GCSE (9–1) MATHEMATICS

Foundation Check In - 5.01 Calculations with ratio

1. A school canteen has 45 chairs and 18 tables. Write the ratio of tables to chairs in its simplest form.

2. Share 1.5 litres of juice in the ratio 3 : 5 : 2.
   Give the quantities in millilitres.

3. Some flour is shared in the ratio 4 : 3. The smaller share weighs 120 g.
   Find the weight of the flour that was shared out.

4. *Seaweed green* is made by mixing yellow paint, blue paint and orange paint in the ratio 3 : 7 : 1. What fraction of the mixture is blue paint?

5. Write 5 g : 200 mg in the ratio n : 1.

6. A piece of wood is cut into three pieces, A, B and C. A is $\dfrac{1}{4}$ of the total length. The lengths of B and C are in the ratio 1 : 2. Explain why B is the same length as A.

7. Lily and Rema win a sum of money which they agree to share in the ratio 1 : 4. Lily says, "I will have a quarter of the winnings". Explain why Lily is wrong and correct her answer.

8. A large pack of gravy granules weighs 700 g and costs £2.80. A small pack of gravy granules weighs 250 g and costs £1.05. Show that the larger pack gives better value for money.

9. Jan has this recipe for macaroni cheese that serves 4 people.

 | | |
   |---|---|
   | 400 g | macaroni pasta |
   | 300 ml | evaporated milk |
   | 150 g | mature cheddar cheese |
   | 2 | shallots |

   If Jan has 2.5 kg of macaroni pasta, 2 L of evaporated milk, 1 kg of mature cheddar cheese and 15 shallots and she makes as much macaroni cheese as possible, how many people will it serve?

10. During a one hour training session, Darren walks, jogs and runs in the ratio 1 : 5 : 2. The length of his stride is 0.8 m when walking, 1.1 m when jogging and 1.4 m when running. His pedometer records 5600 strides in a session. Work out his average speed in km/h.

Extension

The graph below shows the relationship between *f*, the amount of flour in grams, and *b*, the amount of butter in grams, used to make pastry.
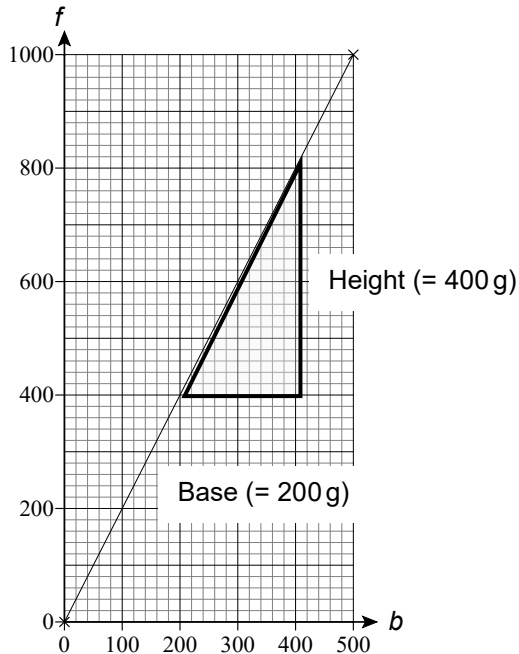
The **gradient** of this line is 2 because, for any right-angled triangle joining two points on the line as shown, the height is twice the base.

The **equation** of the line is $f = 2b$.

(a)   Write the ratio $f : b$ in its simplest form.
      Find how much butter is used when 1.2 kg of flour is used.

(b)   Draw a graph for when the ratio is $f : b = 3 : 1$.
      Write down the equation of the graph.

(c)   Draw a graph for when $f = 0.5b$.
      Write the ratio $f : b$ in its simplest form.
      Find how much flour is used when 550 g of butter is used.

Answers

1. 2 : 5

2. 450 ml, 750 ml, 300 ml

3. 280 g

4. $\dfrac{7}{11}$

5. 25 : 1

6. *A* is $\dfrac{1}{4}$ of the whole so *B* + *C* is $\dfrac{3}{4}$ of the whole. These are shared in the ratio 1 : 2 or $\dfrac{1}{4} : \dfrac{2}{4}$ so *B* is the same fraction of the whole as *A*.

7. 1 : 4 means there are 5 parts, so Lily will get $\dfrac{1}{5}$ of the total.

8. Cost per 100 g of the larger pack $= 7\overline{)280}^{\,40}$, whilst cost per 100 g of the smaller pack $= 5\overline{)210}^{\,42}$. The larger pack is better value than the smaller pack oe.
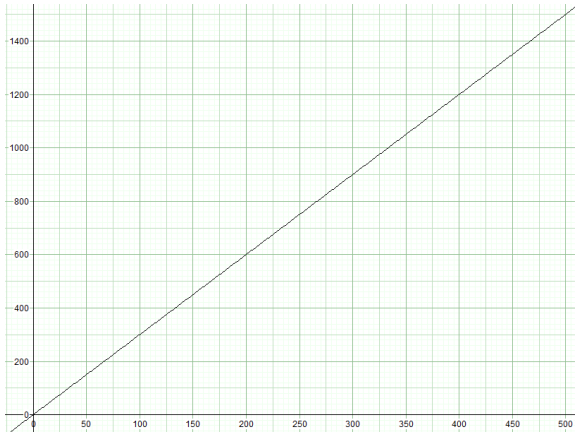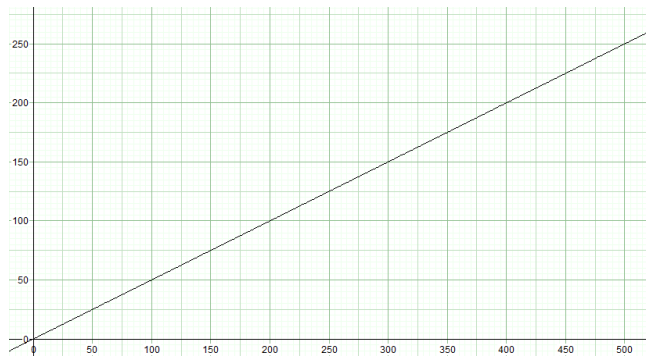
9. 25 people

10. 6.37 km/h

Extension

(a) $f : b = 2 : 1$
        0.6 kg or 600 g of butter used

(b)

$f = 3b$

(c)

$f : b = 1 : 2$
275 g of flour used

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AO1	2	Split a quantity into three parts given the ratio			
AO1	3	Calculate one quantity from another, given the ratio of the two quantities			
AO1	4	Interpret a ratio as a fraction of a whole			
AO1	5	Find a ratio of mixed unit quantities in the form $n : 1$			
AO2	6	Interpret a ratio as a fraction			
AO2	7	Interpret a ratio as a fraction of a whole			
AO2	8	Use ratios to determine value for money			
AO3	9	Solve a proportion problem			
AO3	10	Solve a problem involving a quantity split into three parts			

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