Maths Knowledge Organiser
Year 9 Ratio and Proportion part 1

Ratio – Simplifying

Ensure all parts of ratio are the same unit, and divide by a common factors

3kg:2000g → 3000g : 2000g
÷1000 ÷1000
3 : 2g

Ratio – unit ratio – n:1

Is where we simplify the ratio until it has a 1 in it, this may include decimals.
For examples → 4 loaves take 320 minutes
4:320
2:160
1:80 → this is the unit ratio

Ratio – Combining

Combine ratios to perform calculation, use common multiples.
Ratio A:B is 3:5 and B:C 3:4

A	:	B	:	C
3	:	5		
x3 → 9		3	:	4 → x5 20
		15		

So A:B:C is **9:15:20**

Value for money and recipes

Use multiplying and dividing to solve proportion questions

A	B
3 packets for £2.10	10 packets for £6.50
↓÷3 ↓	↓÷10 ↓
1 packet for £0.70	1 packet for £0.65

Therefore pack B better value as its lower

Recipe for 4 people		Recipe for 5 people
12g flour	→÷4 x5	15g flour
2 eggs	→÷4 x5	2.5 eggs
20g butter	→÷4 x5	25g butter
15g sugar	→÷4 x5	18.75g sugar

Ratio – Sharing

We can share an amount into a ratio
Ratio of blue to green token is 2:3

Scenario 1 – given total
There are 45 token in total → 45 ÷ 5 = 9

Blue	9	9		18 blues
Green	9	9	9	27 greens

Scenario 2 – given one amount
There are 30 blue tokens → 30 ÷ 2 = 15

Blue	15	15		30 blues
Green	15	15	15	45 greens

Scenario 3 – given difference
There are 12 more green than blue tokens → 12 ÷ 1 = 12

Blue	12	12		24 blues
Green	12	12	12	36 greens

Conversion graphs

Graphs which help us convert one unit of measure to another
To plot simply take the given information and join with a straight line

Maths Knowledge Organiser
Year 9 Ratio and Proportion part 2

Direct proportion

The relation between quantities whose ratio is constant.

a and b are directly proportional

a and b are directly proportional
When a = 4 b = 20
20 ÷ 4 = 5
So $b = 5a$
b is 5 times bigger than a

Inverse proportion

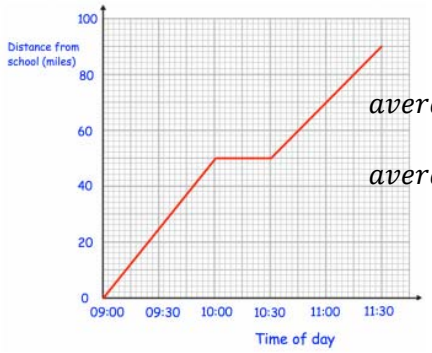
A relation between two quantities such that one increases in proportion as the other decreases.

a and b are inversely proportional
When a = 4 b = 5
4 x 5 = 20
So $a = \frac{5}{b}$

a and b² are inversely proportional
When a = 3 b = 4
3 x 16 = 48
So $a = \frac{48}{b^2}$

Distance time graphs

Graphs which describe a journey, straight line equals constant speed.
Horizontal line mean stationary (no speed)



$$speed = \frac{distance}{time}$$

$$average\ speed = \frac{total\ distance}{total\ time}$$

$$average\ speed = \frac{90}{2.5} = 36mph$$