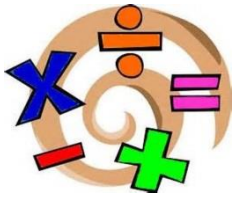
COLÁISTE BRÍDE

1st year

Maths Notes

2023

1st Year Maths Revision
NATURAL NUMBERS : Chapter 1



Natural numbers are counting numbers 1,2,3,4,.....
The capital letter **N** is used to represent natural numbers.

Even natural numbers can be divided by 2 with NO remainder.

2,4,6,8,10

Odd natural numbers are:

1,3,5,7,9,11

Consecutive numbers are numbers that follow on in order or sequence.

Place value

37,924 3--- ten thousands
7---thousands
9 --- hundreds
2 --- tens
4 --- units

FACTORS:

Factors are pairs of numbers that multiply to give you the number.
They divide into a number with NO remainder.
Factors of 36:

1,2,3,4,6,9,12,18,36

HCF : highest common factor
Factors of 18: 1 , 2, 3, 6, 9, 18 HCF = 6
Factors of 24: 1, 2, 3, 4, 6, 8, 12, 24
The HCF common to both 18 and 24 is 6

PRIME NUMBERS:

Prime numbers are numbers that only have 2 factors, itself and one.
Note: 1 is not a prime number

2 , 3, 5, 7, 11, 13, 17 etc

MULTIPLES:

Counting up (adding on) in a given number

Multiples of 3: 3, 6, 9, 12, 18

Multiples of 5: 5, 10, 15, 20, 25

LCM: lowest common multiple

The smallest multiple common to both numbers

4, 8, 12, 16, 24

6, 12, 18, 24, 30 LCM = 12

SQUARES/SQUARE ROOTS

4^2 means 4 x 4 use x^2 button on calculator.

4^3 means 4 x 4 x 4 use x ▢button on calculator.

Be familiar with the following numbers:

$2^2 = 4$	$8^2 = 64$
$3^2 = 9$	$9^2 = 81$
$4^2 = 16$	$10^2 = 100$
$5^2 = 25$	$11^2 = 121$
$6^2 = 36$	$12^2 = 144$
$7^2 = 49$	$13^2 = 169$

Perfect squares

When square root gives you a WHOLE number as the answer

$\sqrt{16}$ means what number multiplied by itself gives 16

$\sqrt{16} = 4$

Use $\sqrt{\ }$ button on the calculator.

4, 9, 16, 25, are all square numbers as the square root of these numbers is a whole number

Order of operations

B I R D M A S

B--- Brackets
I--- indices/power
R----- roots
M ---multiplication } order not important can ÷ or ×
D--- division }
A--- addition } order not important + or -
S--- subtraction }
Sometimes see BEMDAS where the E stands for exponent

ROUNDING:
If number ends in 5 or more round UP
If number is less than 5 round DOWN

Significant figures:
74,568 → above 5 round up
4 significant figures 74, 570

74,568
↓
Above 5 round up to 600
3significant figures 74,600

74,568
↓
5 so round up to the next thousand
2 significant figures 75,000

74,568
4 so round down
1 significant figure 70,000

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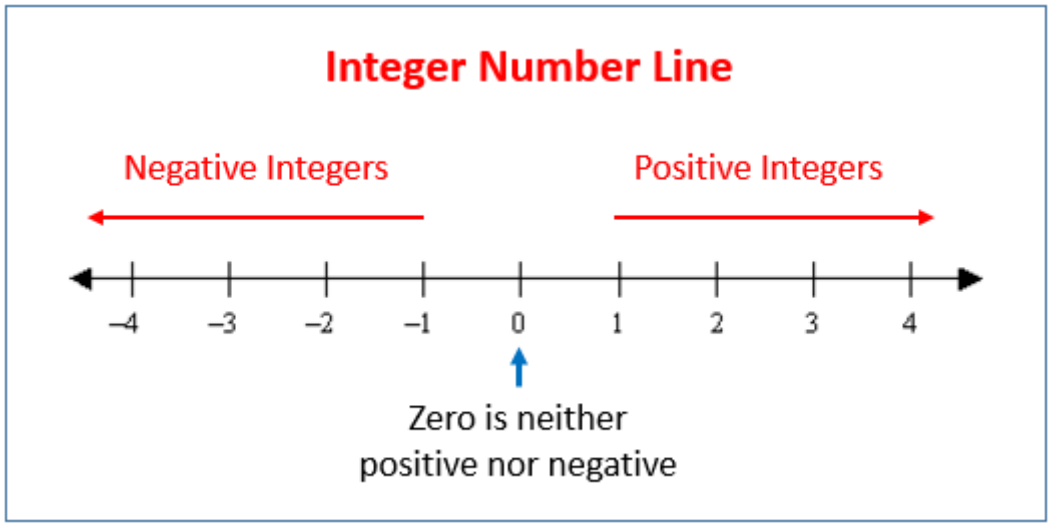
INTEGERS: Chapter 2



Integers are positive and negative WHOLE numbers

The letter **Z** is used to represent integers

Symbols

< LESS than (points to the left)

> GREATER than (points to the right)

Rules for ADDITION & SUBTRACTION:

When the signs are the SAME (2 + or 2 -) KEEP the sign and ADD

-2 -4 = -6

-3 -5 = -8

2 + 6 = 8

When the sign are DIFFERENT keep the sign of the BIGGER number and SUBTRACT

$$-8 + 2 = -6$$

$$10 - 12 = -2$$

$$14 - 10 = 4$$

Rules for MULTIPLiCATION & DIVISION:

LIKE signs (same signs) give PLUS (+)

$$-4 \times -4 = 16$$

$$-12 \times -2 = 24$$

$$\frac{-16}{-8} = 2$$

$$2 \times 4 = 8$$

$$\frac{4}{2} = 2$$

UNLIKE signs (different signs) give MINUS (-)

$$-3 \times 5 = -15$$

$$-2 \times 5 = -10$$

$$\frac{-30}{10} = -3$$

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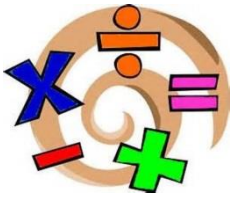
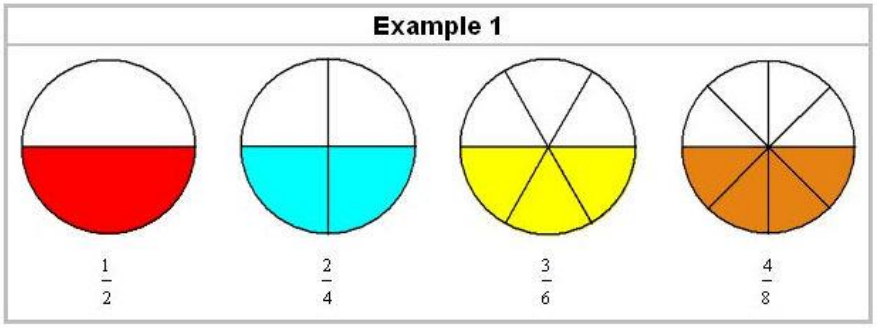
FRACTIONS: Chapter 3



$$\frac{2}{5} \qquad \frac{numerator}{denominator}$$

Equivalent fractions: fractions that all have the SAME value

What do the fractions in example 1 have in common?



Simplifying fractions:

$\frac{4}{16} = \frac{1}{4}$ divide above and below by 4

If a fraction cannot be simplified anymore it is said to be in it's SIMPLEST FORM

$\frac{16}{24} = \frac{8}{12} = \frac{2}{3}$ ← simplest form

Types of fractions:

Proper fractions--- fractions that are less than 1 eg, $\frac{1}{3}, \frac{1}{4}, \frac{1}{2}$

Improper fractions --- fraction that are greater than 1 eg. $\frac{8}{5}, \frac{5}{2}, 2\frac{1}{4}$

Mixed numbers --- whole number and a fraction eg. $2\frac{3}{4}$

Changing to an improper fraction:

$4\frac{3}{4} = \frac{19}{4}$ make 4 represent a fraction of itself $\frac{16}{4} + \frac{3}{4} = \frac{19}{4}$

$2\frac{3}{5} = \frac{13}{5}$ $2 = \frac{10}{5}$ $\frac{10}{5} + \frac{3}{5} = \frac{13}{5}$

Changing to a mixed number:

$\frac{19}{4}$ divide 19 by 4 = 4 and 3 left over

$$\frac{19}{4} = 4\frac{3}{4}$$

Comparing fractions:

Need to get the denominators to be the SAME

Remember what you do to the top you must also do to the bottom!!!!

Which is bigger $\frac{3}{5}$ or $\frac{3}{4}$??

Get LCM of 4 and 5 LCM = 20

$\frac{3}{5}$ $\frac{3}{4}$

Multiply top and bottom by 4 Multiply top and bottom by 5

$\frac{3 \times 4}{5 \times 4}$ $\frac{3 \times 5}{4 \times 5}$

$\frac{12}{20}$ $\frac{15}{20}$

Therefore $\frac{3}{4}$ is bigger than $\frac{3}{5}$

Finding a fraction of a number:

Multiply with the numerator

Divide with the denominator

use – button on calculator

Adding and Subtracting :

$\frac{4}{7} + \frac{2}{7} = \frac{6}{7}$ $\frac{6}{9} - \frac{2}{9} = \frac{4}{9}$

When the denominator is the SAME add or subtract the numerator

When the denominator is DIFFERENT use the LCM to get the denominators to be the same and then add or subtract

$\frac{3}{7} + \frac{1}{14}$ LCM = 14

$\frac{3 \times 2}{7 \times 2} = \frac{6}{14}$ $\frac{6}{14} + \frac{1}{14} = \frac{7}{14}$

When adding or subtracting mixed fractions turn into improper fractions (top heavy fractions) and use the above rules

$4\frac{5}{6} + 1\frac{3}{4}$ same as $\frac{29}{6} + \frac{7}{4}$ LCM = 12

$\frac{29 \times 2}{6 \times 2} + \frac{7 \times 3}{4 \times 3}$

$\frac{58}{12} + \frac{21}{12} = \frac{79}{12} = 6\frac{7}{12}$

Multiplying fractions:

Multiply top by top

Multiply bottom by bottom

$$\frac{1}{2} \times \frac{3}{4} = \frac{3}{8}$$

Dividing fractions:

Turn the fraction upside down and multiply

$$\frac{3}{4} \div \frac{1}{2}$$

$$\frac{3}{4} \times \frac{2}{1} = \frac{6}{4}$$

$$3 \div \frac{3}{5}$$

$$\frac{3}{1} \times \frac{5}{3} = \frac{15}{3} = 5$$

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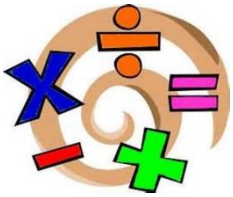
Chapter 4: **PROBABILITY**



Throwing a dice, tossing a coin, spinning a spinner the answer that you get are called *outcomes*

Dice: outcomes = 1,2,3,4,5,6

Coin: outcomes =heads or tails

If you throw a dice and toss a coin the outcomes are as follows

H1,H2,H3,H4,H5,H6,T1,T2,T3,T4,T5,T6

There are 12 different outcomes

2 outcomes for the coin and 6 for the dice

2x 6 = 12

This is the Fundamental Principle of Counting:

If one event has **m** possible outcomes and the second event has **n** possible outcomes, the two events have **m x n** possible outcomes

Examples:

If a boy has to choose a shirt, tie and jacket from 5 shirts, 3 ties and 4 jackets

He has 5 x 3 x4 =60 different combinations

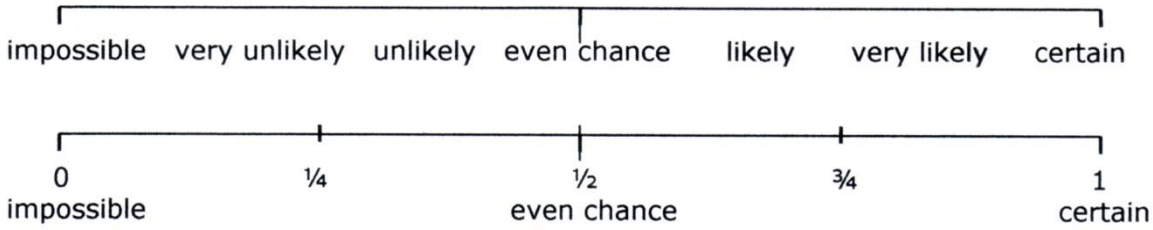
An early bird menu consists of 3 starters and 4 main courses. How many different 2 course meals can you have?

3 x 4 = 12

The Probability Scale:

Is used to show how likely any event is to happen

Probability uses numbers to tell us how likely something is to happen



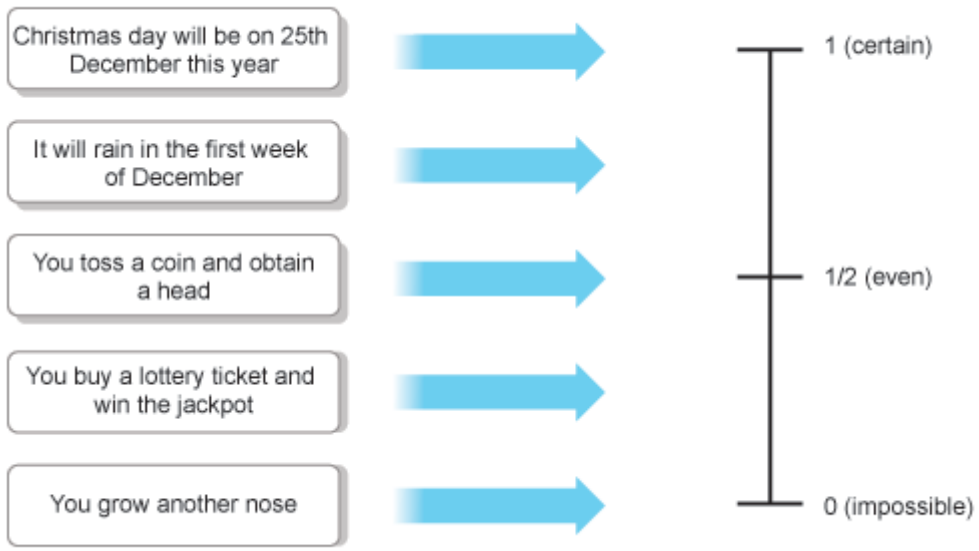
The probability scale goes from 0 to 1

The probability of an event that is **impossible** to happen is **zero**

The probability that an event is **certain** to happen is **1**

The more likely an event is to happen the closer the probability is to 1

If there is a 50:50 chance, it is described as a **even chance**



Events and outcomes:

Eg. Throwing a dice

The act of throwing a dice is called **trial**

The numbers you get 1,2,3, etc are called possible **outcomes** of the trial

The result you want (throw a 6) is called an **event**

If events have the same chance of happening, the events are said to be **equally likely**

Calculating probability:

For equally likely outcomes (something that has the same chance of happening)

Probability of an event = $\frac{number\ of\ favourable\ outcomes}{number\ of\ possible\ outcomes}$

*Note: a favourable outcome is an outcome that you want

Example:

In a pack of cards what is the probability of picking a Queen?

Favourable outcomes = 4 (4 queens in a pack of cards)

Possible outcomes = 52 (52 cards in a pack)

P(E) = $\frac{4}{52}$

*Note: for probability your answer will ALWAYS be a fraction or a decimal

Remember values can only be *between 0 and 1*

When we say 'pick a card **at random**' it means that every card in the pack has an equal chance of being chosen

Deck of cards:

Total number of cards in deck **52** (jokers NOT included!)

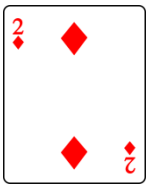
4 different suits:

2 red suits (26 cards)--- hearts (13 cards) & diamonds (13cards)

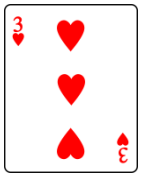
2 black suits (26 cards) ---- spades(13 cards) & clubs(13 cards)

Picture cards: 3 in each suit--- jack, king, queen

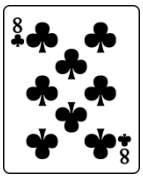
Aces(4 cards) card with the A --- one in each suit



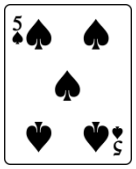
Diamonds



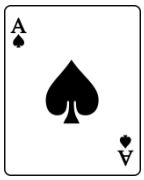
Hearts



Clubs



Spades



Ace

King

Queen

Jack

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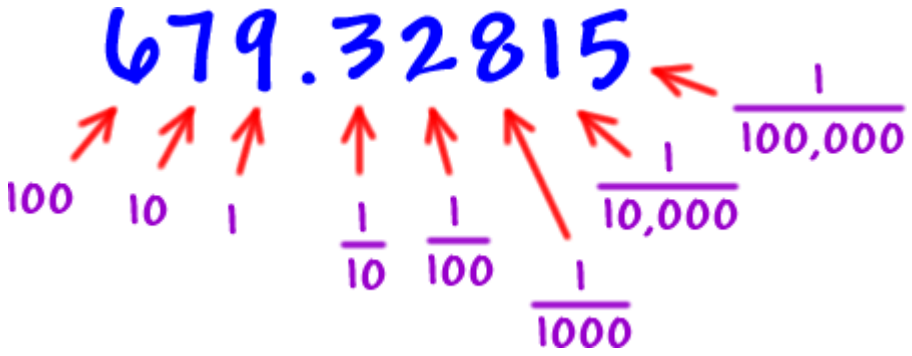
Chapter 5 : DECIMALS

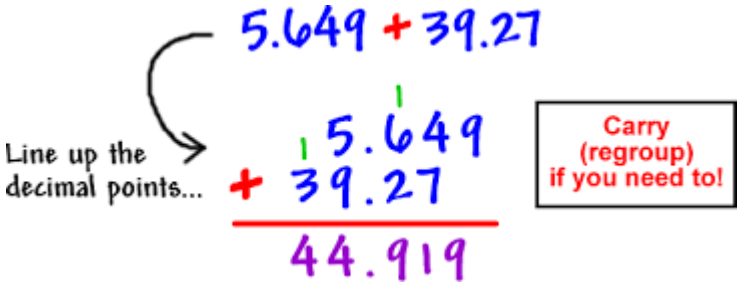
Decimal Place Value Chart													
Millions	Hundred thousands	Ten thousands	Thousands	Hundreds	Tens	Ones	Decimal point	Tenths	Hundredths	Thousandths	Ten-thousandths	Hundred thousandths	Millionths
			3	6	8	4	.	2	6				

Image 1: Decimal Place Value chart.



Adding / subtracting decimals:

Make sure decimal points are lines up directly, then add or subtract



OR

Use a calculator

Multiplying by 10, 100, 1000

X 10 move decimal point 1 place to the right

2.58 x 10 = 25.8

X100 move decimal point 2 place to the right

11.378 x 100 = 1137.8

X1000 move decimal point 3 places to the right

2.179 x 1000 = 2179

Dividing by 10, 100, 1000

÷ 10 move decimal 1 pace to the left

45.678 ÷ 10 = 4.5678

÷ 100 move decimal 2 places to the left

234.6 ÷ 100 =2.346

÷ 1000 move decimal 3 places to the left

5678.9 ÷ 1000 = 5.6789

Multiplying decimals

In the answer the number of digits after the decimal point will be EQUAL to the SUM of the number of digits in the 2 decimal to be multiplied

0.4 x 0.02

1 place + 2 places

Answer will have 3 places

0.4 x 0.02 = 0.008 (3 places)

Rounding

Last digit 5 or more increase the previous digit

Last digit 4 or less leave digit as it is

Expressing fractions as a decimal

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

Divide the numerator by the denominator

3 ÷ 4 = 0.75

Using calculator change from a fraction to a decimal use the S⇔D button

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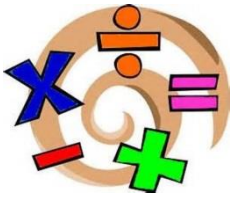
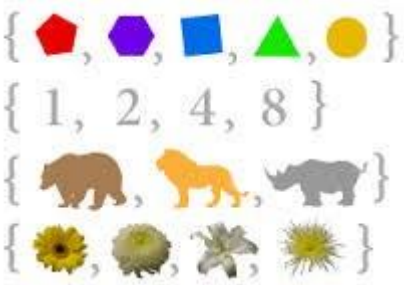
Chapter 6: SETS



List of clearly defined objects is called a SET



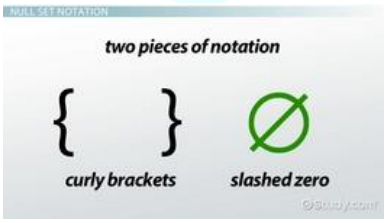
Items in a set are called ELEMENTS

Elements are listed in chain or curly brackets { }

Capital letters are used to name sets

$\in$ element is a member of a set

$\notin$ Not an element of a set



These symbols represent the null set or empty set

Two sets are equal if they contain EXACTLY the same elements

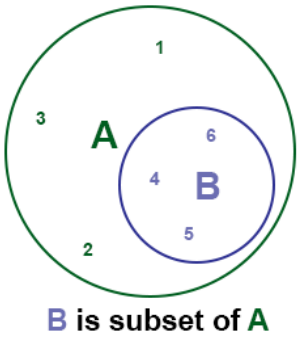
$\{A,B,C,D\} = \{D,C,B,A\}$

<u>Subsets</u>

$A = \{ 1,2,3,4,5 \}$ $B = \{ 1,2 \}$

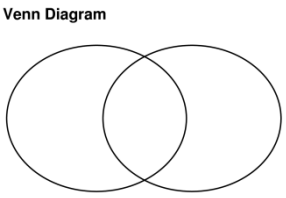
B is a subset of A as every element of B is also an element of A

$B \subset A$

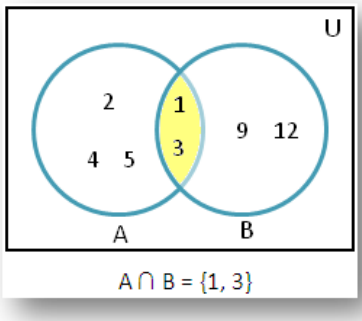


B is subset of A

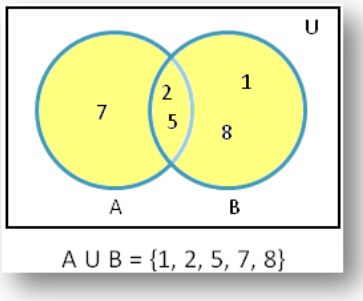
Sets can be represented using diagrams called <u>Venn diagrams</u>



Intersection of two sets A∩B means the elements common to BOTH sets

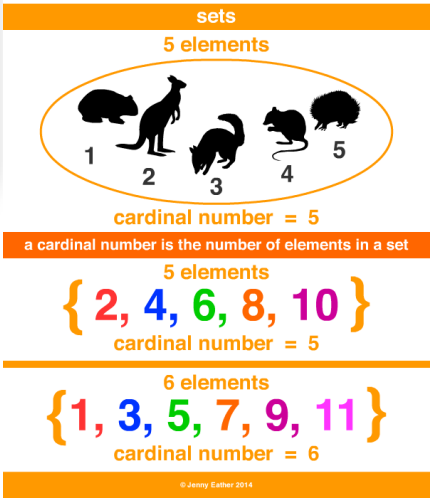


Union of sets A ∪ B means all the elements of A and B combined



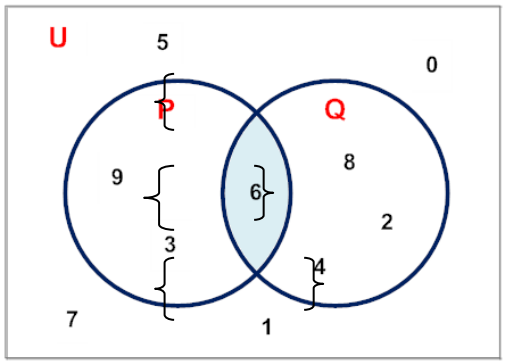
Cardinal number #

How many elements are in a set



Universal set (U)

Set from which all other sets are taken



U = 0, 1,2,3,4,5,6,7,8,9

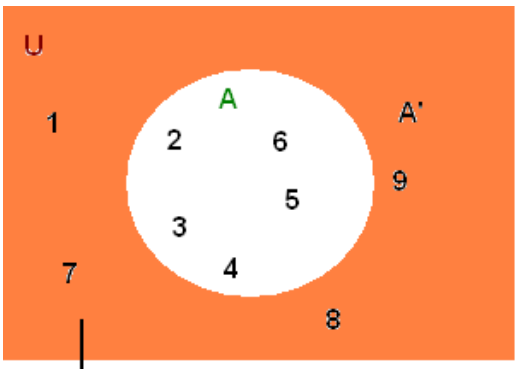
P = 3,6,9

Q = 2,4,6,8

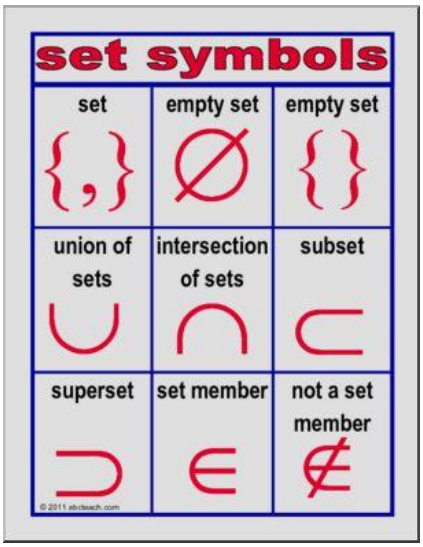
Compliment of a set A'

Everything in the set EXCEPT A

$\{1,7,8,9,\}$ = A'

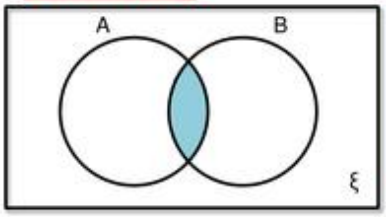


The complement of the set A i.e. A'



Venn Diagrams

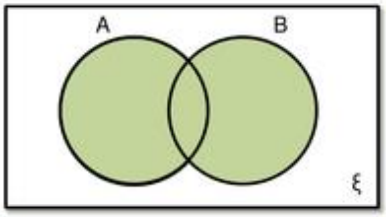
Definitions:



The intersection is where two sets overlap.

$A \cap B$

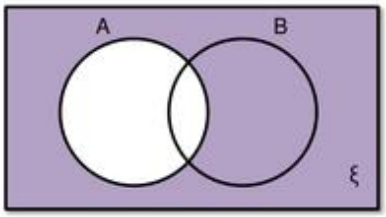
This means **A and B**.



If you put two sets together, you get the Union.

$A \cup B$

This means **A or B**. Think marriage, they become 1!



The **complement of A** is the region that is not A.

A'

This means **not A**. Or outside of A

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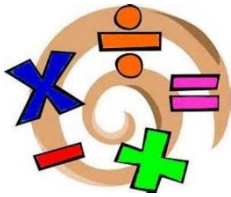
Chapter 7: PERCENTAGES



% per cent (out of one hundred)

To change a fraction to a percentage:

Multiply the fraction by $\frac{100}{1}$

$$\frac{3}{4} \times \frac{100}{1} = \frac{300}{4} = 75\%$$

To change a decimal to a percentage:

Multiply the decimal by 100

$$0.25 \times 100 = 25\%$$

To change a percentage to a decimal:

Divide the percentage by 100

$$20\% = \frac{20}{100} = \frac{1}{5} = 0.2$$

Finding percentages:

Change the percentage to a decimal and multiply

Find 8% of €36

$$0.08 \times 36 = € 2.88$$

OR use % button on calculator

Important when comparing quantities that both quantities have the SAME UNITS

Example: Express 15 minutes as a percentage of 1.5 hours

Must put 1.5 hours into minutes so that the units are the SAME

1.5 hours = 90 minutes

$$\frac{15}{90} \times 100 = 16\frac{2}{3}\%$$

Increasing or decreasing a percentage:

Step 1: Add the % to 100% (INCREASE) or subtract the % from 100% (DECREASE)

Step 2: Change the resulting % to a decimal

Step 3: **Multiply** the given number by the decimal

Example 1:

Increase 240 by 16%

Step 1: 16 + 100 = 116%

Step 2: 116 % = 1.16

Step 3: 240 x 1.16 = 278.4

Example 2:

Decrease 5000 by 4%

Step 1: 100 – 4 = 96%

Step2: 96% = 0.96

Step 3: 5000 x 0.96 = 4800

To find the original number when given a percentage of it:

Example :

If 12% of a number is 72 find the number

Step 1 : Find 1%

72÷ 12 = 6

Step 2: Find 100%

Take the 1% and multiply by 100

6 x 100 = 600 the original number is 600

Discount:

If something is discounted it means the item has been reduced in price (sales in shops)

'20% off' means you get a discount of 20% and you only pay 80% of the price

Example: A bicycle costs €780 before a 25% discount was applied.

Find the value of the bicycle after the discount was applied

Step 1: if the discount is 25% the sale price is 75% of the marked price

Find 75% of €780

780 x 0.75 = €585

Example: A woman paid €200 for a coat after a 20% discount was given. Find the price of the coat before the discount was applied.

80% = 200 want to find 100%

Step 1: find 1% 200÷ 80= 2.50

Step 2: find 100% 2.50 x 100 = €250

Percentage discount:

$$\frac{Discount}{given\ price} \text{ X } 100\%$$

Example:

A music shop offered a discount of €4.80 on DVD's with a marked price of €24. Calculate the percentage discount

$\frac{4.80}{24}$ x100% = 20 %

VAT (value added tax):

VAT is a Tax that the government adds to items that you buy, the value of VAT can vary but you will be told in the question what VAT to use

In most cases the VAT is already added on or included in the price of items, but more expensive items like TV's & furniture the prices are given without VAT and the shopkeeper must add on the VAT

***remember to take the price excluding VAT as 100%**

Example 1:

A computer was advertised at €1140 + VAT @ 23%. Find the price of the computer including VAT

Step 1: price before VAT €1140 (100%)

Step 2 : price including VAT (123%)---- find 123% of €1140

1140 x 1.23= €1402.20

Example 2:

An electricity bill is €164.82 including VAT at 23%

Calculate the amount of VAT

Step 1: €164.82 (includes VAT = 123%)

Need to find price before VAT – 100%

€164.82÷ 1.23 = €134

Step 2 : calculate the amount of VAT--- subtract

€164.82 – €134 = €30.82 amount of VAT

Percentage profit and loss:

A **profit** is made when an item is sold for more than it cost to buy or produce it

If the selling price is lower than the cost price , a **loss** is made

$$\frac{profit}{cost\ price} \times 100\% \qquad \frac{loss}{cost\ price} \times 100\%$$

Example:

A shopkeeper buys milk for €1.40 per litre. He sells milk for €1.75 per litre. Calculate his percentage profit

Step 1: calculate the profit

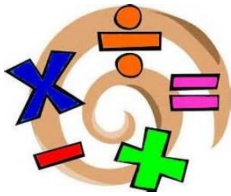
1.75 – 1.40 = 0.35c(profit)

Step 2: calculate % profit $\frac{profit}{cost\ price} \times 100\%$

$\frac{0.35}{1.40} \times 100\% = 25\%$

1st year Maths Revision

Chapter 8: ALGEBRA



Algebra uses LETTERS or SYMBOLS to represent or stand for numbers

This is called an expression

Coefficient → 2x + 3y + 5 ← constant

Variable

To simplify expressions:

Add or subtract 'like terms' ---- terms that are the SAME

3a + 2 – a + 5 3a –a are like terms

2 + 5 are like terms

= 2a + 7

Substitution:

To find a value for an expression replace or substitute (put in) a value for the unknown variable

If x = 2 find the value of 2x + 5

Where you see x put in 2

2(2) + 5 = 9

Removing brackets:

To multiply out the bracket EVERYTHING in the bracket must be multiplied by the number outside the bracket.

Then simplify by adding or subtracting terms that are the same

$$3(a -2) -4 (2a -3)$$

Step 1: multiply out brackets

$$3a -6 -8a +12$$

Step 2 : add or subtract terms that are the SAME (remember your rules for integers!!!)

$$\underline{3a} -6 \underline{-8a} +12$$

$$= - 5a + 6$$

Multiplication involving powers:

$$a \times a = a^2$$

$$a \times a \times a = a^3$$

$$a \times a \times a \times a = a^4$$

$$a^2 \times a^4$$

$$a \times a \qquad a \times a \times a \times a$$

(counting the a's) $= a^6$

When multiplying the same number to two powers ADD the powers

$$2^4 \times 2^5 = 2^{4+5} = 2^9$$

$$3^4 \times 3^3 = 3^{4+3} = 3^7$$

Multiplying two expressions:

(x +2) (x + 3) Use BOX METHOD

Step 1: Draw the box

Step 2: put 1st bracket on the TOP

Put 2nd bracket on the SIDE

	X	+ 2
X		
+3		

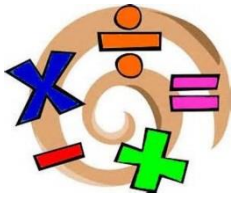
Step 3: multiply out

	X	+ 2
X	x^2	2x
+3	3x	6

Step4: simplify (add terms that are the same)

$x^2 + \underline{2x + 3x} + 6 =$

$x^2 + 5x + 6$



1st year Maths Revision

Chapter 9: **PERIMETER & AREA**

Length is the straight-line distance between two points. Length is measured using a ruler or metre stick, trundle wheel.

The units of length are mm, cm, m, km

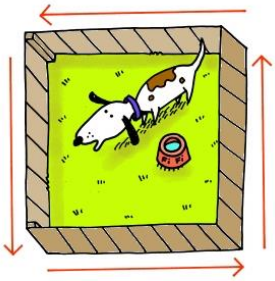
1cm = 10mm

1m = 100cm

1km= 1000m

Perimeter:

The perimeter of a shape is the distance around the edge of the shape



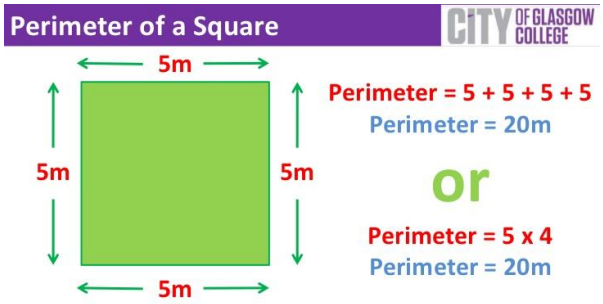
perimeter

Perimeter of a rectangle:

2(l +b) where l= length b= breadth (width)

Perimeter of a square: 4 x l

Where l is the length of a side



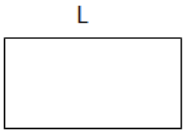
Area:

Area is the amount of space covered by a shape.

The units of area are **cm^2**

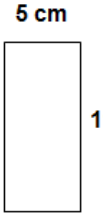
Area of a rectangle:

length x breadth



Area = L x W
Area = Length x Width

Example:



Area = L x W
Area = 5 cm x 11 cm
Area = 55 cm^2

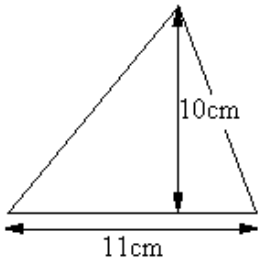
Area of a triangle:

$\frac{1}{2}$ x base x height

Example

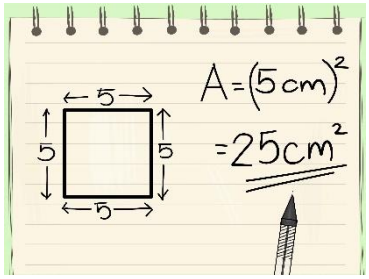
$$\text{Area} = \frac{1}{2} \times \text{base} \times \text{perpendicular height}$$

$$= \frac{1}{2} \times 11 \times 10 = 55 \text{ cm}^2$$



Area of a square:

(length of side)^2



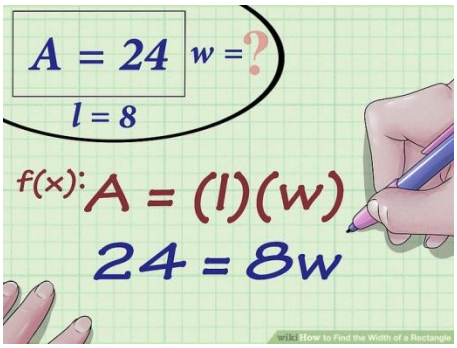
Finding the length or breath when given the area:

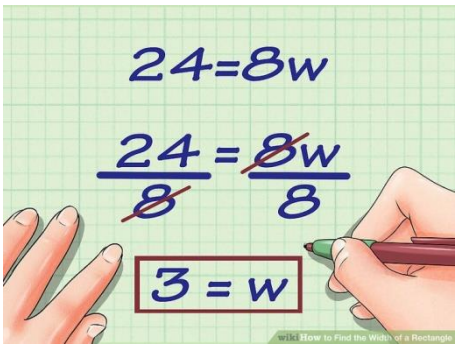
Step 1: let the formula = area

Step2: fill in the information you know

Step3: find the unknown

Example:



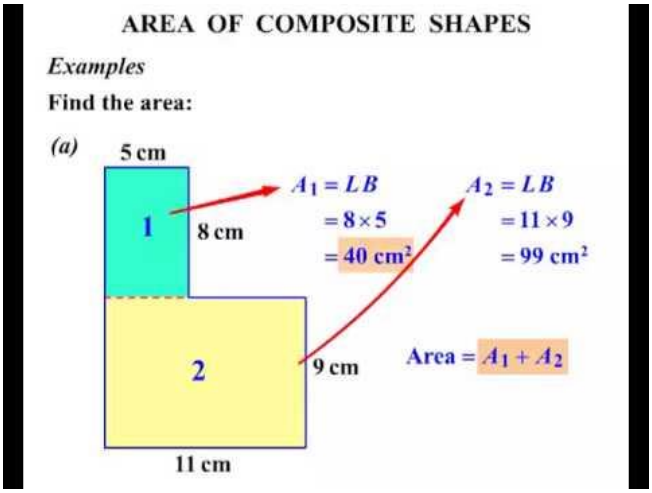


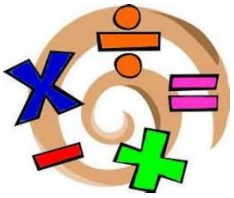
Compound shapes:

Break the shape up into the various shapes

Find the area of each shape

Add the areas together



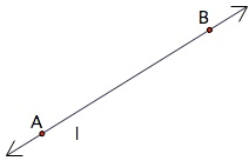


1st Year Maths Revision

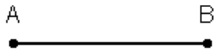
Chapter 10: **GEOMETRY 1**

Points, lines & line segments:

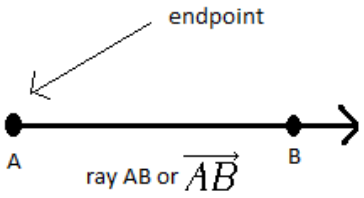
- A point A



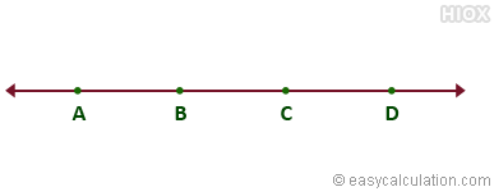
This is the line AB, it passes through the points A and B



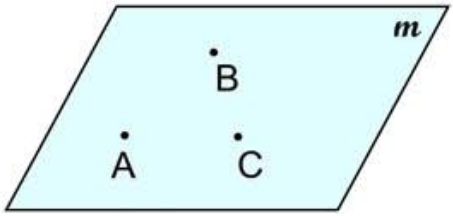
A line that starts at point A and finishes at point B is called the **line segment** AB



A line that starts at A and continues through B is called the **ray** $[\![AB$



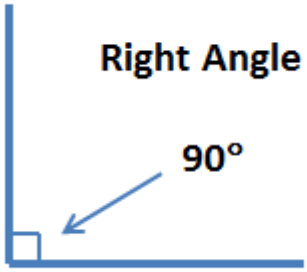
Collinear points are in the same straight line

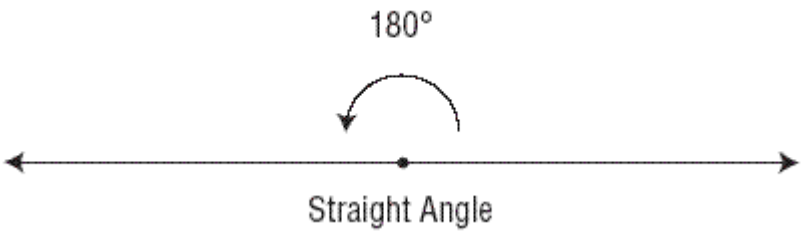


The flat surface on which points and lines are shown is called a **plane**

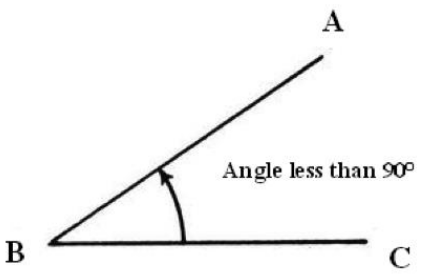
Angles:

a quarter of a revolution is called a right angle and it 90°



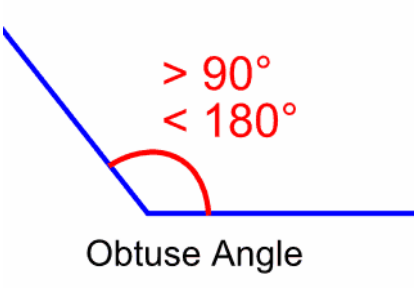


half a revolution makes a straight angle of 180o

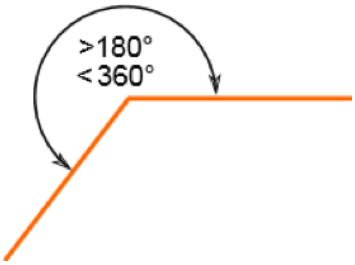


An angle that is less than 90° is called an

ACUTE angle



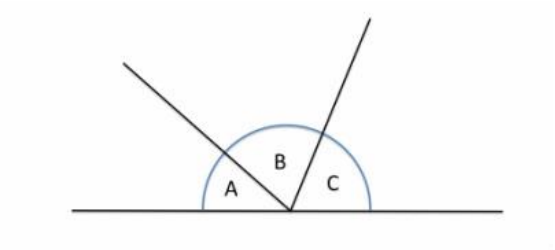
An angle that is bigger than 90° but less than 180° is called an **OBTUSE** angle



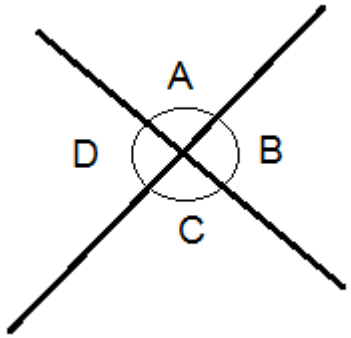
An angle that is bigger than 180° but less than 360° is called a **REFLEX** angle

Calculating angles;

Angles on a straight line all ADD up to 180°

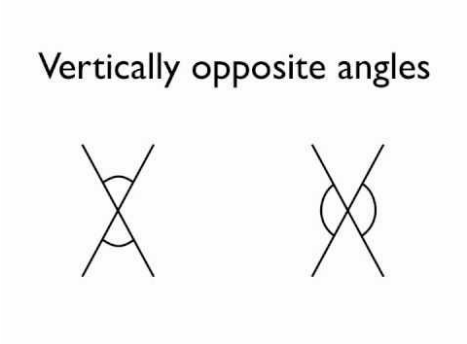


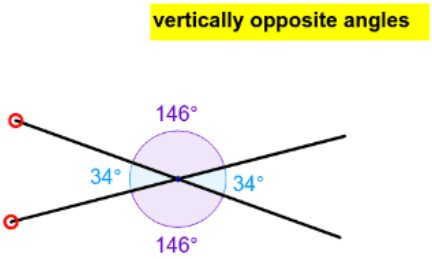
A + B + C = 180°



Angles at a point ADD up to 360°

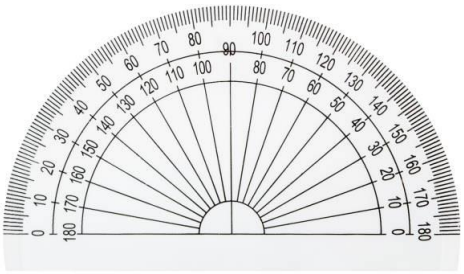
A + B + C + D = 360°



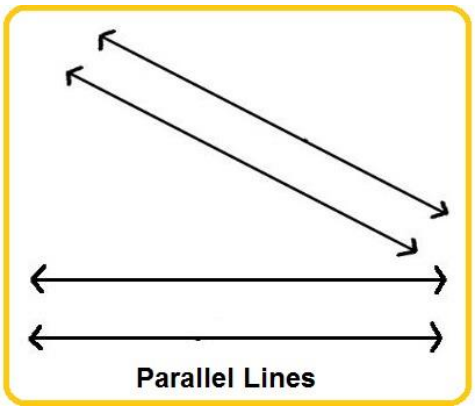


Vertically opposite angles are EQUAL

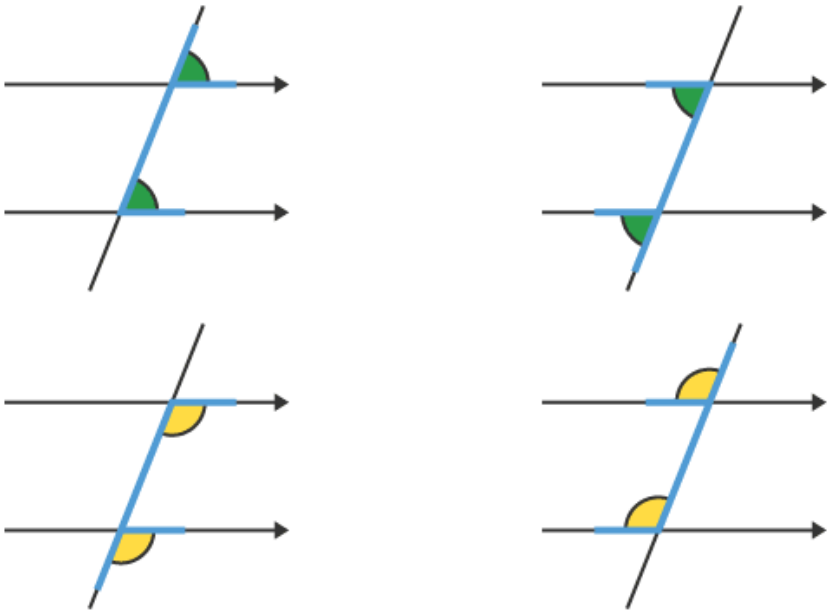
A protractor is used to DRAW angles



Parallel lines are lines that are horizontal lines that will never meet

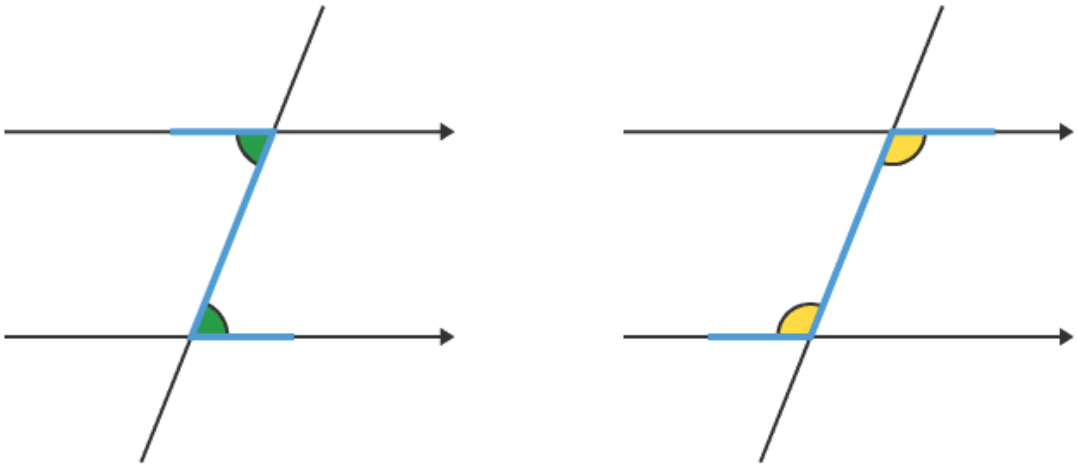


Corresponding angles are EQUAL in measure

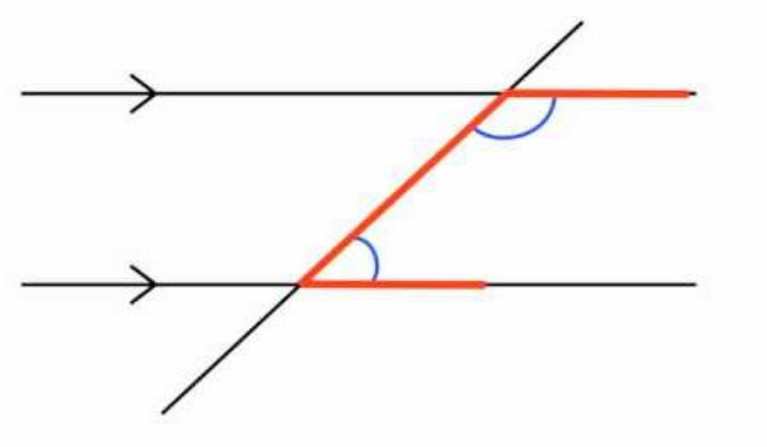


Alternate angles are EQUAL in measure

Interior angles



Interior angles add up to 180°



Using a set square and ruler students should be able to draw

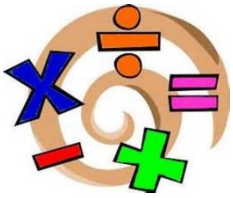
1) A line parallel to a given line
2) A line perpendicular to a given line through a given point

See book pg 180 & 181

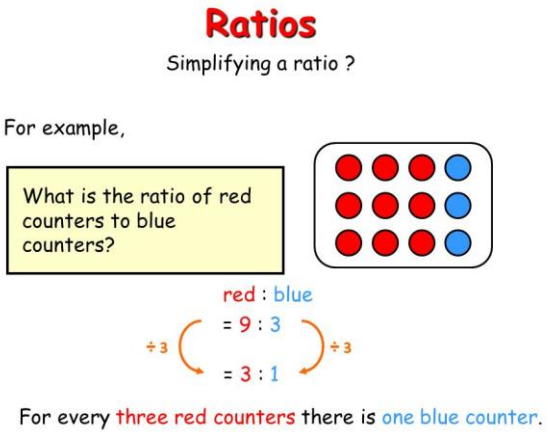
Drawing parallel and perpendicular lines

1st Year Maths Revision

Chapter 11: **Ratio & Proportion**

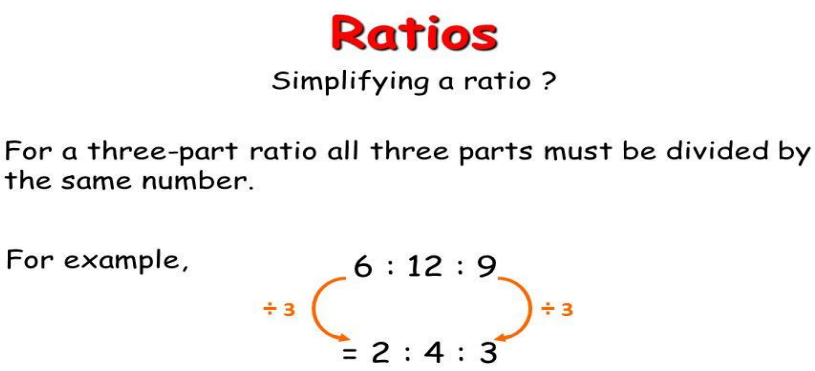


Ratio is used to compare one amount with another



When comparing more than two ratios it is important to make sure the quantities are expressed in the SAME UNITS

Eg. 2days : 2weeks 2days : 14days simplest form 1:7

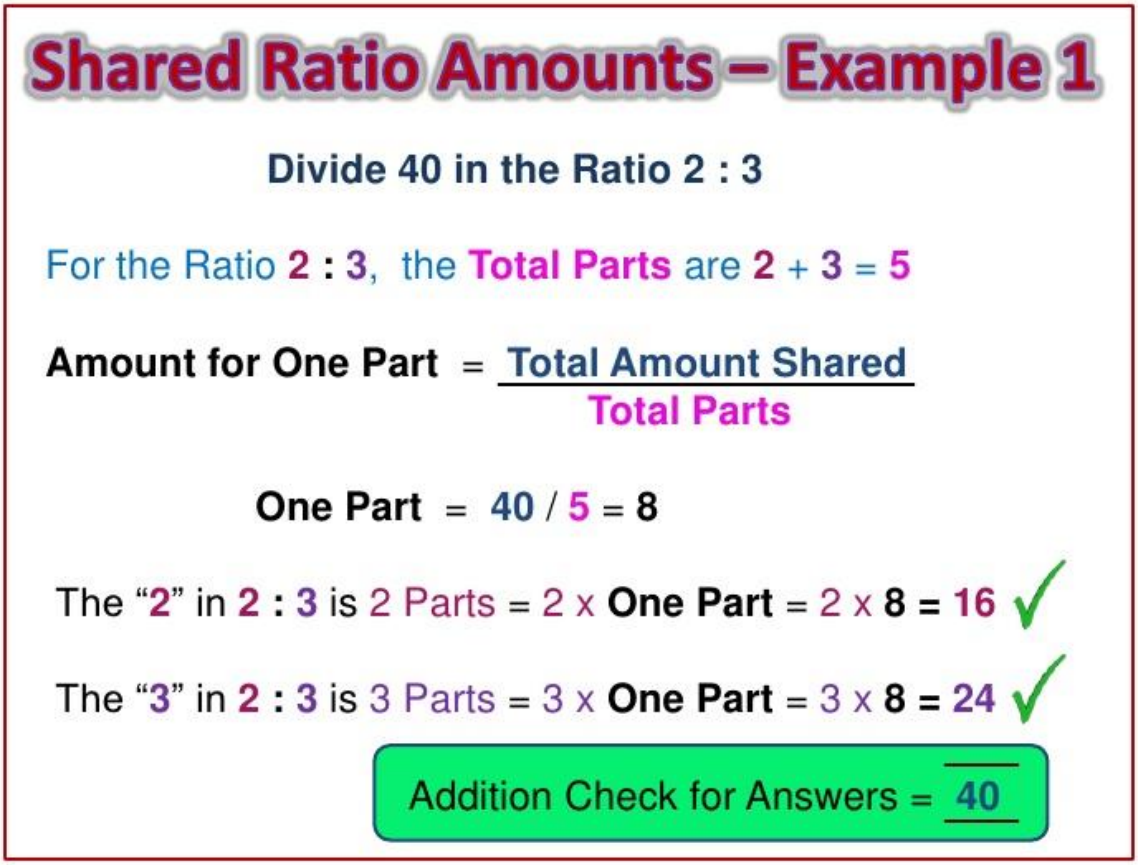


Dividing in a giving ratio

Step 1: add all the ratio to find the total number of parts

Step2: to find 1 part divide the amount by the total number of parts

Step 3: find the other amounts by mutiplying



EXAMPLE 2:

In a school the ratio of boys to girls is 6:5 (total parts 11)

If there are 325 girls find the number of pupils

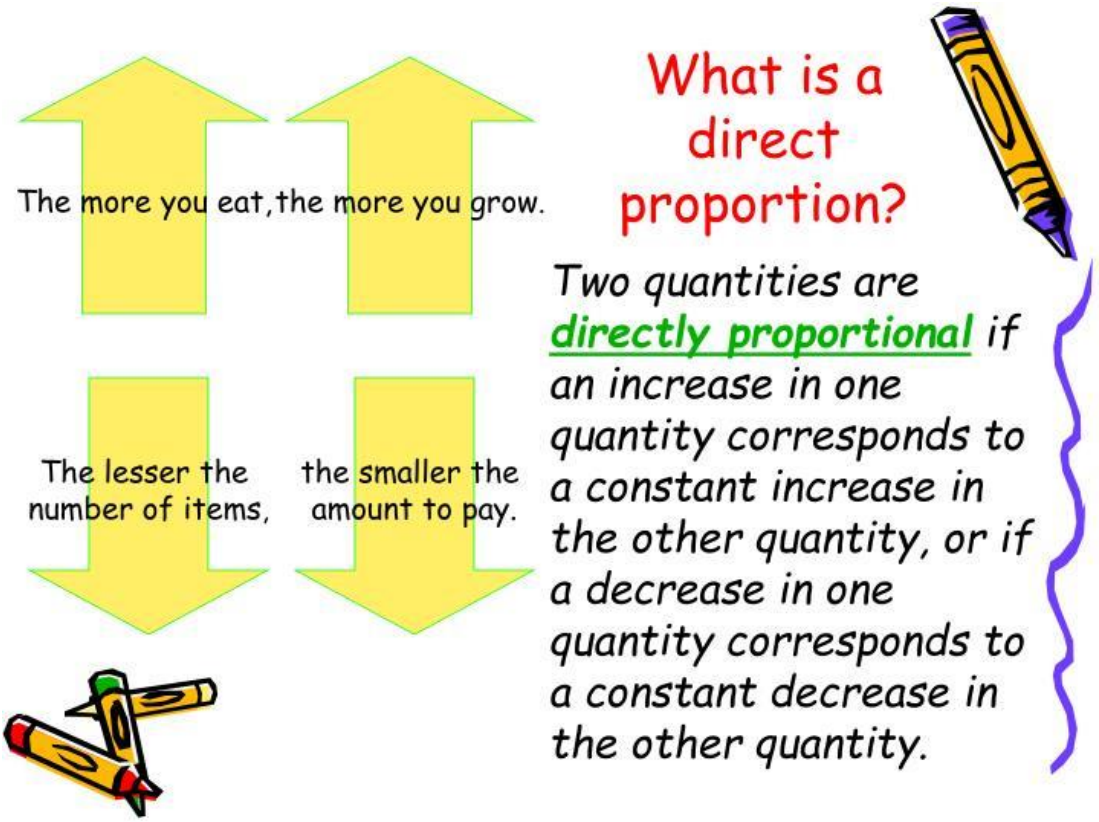
5/11 are girls = 325

Asked to find 11/11 so work back and find 1/11 first

1/11 = 325/5 = 65

11/11 = 65 x 11 = 715 pupil in total

Proportion compares parts to a whole, proportion can be written as a fraction ,decimal or percentage.

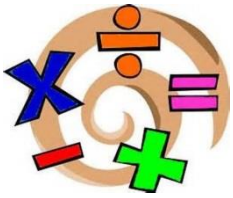


Inverse proportion is where an increase in one quantity causes a decrease in another quantity.

Example: the faster a car is travelling the less time it will take to complete a journey (speed increases while length of journey decreases)

1st Year Maths Revision

Chapter 12: Statistics ----**Collecting Data**



Information that is gathered is called **DATA**.

The branch of Maths that looks at collecting, presenting & interpreting data is called **STATISTICS**.

A **survey** is a way of finding information from people, it involves asking questions, recording and collecting the data, presenting the data in way that is easy to understand.

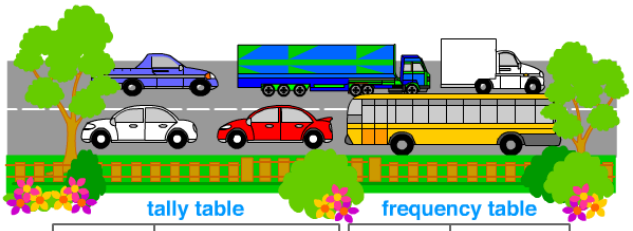
Data is information that you or someone else collects

To collect data for a simple survey a **tally** can be used

tally

Using tally marks to record counting.

traffic frequency tally



tally table

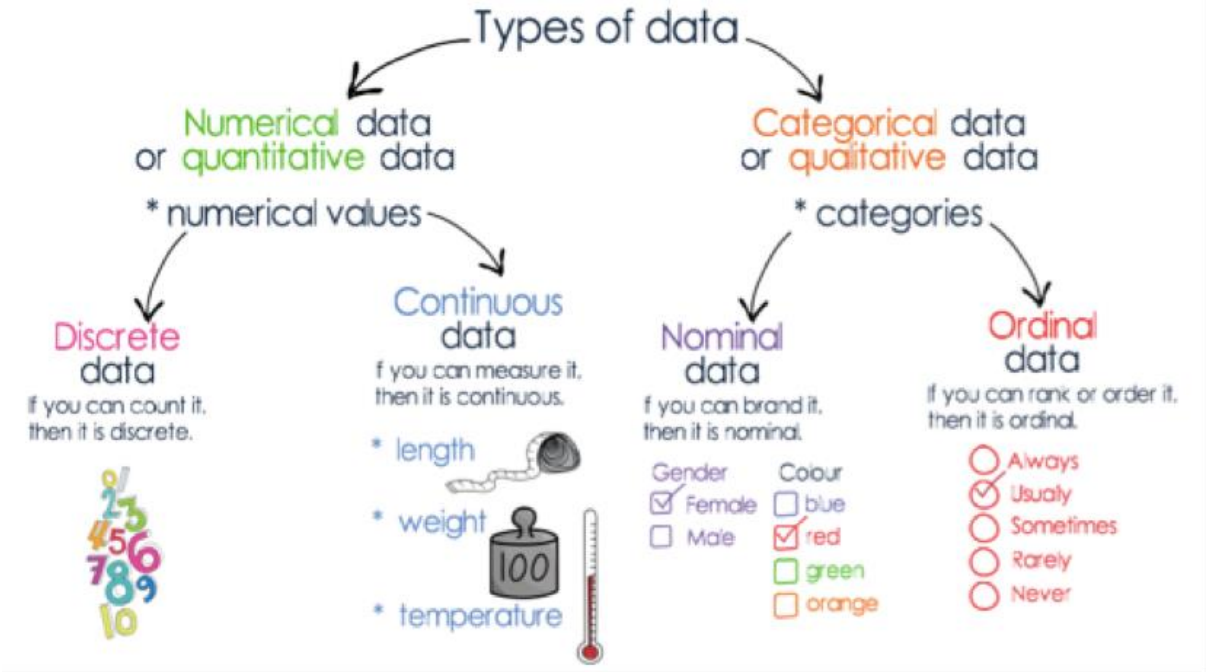
vehicle	frequency
cars	𝍸 III
trucks	𝍸
vans	II
utes	II
buses	IIII
bikes	

frequency table

vehicle	frequency
cars	8
trucks	5
vans	2
utes	2
buses	4
bikes	0

I II III IIII 𝍸
1 2 3 4 5

Types of data:



Sampling:

Population: everything/everybody that could possibly be involved in the investigation/survey

Sample: data collected from some of the population from which conclusion are drawn.

Sample size: too small results may not be reliable, too big, it may take too long to collect and analyse.

Simple random sample: every member of the population has an equal chance of being chosen.

If data obtained is not truly representative of the whole population, the results may be **biased**.

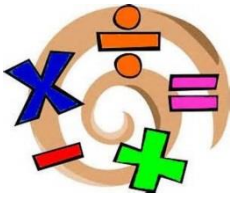
QUESTIONNAIRES:

Are designed to obtain data.

Respondents are people that answer the questionnaires.

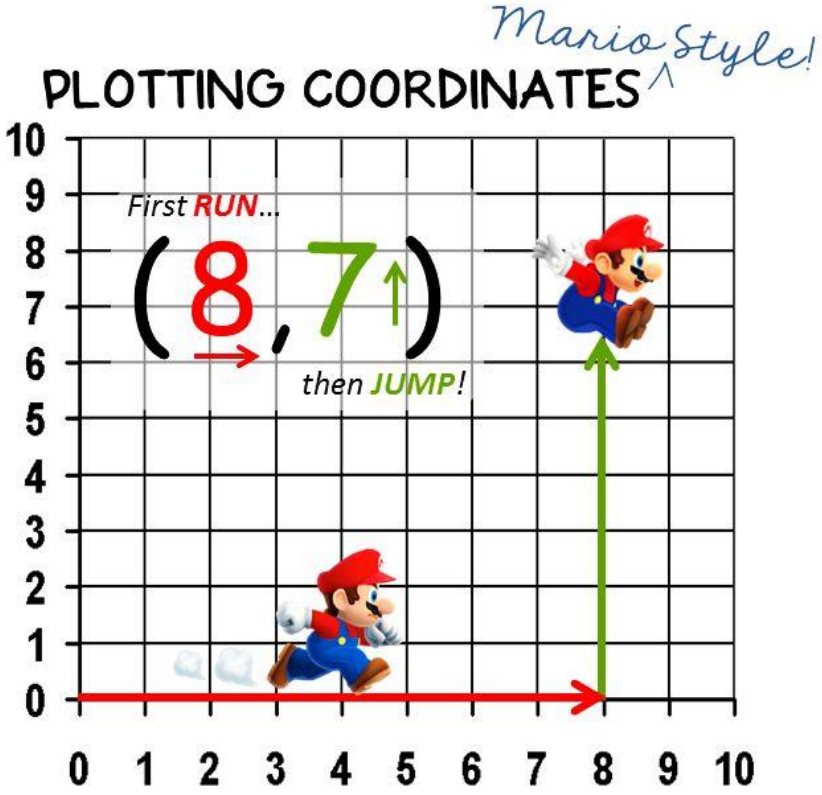
Designing a questionnaire

- Be clear about what you want to find out
- Keep questions simple
- Don't ask leading questions
- Provide response boxes



1st Year Maths Revision

Chapter 13: **Coordinates**



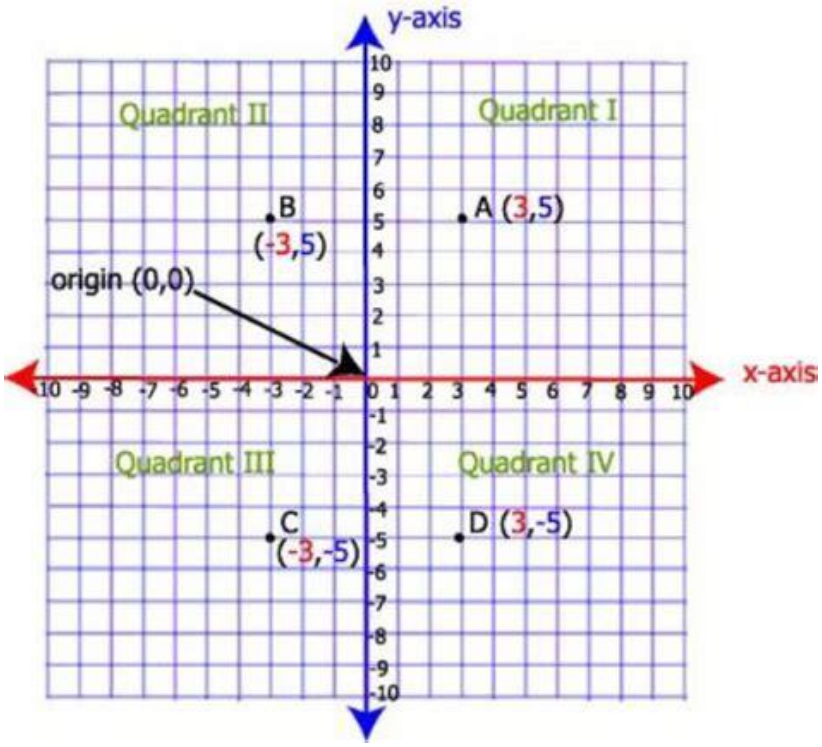
When drawing a grid or a graph, it is made up of two lines

The *horizontal* line is called the **x axis**

The *vertical* line is called the **y axis**

A point is made up of 2 numbers (8, 7) the first number (8) is the **x coordinate** and the second (7) is the **y coordinate**

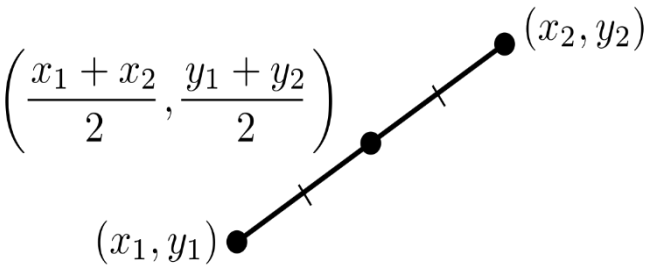
The point (0,0) where the x and y axis meet is called the **origin**

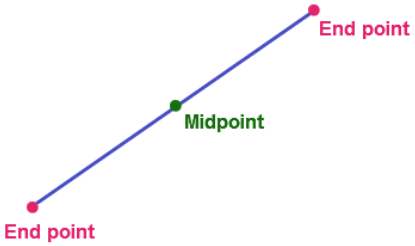


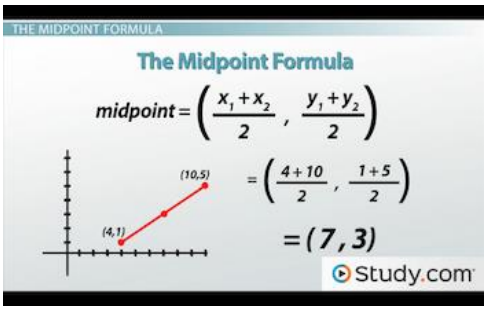
The diagram above is divided into 4 quarters. Each is called a quadrant

The diagram is called the ***coordinated plane or cartesian plane***

Midpoint of a line segment:



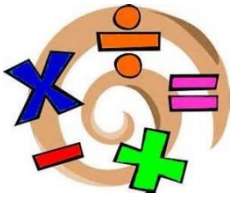




Step 1: Label your points (x_1,y_1) (x_2,y_2)

Step 2: Fill values into formula

Step 3: Work out



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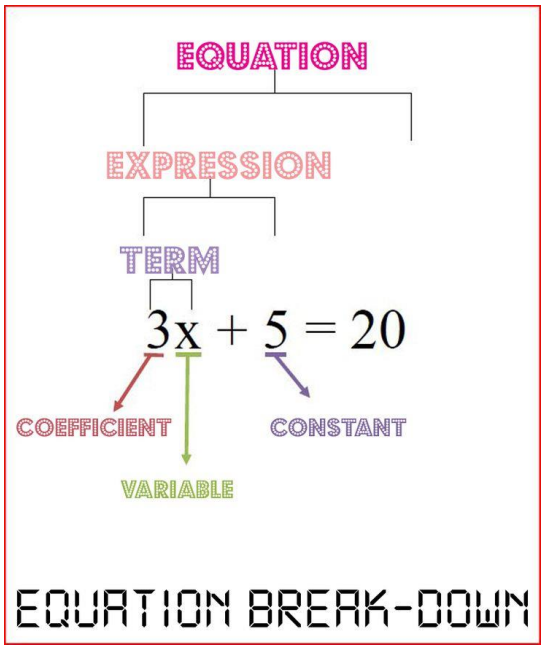
Chapter 14: **SOLVING EQUATIONS**



Solving equations:

To solve an equation it is important to always remember what you do to one side you must also do to the other side, in order to keep both sides balanced

Solving Two-Step Equations

1. Add or subtract to isolate the variable term.
2. Multiply or divide to solve for the variable.
3. Check your solutions.

Example:

$$3x+5=-16$$
$$-5 \quad -5 \quad \text{Subtract}$$
$$3x=-21$$
$$\frac{3x}{3}=\frac{-21}{3} \quad \text{Divide}$$
$$x=-7$$
$$3(-7)+5=-16 \quad \text{Check}$$

Equations with brackets:

You must remove the brackets first----- you do this by MULTIPLYING out the bracket

Then solve the equation

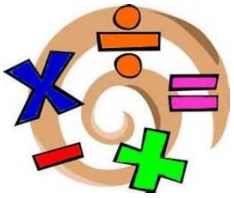
Forming simple equations:

X will always stand for an unknown number

2 bigger than x -------- ADD 2	x + 2
4 less than x -------- SUBTRACT 4	x – 4
Double the number ---- MULTIPLY by 2	2x
The result is ------- means equal to	=
Five times x -------- MULTIPLY by 5	5x

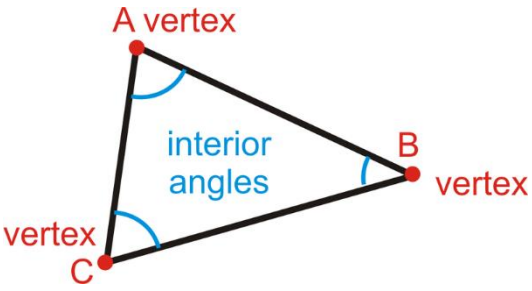
1st Year Maths Revision

Chapter 15: **GEOMETRY 2**



A triangle is made up of 3 sides and 3 angles

Angles in a triangle:



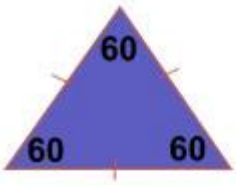
Each corner is called a vertex

The triangle is named ACB

The angle at vertex A is called < A or < CAB

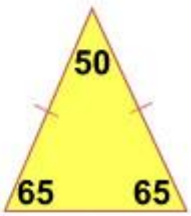
Angle Sum of a Triangle

The three angles in any triangle always add up to make a total of 180 degrees.



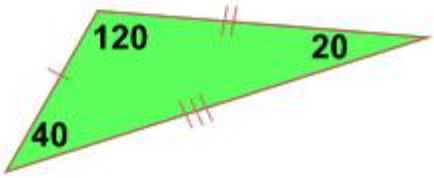
Equilateral

60 + 60 + 60 = **180**
or 3 x 60 = **180**



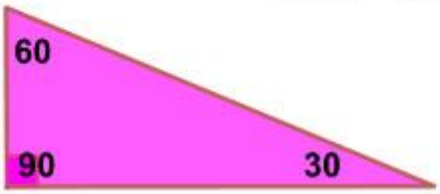
Isosceles

50 + 65 + 65 = **180**
or
2 x 65 + 50 = **180**



Scalene

40 + 120 + 20 = **180**

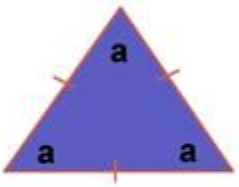


Right Triangle

30 + 60 + 90 = **180**

Finding Missing Angles

The three angles in any triangle always add up to make a total of 180 degrees.

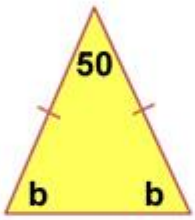


Equilateral

The angles in an Equilateral Triangle equal 60 degrees

60 + 60 + 60 = **180**

a = 60° ✓



Isosceles

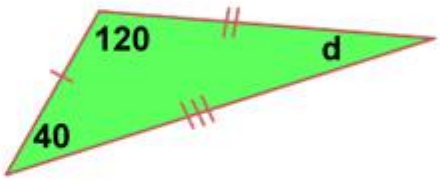
50 + b + b = **180**

50 + 2 x b = **180**

2 x b = 180 - 50

b = 130 / 2

b = 65° ✓



Scalene

40 + 120 + d = **180**

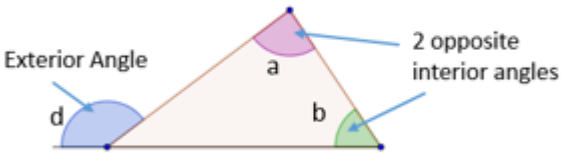
160 + d = 180

d = 180 - 160

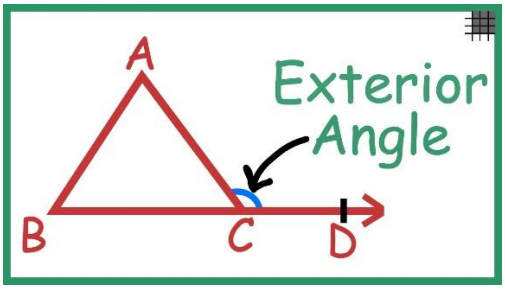
d = 20° ✓

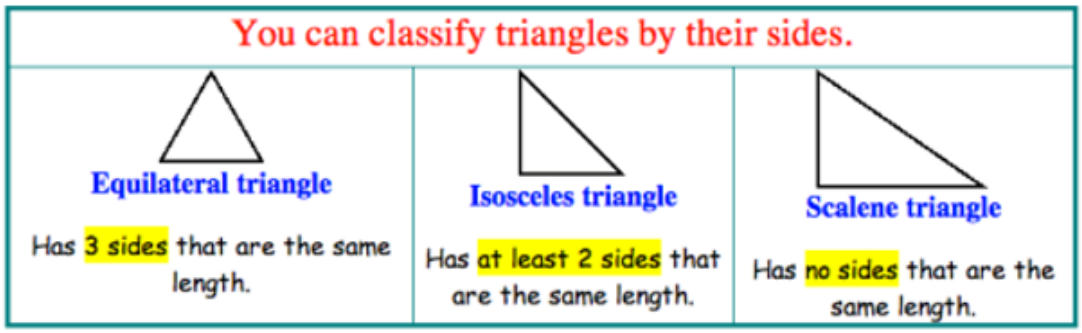
Exterior angle of a triangle

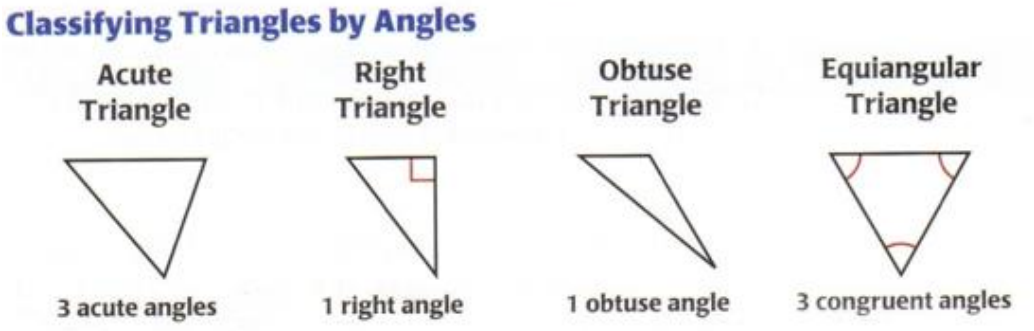
The exterior angle is equal to the sum of the two opposite interior angles.

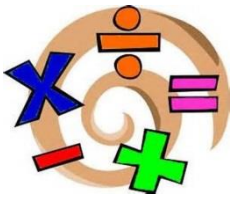


d = a + b









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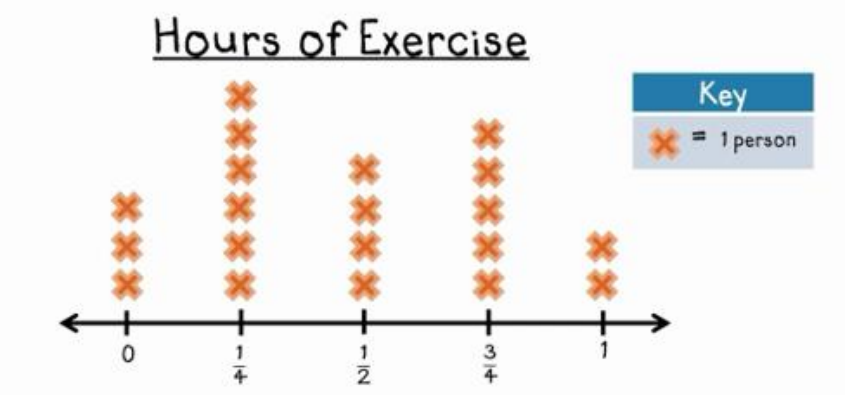
Chapter 16: **PRESENTING DATA**

There are various different ways of presenting the data that you have collected.

Line plots:

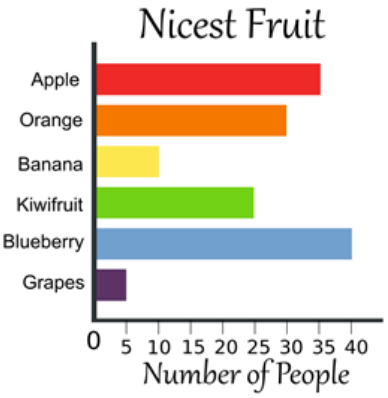
Use dots or x's to represent the data on a scale. Line plots should have a title and labelled axis

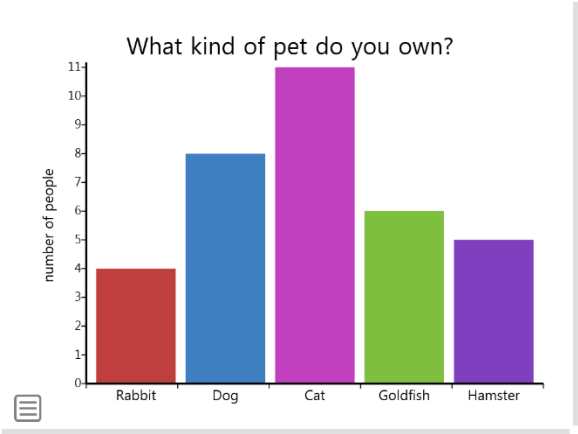


Bar charts:

Bars can be drawn vertically or horizontally and must be of the same width, and are separated by gaps of equal width.

Both axis must be labelled.





Stem and leaf plots:

These plots are made by splitting the numbers into tow parts. The **STEM** will represent the **tens** and the **LEAF** will represent the **units**. It is very important to always include a ***KEY*** to show how the stem and leaf combine.

The numbers should be placed in order of size

It is a good idea to do an unordered plot first and then rearrange the numbers in order of size, making sure the plots are labelled ordered and unordered

stem	leaf
0	1, 1, 2, 2, 3, 4, 4, 4, 4, 5, 8
1	0, 0, 0, 1, 1, 3, 7, 9
2	5, 5, 7, 7, 8, 8, 9, 9
3	0, 1, 1, 1, 2, 2, 2, 4, 5
4	0, 4, 8, 9
5	2, 6, 7, 7, 8
6	3, 6

Key: 6 | 3 = 63 years old