Planner

Ratio and proportion (1)

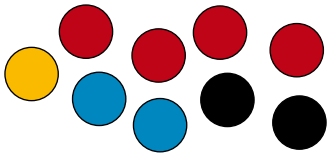
- Expressing a proportion as a fraction, decimal or percentage
- Comparing proportions
- Comparing two quantities using a ratio
- Simplifying a ratio and sharing an amount in a given ratio

Keywords

You should know

explanation 1

1 Here is a set of 9 counters.

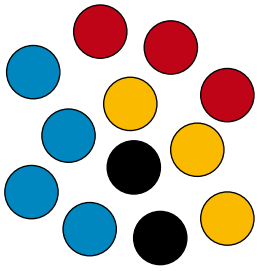


What proportion of the counters are

a orange **b** blue **c** red

d red or orange **e** not red **f** not black

2 Here is a set of 12 counters.

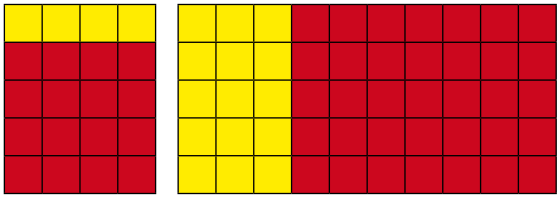


What proportion of the counters are these colours? Give your answers as fractions in their lowest terms.

a Blue **b** Red **c** Black

d Blue or black **e** Not orange **f** Not blue

3 These diagrams are made from red and yellow squares.



A B

a **i** How many red squares are in each diagram?

ii Which diagram has more red squares?

b **i** Find the proportion of red squares in each diagram. Give your answers as fractions in their lowest terms.

ii Give your answers to part **i** as fractions with denominator 10.

iii Which diagram has the higher proportion of red squares?

c Compare the number of red squares in each diagram to the proportion of red squares in each diagram. Write a sentence about this.

explanation 2

4 In a football match, team A had 20 shots at goal with 14 on target.

Team B had 12 shots at goal with 9 on target.

a What proportion of shots were on target for each team? Write your answers as fractions in their lowest terms.

b Write the proportion of shots on target for each team as a percentage.

c Which team seems to be more accurate? Explain why you think so.

5 In his summer exams Asad scored 24 out of 30 marks in French and 30 out of 40 marks in German.

a Write Asad's mark in each subject as a fraction in its lowest terms.

b Write Asad's mark in each subject as a percentage.

c Which subject has Asad done better in?

d Why is it a good idea to compare the proportion of marks as percentages?

6 A bag contains different coloured counters.

Kirsty picks 12 counters.

How many counters are there of each colour?
Use these clues.

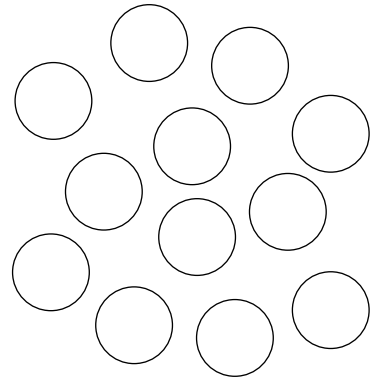
i $\frac{1}{3}$ of the counters are yellow.

ii The proportion of blue counters is 25%.

iii The proportion of yellow counters is double the proportion of red counters.

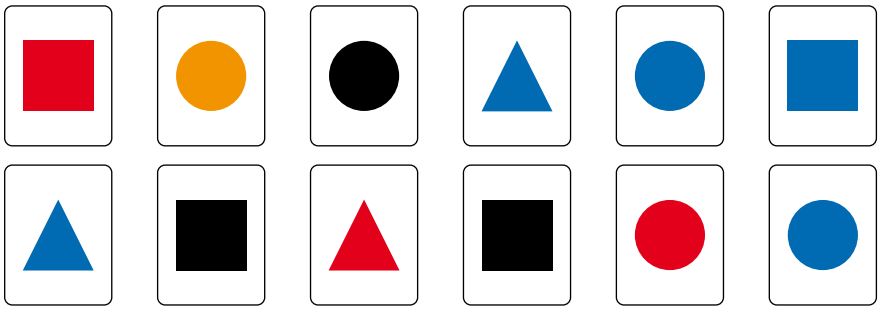
iv There is at least 1 orange counter.

v 50% of the counters are yellow or black.



explanation 3 online

7 Harry deals 12 cards at random.



Find these ratios in their simplest form.

a The ratio of orange cards to black cards.

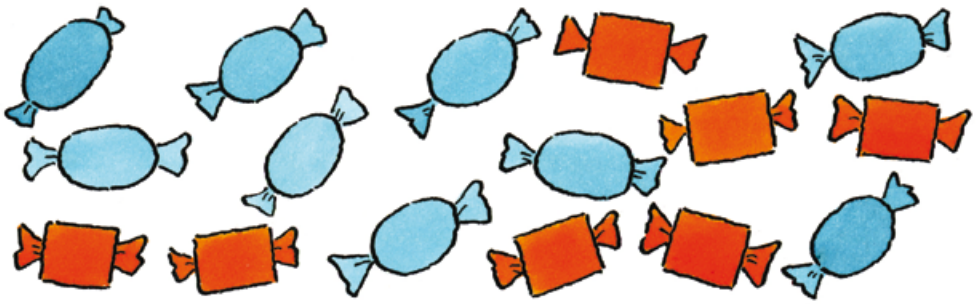
b The ratio of square cards to circle cards.

c The ratio of blue circle cards to red cards.

d The ratio of triangle cards to black square cards.

e The ratio of blue square cards to red square cards.

8 Deborah and Karam are going to share some sweets.



a What is the ratio of blue sweets to orange sweets?

b What is the ratio of orange sweets to blue sweets?

c What is the ratio of blue sweets to the total number of sweets?

d Deborah eats one of the orange sweets.

What is the new ratio of blue sweets to orange sweets in its simplest form?

e Karam then eats 3 sweets. This makes the ratio of blue sweets to orange sweets 2 : 1.

How many *blue* sweets did Karam eat?

9 Write each ratio in its simplest form.

a 4 : 6	**b** 10 : 50	**c** 15 : 20	**d** 9 : 12
e 8 : 12	**f** 27 : 9	**g** 24 : 30	**h** 30 : 25
i 62 : 31	**j** 24 : 32	**k** 7 : 21	**l** 45 : 30
m 45 : 60	**n** 120 : 180	**o** 55 : 88	**p** 28 : 70

10 In a survey, 55% of students in their first year at university said that they could drive a car.

a What percentage of the students could not drive?

b Show that the ratio of drivers to non-drivers in its simplest form is 11 : 9.

11 Different teams are competing in Sports Day.

a In team A there are 16 boys and 12 girls.

Write the ratio of boys to girls in its simplest form.

b In teams B and C the ratio of boys to girls is 1 : 2.

i There are 7 boys in team B.
How many girls are there?

ii There are 18 girls in team C. How many boys are there?

c In team D the ratio of boys to girls is 2 : 3.

i Copy and complete.

The ratio of boys to girls is 2 : 3 means that for every ☐ boys there are ☐ girls.

ii When there are 4 boys in team D, how many girls are there?

iii When there are 10 boys in team D, how many girls are there?

explanation 4

12 Explain why the ratio £2 : 80p simplifies to 5 : 2.

13 Write each of these ratios in its simplest form.

a £1 : 2p **b** 25 cm : 1 m **c** 10 cm : 1 mm

d 1 km : 200 m **e** £1.45 : £2.90 **f** 40 mm : 3 cm

g 16 cm : 1 m **h** 12 mm : 6 cm **i** 97 m : 97 km

explanation 5 online

14 Chloe and David share 30 marbles in the ratio 2 : 3.

a Explain why one share is 6 marbles.

b Explain why Chloe receives 12 marbles.

c How many marbles does David receive?

15 Jane and Suna share £40 in the ratio 2 : 3.

a Show that one share is £8.

b How much does Jane receive?

c How much does Suna receive?

16 Kerry and Stuart share 30 stickers in the ratio 1 : 2.
How many stickers does each get?

17 Emily and Indira share out 12 crayons in the ratio 1 : 3.
How many crayons does each get?

18 Ali and Daniel share out 50 comics between them in the ratio 1 : 1.
How many comics does each get?

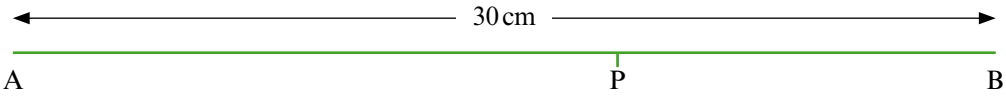
19 Mary and Raj share a box of chocolates in the ratio 3 : 4.

The box contains 35 chocolates. How many does each receive?

20 Yasmin and Jonathan share £200 in the ratio 7 : 3. How much does each receive?

21 In the diagram, the distance from A to B is 30 cm.

The distance from A to P is double the distance from P to B.



a Write the distances AP to PB in a ratio.

b Find the distance AP.

22 A shade of magenta is made by mixing blue and red paint in the ratio 3 : 2.

How many litres of red and blue paint would you need to make 15 litres of magenta paint?

23 The ratio of girls to boys on a school trip is 5 : 4.

There are 36 pupils altogether. How many girls and boys are on the trip?