



## Ratio

- Simplify a ratio** by finding highest common factor  
 $48 : 12 \rightarrow 24 : 6 \rightarrow 12 : 3 \rightarrow 4 : 1$   
 Sometimes you need to multiply  
 $7.5 : 3 \rightarrow 15 : 6$
- Share an amount in a given ratio:**  
 Share £56 in the ratio 3: 5
  - Add the ratio parts together ( $3+5=8$ )
  - Divide the amount by your answer ( $56 \div 8 = 7$ )
  - Multiply each ratio part by your answer ( $3 \times 7 = 21$  and  $5 \times 7 = 35$ )  
 Answer £21: £35
- Express a ratio in the form n : 1 or 1 : n.** This means making one part of the ratio equal to 1 (by dividing or multiplying).
  - Express 25: 75 in the form 1: n. Divide by 25  $\rightarrow 1 : 3$
  - Express 7: 2 in the form n: 1. Divide by 2  $\rightarrow 3.5 : 1$
  - Express 5: 0.25 in the form n: 1. Multiply by 4  $\rightarrow 20 : 1$

## Probability

- Probability** is the likelihood/chance of something happening. It is expressed as a number between 0 (impossible) and 1 (certain); as a fraction, decimal, percentage or in words (likely, unlikely, even chance etc.)
- Mutually exclusive** events cannot happen at the same time. E.g. Turning left and right. Heads and Tails on a coin.
- Venn Diagram:** shows the relationship between a group of different things and how they overlap.
- Two-way tables:** A table that organises data around two categories. Fill out the information step by step using the information given. Make sure all the totals add up for all columns and rows.

## Construction & Loci

- Angle bisector** cuts an angle in half
- Perpendicular Bisector:** Cuts a line in half and at right angles.
  - Angle of  $90^\circ \rightarrow$  Construct a perpendicular bisector
  - Angle of  $45^\circ \rightarrow$  Bisect the  $90$  angle
  - Angle of  $60^\circ \rightarrow$  Start to construct an equilateral triangle
  - Angle of  $30^\circ \rightarrow$  Bisect  $60$  angle
- The perpendicular distance** from a point to a line is the shortest distance to that line.
- Loci:**

## Straight line graphs

- Midpoints:** Finding the mid point of a line or data
  - Method 1:** add the x coordinates and divide by 2, add the y coordinates and divide by 2
  - Method 2:** Sketch the line and find the values half way between the two x and two y values.
- Straight line graph** is also called a linear graph.
  - The general equation of a linear graph is  

$$y = mx + c$$
 where **m** - is the gradient and **c** - is the y- intercept.

## Vectors

- Vectors:** A vector can be written in 2 ways:  
 $\mathbf{a}$  or  $\underline{a}$ 
  - A vector is a quantity represented by an arrow with both direction and magnitude.
- Magnitude** is defined as the length of a vector.
  - If two vectors have the same magnitude and direction, they are equal.
- Parallel vectors** are multiples of each other.
- A scalar** is the number we multiply a vector by.
- Collinear vectors** are vectors that are on the same line.
  - To show that two vectors are collinear, show that one vector is a multiple of the other (parallel) AND that both vectors share a point.

## Plotting straight line graphs

- Method 1:** Table of Values  
 Construct a table of values to calculate coordinates.
- Method 2:** Gradient-Intercept Method (use when the equation is in the form  $y = mx + c$ )
  - Plot the y-intercept
  - Use the gradient, plot a second point.
  - Draw a line through the two points plotted.
- Method 3:** Cover-Up Method (use when the equation is in the form  $ax + by = c$ )
  - Cover the term and solve the resulting equation. Plot this on the
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  - Draw a line through the two points Plotted.