
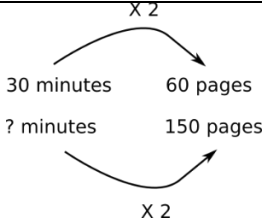


## Year 9 Higher Knowledge Organisers

### N6 Ratio and proportion **Higher only content in blue**

Topic/Skill	Definition/Tips	Example
1. Ratio	Ratio compares the size of <b>one part</b> to <b>another part</b> .  Written using the ':' symbol.	$3 : 1$ 
2. Proportion	Proportion compares the size of <b>one part</b> to the size of the <b>whole</b> .  Usually written as a fraction.	In a class with 13 boys and 9 girls, the proportion of boys is $\frac{13}{22}$ and the proportion of girls is $\frac{9}{22}$
3. Simplifying Ratios	<b>Divide</b> all parts of the ratio by a <b>common factor</b> .	$5 : 10 = 1 : 2$ (divide both by 5) $14 : 21 = 2 : 3$ (divide both by 7)
4. Ratios in the form $1 : n$ or $n : 1$	<b>Divide</b> both parts of the ratio by one of the numbers to make <b>one part equal 1</b> .	$5 : 7 = 1 : \frac{7}{5}$ in the form $1 : n$ $5 : 7 = \frac{5}{7} : 1$ in the form $n : 1$
5. Sharing in a Ratio	<b>1. Add</b> the total parts of the ratio. <b>2. Divide</b> the amount to be shared by this value to find the value of one part. <b>3. Multiply</b> this value by each part of the ratio.  Use only if you <b>know the total</b> .	Share £60 in the ratio $3 : 2 : 1$ .  $3 + 2 + 1 = 6$ $60 \div 6 = 10$ $3 \times 10 = 30, 2 \times 10 = 20, 1 \times 10 = 10$ $\pounds 30 : \pounds 20 : \pounds 10$
6. Proportional Reasoning	Comparing two things using <b>multiplicative reasoning</b> and applying this to a new situation.  Identify one multiplicative link and use this to find missing quantities.	
7. Unitary Method	Finding the <b>value of a single unit</b> and then finding the necessary value by <b>multiplying</b> the single unit value.	3 cakes require 450g of sugar to make. Find how much sugar is needed to make 5 cakes.  $3 \text{ cakes} = 450\text{g}$ So $1 \text{ cake} = 150\text{g}$ ( $\div$ by 3) So $5 \text{ cakes} = 750 \text{ g}$ ( $\times$ by 5)
8. Ratio already shared	Find what <b>one part</b> of the ratio is worth using the <b>unitary method</b> .	Money was shared in the ratio $3:2:5$ between Ann, Bob and Cat. Given that Bob had £16, found out the total amount of money shared.  $\pounds 16 = 2 \text{ parts}$ So $\pounds 8 = 1 \text{ part}$ $3 + 2 + 5 = 10 \text{ parts}$ , so $8 \times 10 = \pounds 80$
9. Best Buys	Find the <b>unit cost</b> by <b>dividing</b> the <b>price</b> by <b>the quantity</b> . The <b>lowest</b> number is the best value.	8 cakes for £1.28 $\rightarrow$ 16p each ( $\div$ by 8) 13 cakes for £2.05 $\rightarrow$ 15.8p each ( $\div$ by 13) Pack of 13 cakes is best value.

10. Ratio difference problems	Solve difference problems involving ratio e.g. a: b: c = 1: 2: 4. If c receives £6 more than a, find b.	e.g. a: b: c = 1: 2: 4. If c receives £6 more than a, find b.
11. Ratio and equations	Relate ratio to linear functions and equations	e.g. if a:b = 3: 5, write two equations connecting a and b e.g. if a : b = 2: 3 then $a = \frac{2}{3}b$ and $b = \frac{3}{2}a$ e.g. if $a = \frac{3}{4}b$ then a : b = 3 : 4 or e.g. if $a = \frac{3}{4}$ of b then a : b = 3 : 4
12. 3 part ratio problems	Solve '3-part' ratio problems	e.g. if a: b = 2 : 5 and b : c = 4: 7, find a : b : c or the minimum value of a + b + c
13. Algebraic fractions and ratio	Simplify algebraic fractions involving ratio	e.g. ratio a: b is $x^2 + x: x + 1$ . Write a as a fraction of the total in its <b>simplest form</b> .
14. Ratio and straight line problems	Apply ratio to straight line problems	e.g. finding another coordinate when a line has been divided using ratio