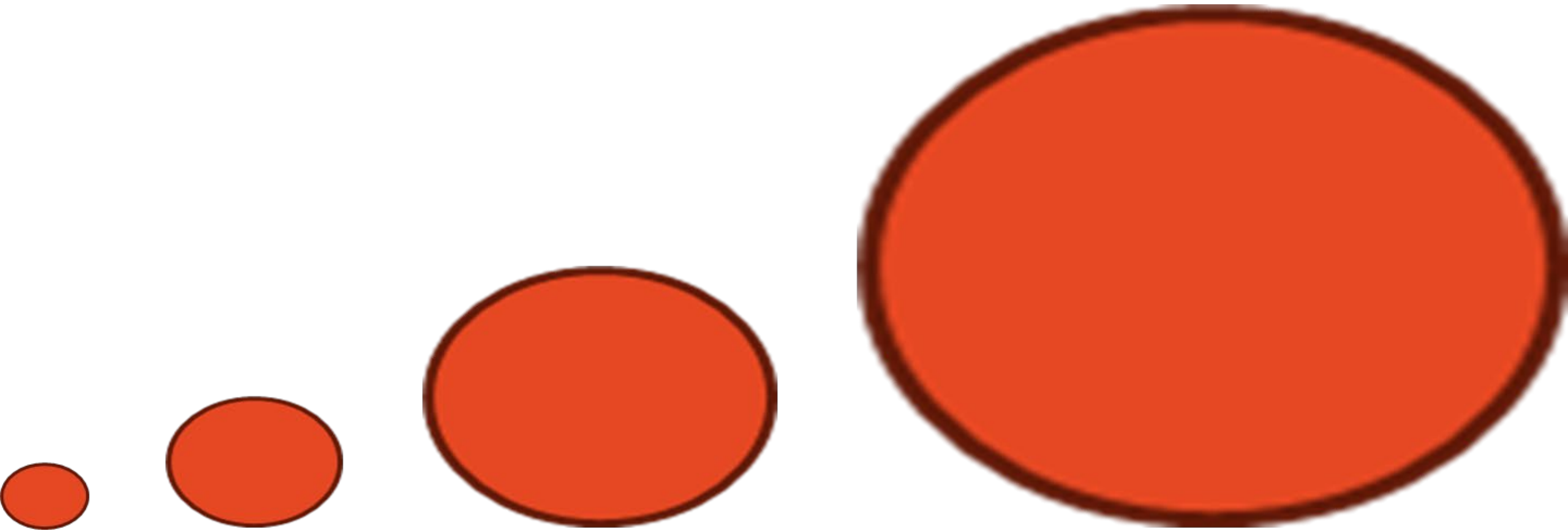




RATIO PROPORTIONATE SCALING

By Mark Gillan

SUB-TOPICS COVERED

- Reminder: Ratio as a Fraction
- Scaling proportionately using a Ratio
- Ratio as a Fraction or Percentage
- Some exercises and practice thought
- 2-Way Split Using a Ratio
- 3-Way Split using a 3-Part Ratio
- Quiz and Summary



REMINDER: RATIO AS A FRACTION

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

2 Blue cars, 3 Red cars = 5 cars in total

- Given the ratio **2:3**
- Part to whole (as a fraction):

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

- In other words, there's 5 parts in total
- Blue accounts for 2/5ths of the total of all cars
- Red accounts for 3/5ths of the total of all cars



SCALING USING 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):

$$\begin{array}{ccc} \frac{1}{50} & \times & 5 \\ & \times & 5 \\ & & 250 \end{array}$$

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



TRY THIS ONE

- ➔ When baking for more than two people and a relative increase is required
- ➔ The ingredients listed had been for 2 hungry people, but we now have 5 hungry people
- ➔ What is the ratio for increased ingredients within the recipe?
- ➔ Originally, the recipe required 100 grams of sugar and 250ml of milk
- ➔ How much sugar is now required and how much milk?



ANSWER

- Recipe for 2 hungry people, but now we have 5 hungry people
- What is the ratio?
- Was 100 grams sugar and 250 ml milk
- How much sugar is now required using the ratio and how much milk?

From 2 people to 5 people

It's 2 different sums using the one ratio

Lowest form of ratio for 1 person

Remember, what you do on one side is done on the other

The ratio can be written as 1:2.5

Sugar $100\text{g} \times 2.5 = 250\text{g}$

Milk $250\text{ml} \times 2.5 = 625\text{ml}$



REMINDER AGAIN — FRACTION USE FOR RATIO

- We can put a ratio into a fraction
- Remember, a ratio of 2:3 for Blue cars to Red cars can be shown for Blue cars:
- $2+3 = 5$ cars in total
- Part to whole (as a fraction):

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

- So, Blue accounts for 2/5ths of the total number of cars
- We can convert a fraction into a decimal by ... ?????

- Dividing the top number by the bottom number, in this instance $2 \div 5 = 0.4$
- We could say it is 40% of the total
- Therefore, a few different ways to calculate the number of Blue cars using the 2:3 ratio for scaling
- If the car showroom now has 200 cars, the quantity of blue cars using the 2:3 ratio can be shown as...
- $200 \times 40\%$ otherwise known as 200×0.4
- $= 80$ blue cars out of 200 total cars



2-WAY SPLIT USING A RATIO

- Let's split £180 in the ratio 2: 3 (maybe one person didn't have 3 courses, the other did)

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 4: 2: 1

Step-by-step:

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



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 6:3:1

Means: $6+3+1=10$

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

Divide 200 by $10 = 20$

Each portion is multiplied by 20

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

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





TRY SOME OF YOUR OWN

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