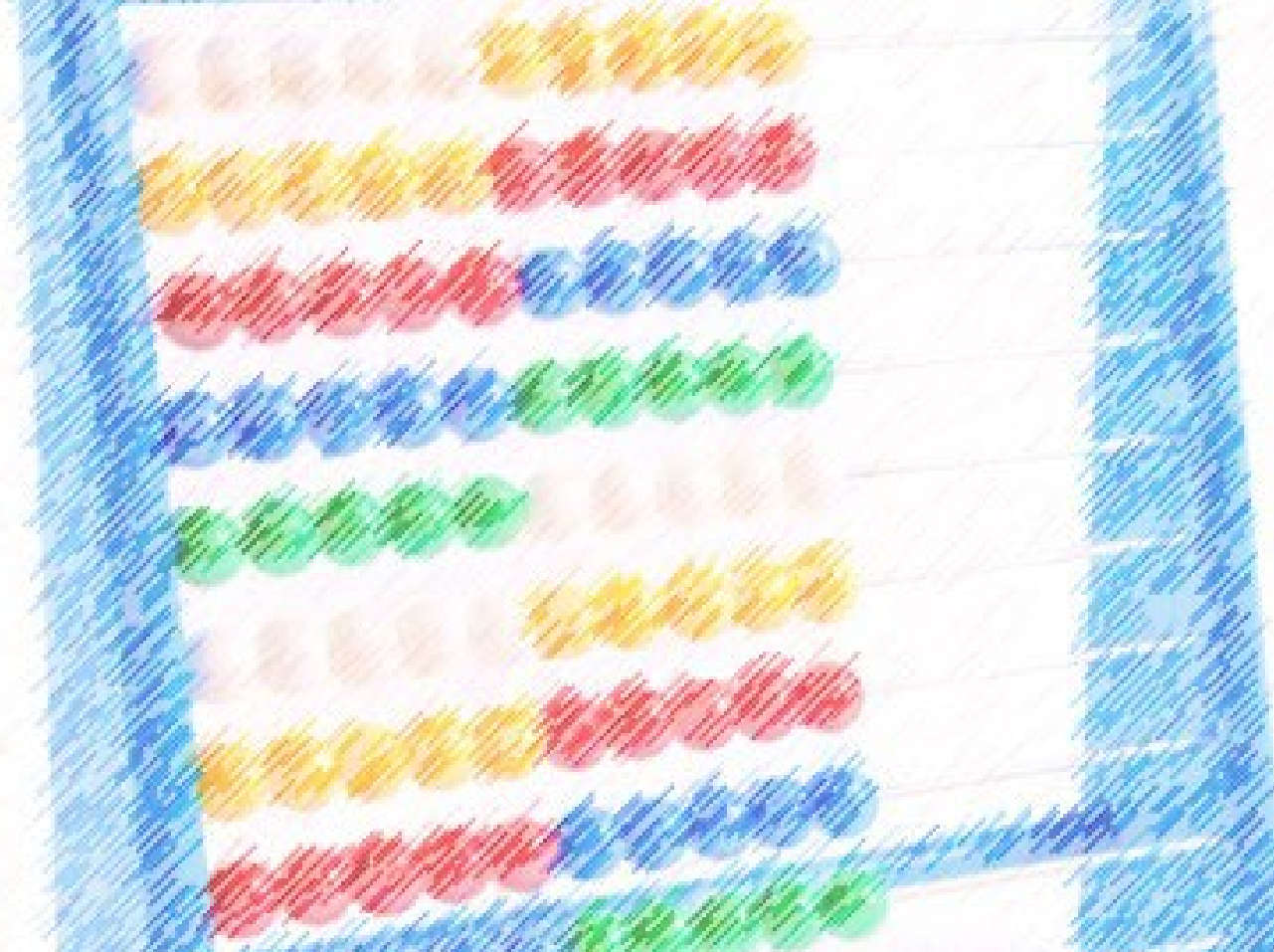




RATIO RELATIONS

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SUB-TOPICS COVERED

- Understanding Ratio and Proportionate Scaling
- Example of Ratio : A Reminder
- Scaling a Ratio
- Ratio as a Fraction or Percentage
- 2-Way Split Using a Ratio
- 3-Way Split using a 3-Part Ratio
- Quiz and Summary



UNDERSTANDING RATIO AND PROPORTIONATE SCALING



A **ratio** is a way to compare two or more quantities. It tells us how much of one thing there is compared to another.



A **proportion** is when two ratios are equal or when something is divided in the same ratio across different contexts.



EXAMPLE OF RATIO : A REMINDER

A car salesroom has 5 cars

2 of them blue in colour

3 red in colour

The difference in colours is due to local buyer trends in sales.

For every 2 blue cars, there's 3 red cars.

The proportion of blue cars to red cars is 2:3



SCALING A RATIO

- Ratio allows projection and scaling
- If it takes 50 minutes to walk 1 mile
- Taken at the lowest of 1:50
- We can write this as a fraction (the mileage number is $1/50^{\text{th}}$ of the number of minutes taken, let's explain):

$$\begin{array}{ccc} 1 & \times & 5 \\ \hline 50 & \times & 5 \end{array} \qquad \begin{array}{c} 5 \\ \hline 250 \end{array}$$

- 5 times the amount of time
- 5 times the mileage
- Proportionate to each other



RATIO AS A FRACTION OR PERCENTAGE

You can express a ratio as a **fraction** by writing one part over the total.

- Given the ratio 2: 3

- Part to whole (as a fraction):

$$\text{Red} = \frac{2}{2+3} = \frac{2}{5}$$

- As a percentage:

$$\frac{2}{5} \times 100 = 40\%$$

- So, 40% of the total is red, 60% of the total is blue.



2-WAY SPLIT USING A RATIO

- Let's split £180 in the ratio 2:3

Step-by-step:

- **Add the parts of the ratio:**
 $2 + 3 = 5$ parts in total
- **Find the value of one part:**
 $\frac{£180}{5} = £36 \text{ per part}$
- **Multiply to find each share:**
 - First person: $2 \times £36 = £72$
 - Second person: $3 \times £36 = £108$
-  **Check:** $£72 + £108 = £180$ 



3-WAY SPLIT USING A 3-PART RATIO

- Now, let's split £210 in the ratio 2: 4: 1

Step-by-step:

- **Add the ratio parts:**
 $2 + 4 + 1 = 7$ parts
- **Find the value of one part:**
 $\frac{£210}{7} = £30 \text{ per part}$
- **Multiply to find each share:**
 - First share (2 parts): $2 \times £30 = £60$
 - Second share (4 parts): $4 \times £30 = £120$
 - Third share (1 part): $1 \times £30 = £30$
-  **Check:** $£60 + £120 + £30 = £210$ 



CONSIDER THESE ...

Hint: Consider the overall total, then the fractional split and focus upon one at a time.

Number Two Scenario has a three-way split of a total and each participant receives a proportionate amount based upon the ratio provided.

NUMBER ONE SCENARIO: A building firm has committed to build social housing at a rate of 9 houses for every 25 private selling houses. They build 500 new homes; how many are social housing?

NUMBER TWO SCENARIO: 3 subsidiary firms, named Garbo, Polanski, Tribal, within a group of companies each receive a share of grouped profits at a relative ratio of: 5:4:1 and if profits are 250 million, how much for each of them in the split?



THE ANSWERS...

NUMBER ONE SCENARIO: Ratio is 25:9

So, the total parts is $25+9=34$

Therefore, social housing is $9/34$ ths
(9 parts of 34)

Decimal value is $9 \div 34 = 0.265$
(each item)

$500 \times 0.265 = 133$ (rounded to whole number)

ANSWER: 133 social houses

NUMBER TWO SCENARIO:

Garbo, Polanski, Tribal have a ratio split of 5:4:1

Again, split it down to 1 part then distribute as per the ratio.

So, $5+4+1=10$ parts in total, dividing by a share of 10 and multiply for each ratio portion.

$250 \div 10 = 25$ million being 1 portion.

Garbo gets 5 portions: $25 \times 5 = 125$ million

Polanski get 4 portions: $25 \times 4 = 100$ million

Tribal get 1 portion = 25 million

NUMBER ONE SCENARIO: A building firm has committed to build social housing at a rate of 9 houses for every 25 private selling houses. They build 500 new homes; how many are social housing?

ANSWER: 133 social houses

NUMBER TWO SCENARIO: 3 subsidiary firms, named Garbo, Polanski, Tribal, within a group of companies each receive a share of grouped profits at a relative ratio of: 5:4:1 and if profits are 250 million, how much for each of them in the split?

Garbo 125m, Polanski 100m, Tribal 25m



SUMMARY

Divide the total down to 1 portion

Use the ratio to distribute the proportioned amount by multiplying for each ratio

Check the total split at the end

If you remember, divide down to 1 portion, multiply per ratio, check the total – you should have it cracked!

For example, a share of 200 with a ratio of 3:6:1

Means: $3+6+1=10$

Therefore, the first portion is $3/10$ ths, the second is $6/10$ ths and the last is $1/10$ th

Divide 200 by $10 = 20$

Each portion is multiplied by 20

The split would be $3 \times 20 = 60$, $6 \times 20 = 120$, $1 \times 20 = 20$

Check on the total $60+120+20=200$



EXAMPLE USE AND IMPORTANCE

- Television or film broadcast
- Different proportions of pixels across x pixels high
- Older TV was 4:3
- Modern is more 16:9
- If ratio is not employed for proportionate changing of screens, newscasters looked very wide faced and incorrect human proportions





TRY SOME OF YOUR OWN

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