

Ratio and Proportion

Key Knowledge/Prior Learning KS2/3 and Retrieval and Suggested Starters

- Simplifying and equivalent fractions
- Fractions of amounts
- Reverse fractions of amounts
- Unit conversions
- Percentage of amounts
- Money Calculations

KS3 National Curriculum – what students will be practicing and Key Questions

To be able to:

- Writing ratios inc as fractions
- Simplifying and find equivalent ratios
- Use ratios to compare
- Share into a ratio
- Share into a ratio when part of the information
- Share into a ratio when the difference is known
- Use unitary method of proportion (direct and inverse)
- Work with recipes
- Work with exchange rates/conversions
- Calculate best buys/best value for money.

Specific Ambitious Knowledge

- Best Buys: Unitary method Vs LCM method
Use of Bar Method/Buckets etc to model ratio

Key Vocabulary/Literacy Opportunities


- Parts
- Whole
- Total
- Ratio
- Simplify
- Equivalence
- Unitary method
- Multiplier
- Combine
- Representing
- Share
- Corresponding
- Original

- Conversion
- Divisor
- Comparison/compare
- Justify

Key Formulae/Knowledge and Misconceptions

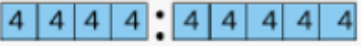
Sharing into a ratio

Nikki : Gemma

 9 Boxes in total

Value of each box = $£36 \div 9 = £4$ per box

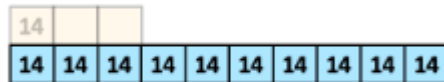
Nikki : Gemma



£16 £20

Parts known

Laura makes some orange juice by mixing orange cordial and water in the ratio 3:10. She uses 42mL of orange cordial. How much water does she use?



3 parts = 42mL

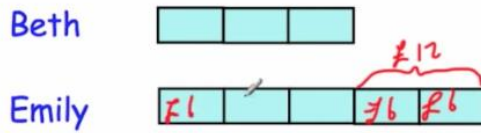
1 part = $42 \div 3 = 14$ mL

10 parts = $14 \times 10 = 140$ mL

Laura uses 140mL of water.

Differences known

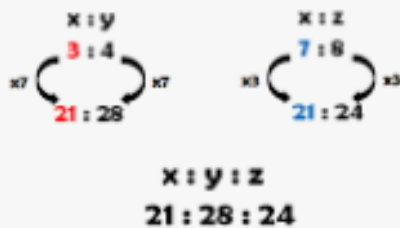
Beth and Emily share money in the ratio 3:5
 Emily receives £12 more than Beth.
 How much money does each girl receive?



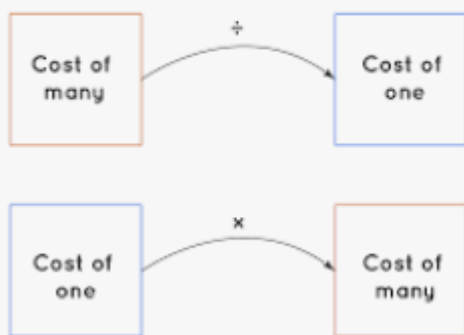
Students stop reading after £12, assuming that Emily gets £12 - emphasis the no comma, so no pause in reading.

Combining ratios

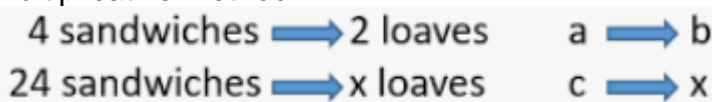
If $x : y = 3 : 4$ and $x : z = 7 : 8$.
 Find the ratio $x : y : z$



Unitary Method



Multiplicative Method



Direct Vs Indirect Proportion

Direct and Inverse Proportion



Direct Proportion

$$y \propto x$$
$$y = kx, \text{ for a constant } k$$



Inverse Proportion

$$y \propto \frac{1}{x}$$
$$y = \frac{k}{x}, \text{ for a constant } k$$



Students not understanding context and using direct proportion

Finding exchange rates

$$\text{Exchange Rate} = \frac{\text{Money in After Exchange}}{\text{Money Before Exchange}}$$

Exchange rates e.g.

$c = a \times b$

a = money you have
 b = exchange rate
 c = money after exchange

Example:
 $a = \$1,500(\text{USD}); b = 0.7618$
 $1,500 \times 0.7618$
 $= 1,142.70 \text{ EUR}$

Maths in Context (Historical, Real Life and Student Thinking Points)

Projects/Enrichment/Investigations

- Mixing lemonade: https://nrich.maths.org/6870?utm_source=secondary-map
- Mixing paints: https://nrich.maths.org/4793?utm_source=secondary-map
- Nutrition and cycling: https://nrich.maths.org/7571?utm_source=secondary-map

Project Ideas: