

Problem solving – fractions

Discover



I think I collected the most water so I won the race!



Bella

Olivia

Mo

Danny

- 1** a) Who won the race?
Order the fractions from largest to smallest to prove your answer.
- b) Each bucket can hold 4,800 ml of water.
How many millilitres of water did Olivia and Bella collect in total?

Share

I used my reasoning skills to compare the fractions.



- a) Compare fractions with the same denominator:

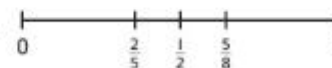
$$\frac{5}{6} > \frac{2}{6}$$

$\frac{5}{6}$ and $\frac{2}{6}$ share the same numerator:

$$\frac{5}{6} > \frac{2}{6}$$



Compare $\frac{2}{5}$ and $\frac{5}{8}$ on a number line.



You can say $\frac{2}{5}$ is less than $\frac{1}{2}$ as the numerator is less than half the denominator.

$\frac{5}{8}$ is greater than $\frac{1}{2}$ as the numerator is greater than half the denominator.

$$\frac{5}{8} > \frac{2}{5}$$

Find a common denominator to compare $\frac{2}{5}$ and $\frac{3}{8}$: $\frac{16}{40} > \frac{15}{40}$

$$\frac{2}{5} > \frac{3}{8}$$

$$\begin{array}{c} \times 8 \\ \frac{2}{5} = \frac{16}{40} \\ \times 8 \end{array}$$

$$\begin{array}{c} \times 5 \\ \frac{3}{8} = \frac{15}{40} \\ \times 5 \end{array}$$

Bella won the race because $\frac{5}{6} > \frac{5}{8} > \frac{2}{5} > \frac{3}{8}$.

I found a common denominator to compare all the fractions.



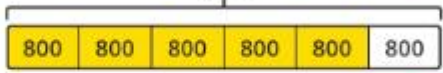


I will find the amount of water in each bucket first.

b) Bella collected $\frac{5}{6}$ of 4,800 ml.

4,800

$4,800 \div 6 = 800$



$800 \times 5 = 4,000$ ml

Olivia collected $\frac{3}{8}$ of 4,800 ml.

$4,800 \div 8 = 600$; $600 \times 3 = 1,800$ ml

$4,000$ ml + $1,800$ ml = $5,800$ ml

$\frac{5}{6} + \frac{3}{8} = \frac{20}{24} + \frac{9}{24} = \frac{29}{24} = 1 \frac{5}{24}$

1 bucket = 4,800 ml

$\frac{5}{24}$ of 4,800 ml = 1,000 ml

$4,800$ ml + 1,000 ml = $5,800$ ml

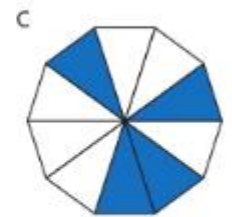
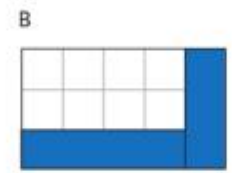
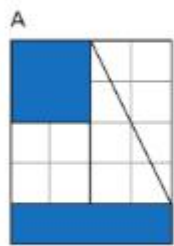
Olivia and Bella collected 5,800 ml of water in total.



I can see another way to solve the problem. I will find the total fraction of a bucket they collected.



3 Which shape has the greatest fraction shaded?



4 Olivia has some money to make lemonade for her friends. She spends £2.20 on sugar and £2.80 on lemons. She has $\frac{5}{12}$ of the money left. How much money did she have to start with?

Think about how this problem can be represented using a bar model.



Think together

1 Bella collected more water than Mo, in her bucket. What fraction of a bucket more did Bella collect?



2 In the next race, Mo collects $\frac{3}{4}$ of a bucket. Danny collects half as much as Mo. What fraction of a bucket does Danny collect?

Problem solving – decimals

Discover



- 1** a) What is the price of one child ticket?
 b) There are 48 seats in the front row of the cinema.
 How much more money will the cinema take when the front row is filled with adults than when it is filled with children?

Share



- a) Two adult tickets cost the same as three child tickets.

First calculate the cost of two adult tickets: $£6.45 \times 2 = £12.90$

£12.90		
adult £6.45	adult £6.45	
child	child	child

$$\begin{array}{r} 04.30 \\ 3 \overline{) 12.90} \end{array}$$

Then find the cost of a child ticket:

$$£12.90 \div 3 = £4.30$$

The price of one child ticket is £4.30.

- b) Change the pounds and pence to pence before multiplying by 48.

adults $\begin{array}{r} 645 \\ \times 48 \\ \hline 5160 \\ 25800 \\ \hline 30960 \end{array}$	children $\begin{array}{r} 430 \\ \times 48 \\ \hline 3440 \\ 17200 \\ \hline 20640 \end{array}$
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When we convert back to pounds and pence, the two amounts are £309.60 and £206.40.

	H	T	O	. Tth	Hth
	3	0	9	. 6	0
-	2	0	6	. 4	0
	1	0	3	. 2	0



I think I can solve this by finding the difference between the price of an adult ticket and a child ticket, and then multiplying it by 48.

The cinema takes £103.20 more when the front row is filled with adults.

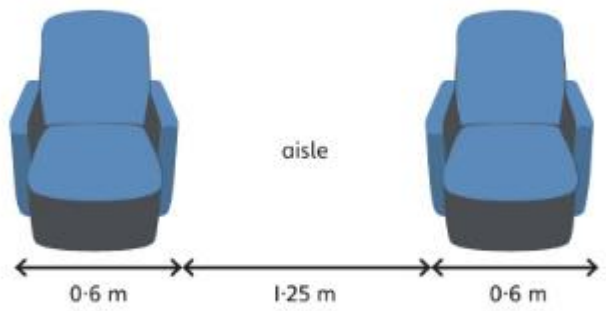
Think together

- 1 The cinema sells cartons of juice.
A box of 8 cartons has a total mass of 6.65 kg.
The empty box has a mass of 0.41 kg.
What is the mass of each carton?

I think there is more than one step to each of these problems. I will use bar models to help me.

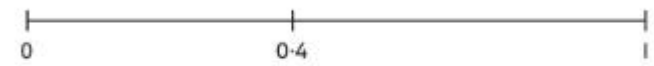


- 2 Here are the dimensions of the seats and the aisle in the front row.



The front row has 48 seats and 1 aisle.
How long is the row?

- 3 Which of these numbers is closest to 0.4?
0.039 0.5 0.14 0.35 0.48



I am going to think about how close the numbers are to 0.4 on a number line.



- 4 The sum of two numbers is 7.
The difference between the two numbers is 0.7.
What are the two numbers?
The two numbers are and .



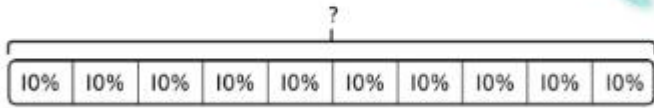
I am going to draw a bar model to show the difference of 0.7 first.



Think together

1 Jen also buys a case for her new computer.
 The case is reduced by 30%.
 The price is now £42.
 What was the full price of the computer case?

I need to think about the percentage of the full price that £42 represents.



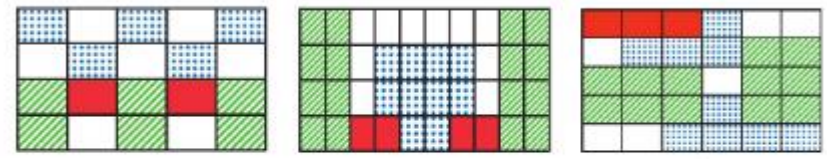
The full price of the computer case was £ .

2 The table shows the number of customers in the shop on the day of the sale.
 Find the missing information.

	Adults	Children
Percentage (%) of total customers	60%	<input type="text"/>
Number of customers	<input type="text"/>	700

Remember that 100% represents all of the customers.

3 a) Which grid matches this description?
 25% dotted blue, 40% striped green and 10% solid red



b) What percentage of the grid you identified in part a) is white?

4 The class is voting for Alex, Jamie or Lee to be on the School Council.



I got 35% of the vote. (Alex)

I got $\frac{2}{5}$ of the votes. (Jamie)

I got the rest of the votes. (Lee)

What percentage of votes did the winner get?

I'm going to think about fraction and percentage equivalents.

I'm also going to think about using a bar model to represent the information I already know.

Problem solving – ratio and proportion

Discover

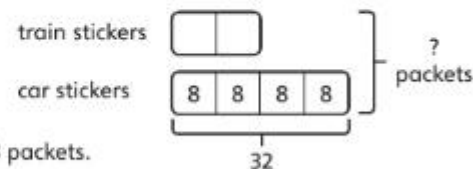


- a) Andy buys some packets of stickers.
He has 32 car stickers.
How many stickers does he have in total?
- b) There are 50 more car stickers than train stickers in a box.
How many packets of stickers are in a box?

Share

a) Method 1:

Represent the problem using a bar model.
There are 4 car stickers for every 2 train stickers in a packet.
Andy has 32 car stickers.



$32 \div 4 = 8$, so Andy buys 8 packets.

$8 \times 6 = 48$, so Andy has 48 stickers in total.

Method 2:

1 packet 4 cars + 2 trains

2 packets 8 cars + 4 trains

4 packets 16 cars + 8 trains

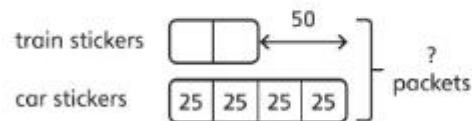
8 packets 32 cars + 16 trains

$32 + 16 = 48$, so Andy has 48 stickers in total.

I can solve the problem another way using **scaling**.



b) This bar model shows that there are 50 more car stickers.

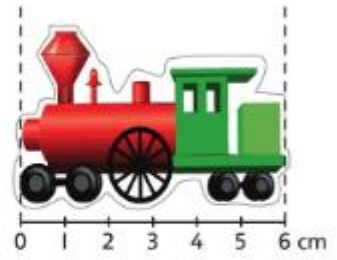


The extra 50 stickers are equal to 2 parts of the car stickers bar.

Each part represents 25 so there are 25 packets of stickers in each box.

Think together

1 a) Here is one of Andy's train stickers.
 1 cm on the picture represents 2.5 m in real life.
 What is the length of the train in real life?



I know that 1 cm is 2.5 m so I can use this information to help me.

The train is m long in real life.

b) Another sticker to the same scale shows a train that is 20 metres long in real life. How many centimetres long is the sticker?

The sticker is cm long.

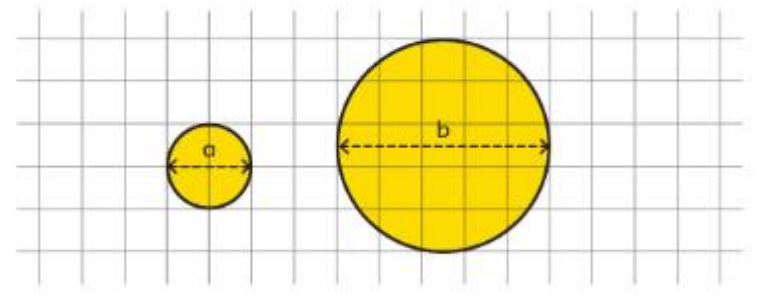
2 A recipe uses 4 spoons of honey for every 240 grams of fruit.
 How many spoons of honey are needed for 600 grams of fruit?

I think I can use scaling to help me here.

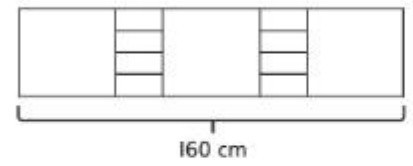
spoons of honey are needed for 600 g of fruit.



3 Here are two circles.
 Write the ratio of diameter a to diameter b.
 a : b = :



4 Sofia and Toshi lay a path that is 4.8 metres long.
 They use 8 small rectangular paving slabs for every 3 large square slabs.



I am going to look at the relationship between the total length of the path and the length of the pattern of slabs in the diagram.

How many small rectangular slabs do they use?
 How many large square slabs do they use?



1

b) The previous dentist clinic was 28 days ago. This is equivalent to 4 weeks.

-7 days -7 days -7 days -7 days

April							May						
Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa
	1	2	3	4	5					1	2	3	
6	7	8	9	10	11	12	4	5	6	7	8	9	10
13	14	15	16	17	18	19	11	12	13	14	15	16	17
20	21	22	23	24	25	26	18	19	20	21	22	23	24
27	28	29	30				25	26	27	28	29	30	31

14 April 21 April 28 April 5 May 12 May

The date of the previous dentist clinic was 14 April.

Remember that different months have a different number of days.

Think together

1 This time line shows some of the dentist's appointments on 12 May.

Mrs Dodd	Mr Kahn	Miss Rai	Mr Nash	break	Miss Ana	Mrs Carr	Mr Wye	Mr Singh
9:20 am	9:50 am	10:20 am	10:40 am		11:10 am		11:40 am	

a) Mr Nash and Miss Ana arrive together 5 minutes before Mr Nash's appointment. They both leave at the end of Miss Ana's appointment. How long do they spend at the surgery?

b) Mr Wye has to wait 25 minutes after his appointment for some medicine. What time does he leave the surgery?

- 2 Max runs 15 laps of the park in $\frac{3}{4}$ hour. Jamilla starts running laps of the same park at 13:30. She completes 30 laps of the park at 14:56. Who runs faster?
- 3 A company spends £245 per month on electricity bills. How much do they spend in total from 1 January 2014 to 31 August 2017?

4 There is a bus to the city every 25 minutes. There is a bus to the seaside every 45 minutes.

The buses start running at 08:00. At what time will a bus to the city and a bus to the seaside next depart together?

I wonder if the buses depart together at other times during the day.

CHALLENGE