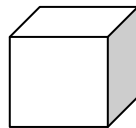


circle (has 1 side)

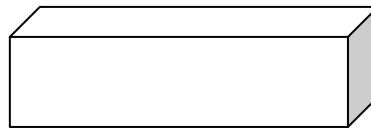
3D shapes



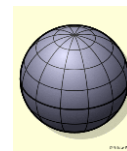
cylinder



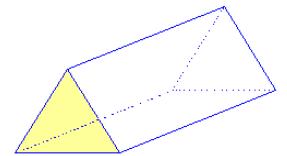
cube



cuboid



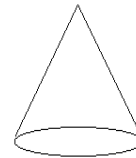
sphere



triangular prism

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

cone

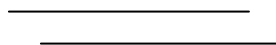
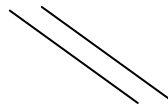


Face - a surface of a shape e.g. a cube has 6 faces

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 lines - Lines which meet at a right angle



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°

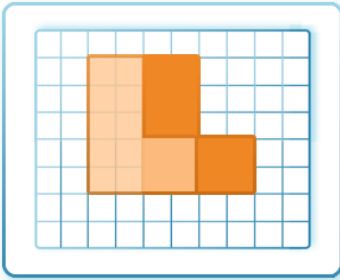
Moving Shapes

Translation

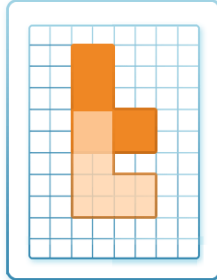
Translation is when a shape **slides from one place to another**, without turning.

Here are some example translations:

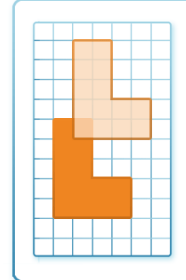
2 squares to the left



3 squares down



1 square to the right and four squares up

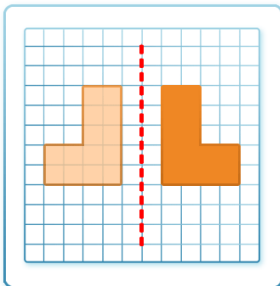


Reflection

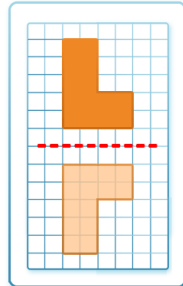
When a shape is reflected in a mirror line (the line of symmetry), the reflection is the same distance from the mirror line as the original shape.

Here are some mirror lines:

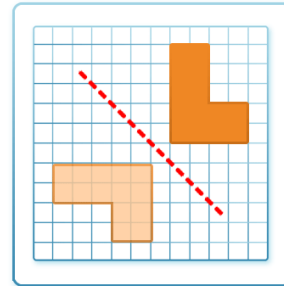
Vertical mirror line



Horizontal mirror line



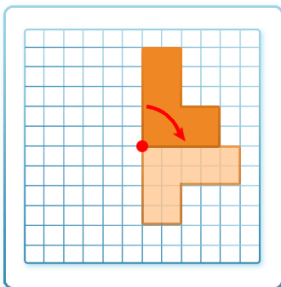
Diagonal mirror line



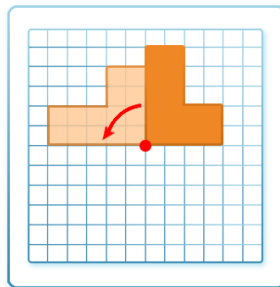
Rotation

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.

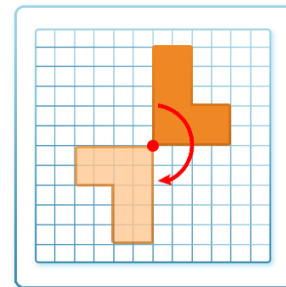
1. 90° clockwise



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. cm^2 m^2

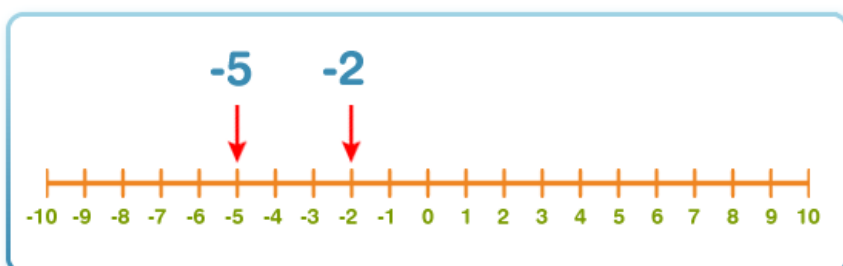
Area of a rectangle = length x width

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 $12+17+15=36$

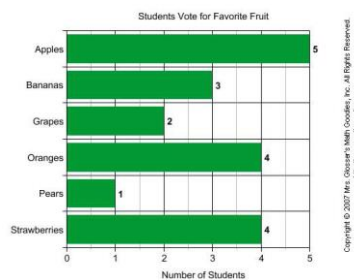
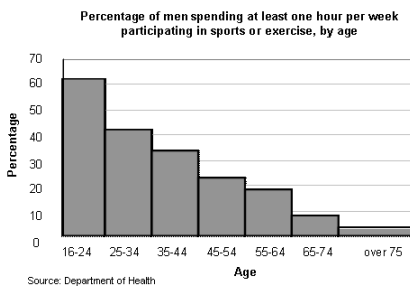
Mean = 36 divided by 3 = 12

Range

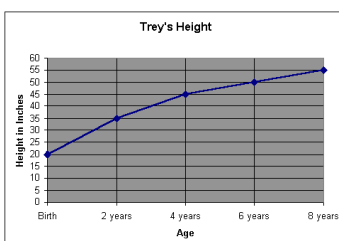
The range is the difference between the highest and the lowest value of the thing being measured. e.g. if the most number of times a week a child reads to a parent is 7, and the least is 1, the range is between 7 and 1. There is a range of 6 numbers.

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	🐾 🐾 🐾

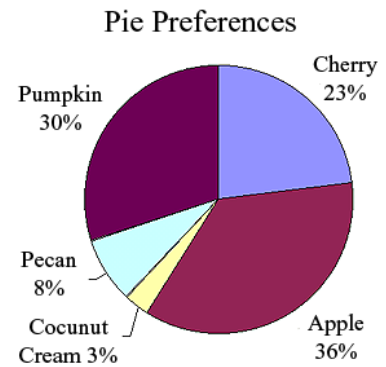
Each 🐾 stands for 2 votes.

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

