Worksheet - Ratio and proportion

Year: Year 7 · 20

Show your working.

Question 1

Question 1 – Simplifying ratios *(Section A · Skills practice)*

Write each ratio in its simplest form.

a. 12 : 18
b. 45 : 60 : 75
c. 2.5 : 10
d. 150 g : 1 kg
e. 40 cm : 1.2 m

Question 2

Question 2 – Sharing in a ratio *(Section A · Skills practice)*

Share each amount in the given ratio. Show your working.

a. £60 in the ratio 1 : 2
b. £90 in the ratio 2 : 3 : 4
c. £84 in the ratio 5 : 7
d. 72 sweets in the ratio 3 : 1

Question 3

Question 3 – Equivalent ratios *(Section A · Skills practice)*

Fill in the missing numbers.

a. 3 : 5 = 12 : ?
b. 4 : 7 = ? : 28
c. 2 : 3 : 5 = 6 : ? : ?
d. The ratio of red to blue is 5 : 2. There are 30 red counters. How many blue counters are there?

Question 4

Question 4 – Direct proportion and unit rates *(Section A · Skills practice)*

Use the unitary method to answer these.

a. 5 pens cost £3.50. Find the cost of 8 pens.
b. 12 apples weigh 1.8 kg. How much do 20 apples weigh?

c. A car uses 6 litres of petrol for 72 km. How far can it go on 10 litres?
d. A worker earns £62.40 for 8 hours. How much would she earn in 15 hours?

Question 5

Question 5 – Comparing using ratios *(Section A · Skills practice)*

Which is the better value? Show your working.

a. A 500 g pack of rice costs £1.20. A 2 kg pack costs £4.40.
b. A 250 ml bottle of shampoo costs £1.50. A 750 ml bottle costs £4.20.
c. Orange squash: 1.5 litres for £2.10 or 2 litres for £2.60.

Question 6

Question 6 – Scale and maps *(Section A · Skills practice)*

A map has a scale of 1 : 50 000.

a. How many centimetres on the ground does 1 cm on the map represent? Convert your answer to metres.
b. Two villages are 6 cm apart on the map. How far apart are they in kilometres?
c. The real distance between a church and a river is 2.5 km. How far apart are they on the map?

Question 7

Question 7 – Making fruit punch *(Section B · Real-life practice)*

A recipe for fruit punch for a school party uses orange juice, pineapple juice and lemonade in the ratio 3 : 2 : 5.

a. How much of each is needed to make 5 litres of punch?
b. The school has 1.2 litres of pineapple juice. What is the largest amount of punch they can make?
c. How much orange juice and lemonade do they need for this amount?
d. Orange juice costs £1.50 per litre, pineapple juice £2 per litre and lemonade £0.60 per litre. What is the cost of 5 litres of punch?

Question 8

Question 8 – Mixing concrete *(Section B · Real-life practice)*

A builder mixes cement, sand and gravel in the ratio 1 : 2 : 4 to make concrete for a garden path. A bag of cement holds 25 kg.

a. How much sand and gravel does the builder need for 2 bags of cement?
b. What is the total mass of the mixture?
c. What fraction of the mixture is cement?

d. The path needs 700 kg of mixture. How many bags of cement does the builder need to buy?

Question 9

Question 9 – Best buy at the supermarket *(Section B · Real-life practice)*

Three different packs of cereal are sold at the supermarket.

Pack	Mass	Price
Small	375 g	£2.25
Medium	600 g	£3.30
Large	1.2 kg	£6.00

a. Work out the price per 100 g for each pack.
b. Which pack is the best value?
c. Mia says "The large pack is twice the medium pack, so it should cost £6.60." Is the large pack a better deal than that? Explain.
d. A family eats 150 g of cereal each day. For how many days does the large pack last?

Question 10

Question 10 – Pocket money in a ratio *(Section B · Real-life practice)*

Ali and Ben share £45 of prize money in the ratio of the number of puzzles they solved: 4 : 5.

a. How much money does each boy get?
b. Their sister Cara joins and the prize becomes £72 shared in the ratio 4 : 5 : 3. How much does each get now?
c. How much more does Ali get in the second share than in the first?
d. Write the fraction of the money each person gets in the second share.

Question 11

Question 11 – Journey speeds *(Section B · Real-life practice)*

A coach travels at a steady speed. In 3 hours it travels 195 km.

a. How far does it travel in 1 hour?
b. How far does it travel in 5 hours?
c. How long does it take to travel 130 km?
d. A second coach travels 280 km in 4 hours. Which coach is faster?

Question 12

Question 12 – Recipe scaling for pancakes *(Section B · Real-life practice)*

A recipe for 4 people uses 200 g flour, 2 eggs and 300 ml milk.

People	4	6	10	15
Flour (g)	200			
Eggs	2			
Milk (ml)	300			

a. Complete the table.
b. A pupil only has 5 eggs. What is the largest number of people they can cook for, and how much flour and milk do they need?
c. Flour costs £1.20 per kilogram, eggs 25p each, and milk 80p per litre. Work out the cost of the ingredients for 10 people.

Question 13

Question 13 – Model of the Eiffel Tower *(Section B · Real-life practice)*

The Eiffel Tower is 330 m tall. A model is made to a scale of 1 : 200.

a. How tall is the model in metres?
b. The model's base is 0.6 m wide. How wide is the real base?
c. The real tower weighs about 10 000 tonnes of iron. A model made of the same iron weighs much less. Explain whether the weight scales in the same ratio.

Question 14

Question 14 – The sports club *(Section B · Real-life practice)*

At a sports club, the ratio of boys to girls is 5 : 4. There are 135 members in total.

a. How many boys and how many girls are in the club?
b. Ten more girls join. What is the new ratio of boys to girls in its simplest form?
c. What percentage of the original members were girls? Give your answer to the nearest whole number.
d. Each member pays £2.50 per session. How much does the club collect from the original members in 4 sessions?

Question 15

Question 15 – Sharing the winnings *(Section C · Problem solving)*

Three friends buy a raffle ticket together. Amy pays £2, Ben pays £3 and Cara pays £5. They win £400 and agree to share the prize in the ratio of the money they paid.

a. Write the ratio in its simplest form.

b. How much does each person get?
c. They spend one quarter of the prize on a party. How much do they have left?
d. The remainder is shared in the same ratio. How much more does Cara get than Amy?

Question 16

Question 16 – Changing a recipe *(Section C · Problem solving)*

A bread recipe has flour and water in the ratio 5 : 3 by mass. A baker needs 1.6 kg of dough made from only flour and water.

a. How much flour and how much water does she need?
b. She accidentally pours in 100 g too much water. What is the new ratio of flour to water in its simplest form?
c. How much flour must she add to bring the ratio back to 5 : 3?
d. What is the total mass of the dough now?

Question 17

Question 17 – The paint problem *(Section C · Problem solving)*

To make green paint, a decorator mixes yellow and blue paint in the ratio 3 : 2. To make a darker green he uses the ratio 2 : 3. He needs 10 litres of each shade.

a. How many litres of yellow and blue are needed for the 10 litres of the first green?
b. How many litres of yellow and blue are needed for the 10 litres of the darker green?
c. What is the total amount of yellow and blue needed for both shades?
d. A tin of yellow holds 5 litres and costs £12.50. A tin of blue holds 2.5 litres and costs £7. Find the least cost of buying enough paint.

Question 18

Question 18 – Spot the mistake *(Section C · Problem solving)*

Each pupil made one mistake. Find it and write the correct answer.

a. Ali: share £50 in the ratio 2 : 3. "2 + 3 = 5, so £10 and £15."
b. Beth: simplify 12 : 18 : 24. "It is 2 : 3 : 5."
c. Carl: 4 pens cost £3. "So 10 pens cost £3 + £6 = £9."
d. Dina: a recipe uses flour and sugar in ratio 3 : 1. She says the fraction of sugar is a third.

Question 19

Question 19 – Best price per unit *(Section C · Problem solving)*

A school buys paper for the photocopier. Shop A sells 500 sheets for £3.50 and offers 10% off when you buy 5 packs or more. Shop B sells 2 500 sheets for £16.

a. What is the cost of 2 500 sheets (5 packs) at shop A before the discount?
b. What is the cost of 5 packs at shop A after the discount?
c. Which shop gives the cheaper price for 2 500 sheets and by how much?
d. How much would the school save buying 10 000 sheets from the cheaper shop instead of the dearer one, assuming the same prices per sheet?

Question 20

Question 20 – Challenge: the age ratio *(Section D · Challenge)*

Today the ages of a mother and her daughter are in the ratio 7 : 2. The mother is 42 today.

a. How old is the daughter today?
b. How old will each be in 5 years' time?
c. Write the ratio of their ages in 5 years in its simplest form.
d. In how many years will the mother be exactly twice as old as the daughter?