Fractions with this property are called **ideal** fractions.

a Show that $\frac{7}{5}$ and $\frac{7}{4}$ are ideal fractions.

b Show that $\frac{2}{3}$ and $\frac{2}{2}$ are ideal fractions.

c Try to find a pattern in the pairs of ideal fractions we have looked at so far. Copy and complete the following.

i $\frac{7}{\ }$ and ____ are ideal fractions.

ii $\frac{11}{\ }$ and ____ are ideal fractions.

iii $\frac{13}{\ }$ and ____ are ideal fractions.

d Write down three more pairs of ideal fractions.

e Can you find any pairs of ideal whole numbers?

Problems involving fractions

Exercise 3M Problems involving fractions

Answer the following in simplest form. Write your answers as mixed numbers where appropriate.

1 Be A Sport sporting goods store advertises a giant end-of-year sale in which prices are slashed by $\frac{1}{4}$. What are the sale prices of the following items if these are their normal prices?

a A football for $20 **b** A soccer ball for $16

c A T-shirt for $28 **d** A pair of tennis shoes for $83

2 A survey was taken of 120 people as they left Wally's Sandwich Bar.

a If 80 were male, what fraction were male?

b What fraction were female?

c If 45 were under 21 years of age, what fraction were under 21?

d What fraction were 21 or over?

e If $\frac{3}{4}$ had bought a drink, how many had bought a drink?

f If $\frac{3}{10}$ had bought a salad roll, how many had bought a salad roll?

3 Valerie is running laps of her school oval to train for Rigby High's Mini Marathon. She ran $4\frac{1}{2}$ laps before having to rest. After her rest, she ran another $3\frac{1}{4}$ laps before stopping again. Then she struggled through another $\frac{1}{3}$ of a lap. How many laps did she complete all together?

Animation

4 Keiran is training in his backyard pool for the 1500 m freestyle at the next Olympics. Unfortunately, the pool is only 20 m in length.

a What fraction of the total 1500 m race would he have swum after completing just one lap?

b How many laps would he have to complete to swim 1500 m?

c What fraction of the total 1500 m race would he have swum after completing 6 laps?

d How far would he have swum if he had completed $\frac{1}{10}$ of the race distance?

How far (in km) is it from:

a Ferndale to Greenhill

b Greenhill to Highvale

c Ferndale to Highvale and back again?

12 Theresa, Isabelle and Bryce worked on a mathematical problem and came up with the answers $8\frac{1}{2}$, $8\frac{2}{3}$ and $8\frac{3}{5}$ respectively. The correct answer was $8\frac{7}{12}$. Which of the three students was closest to the correct answer?

13 Tung is planning his European holiday. He has 5 months and has worked out the following itinerary. He will be in England for $1\frac{1}{2}$ months, in Germany for $1\frac{2}{3}$ months, and in Italy for $\frac{3}{4}$ of a month. The other country he will be visiting is France. How much time (in months) will he spend in France?

14 In 7F at Richwood High, $\frac{2}{3}$ of the students are boys, $\frac{1}{4}$ of the boys have blond hair, twice as many boys as girls have blond hair, and Julie and Daniella are the only girls with blond hair.

a How many boys are there in the class?

b How many students are there in the class?

15 At Julio's party, which was due to start at 8.00 p.m., $\frac{3}{5}$ of the guests arrived at least one hour late, $\frac{1}{8}$ of the guests arrived at least half an hour early, and 22 guests arrived between 7.30 p.m. and 9.00 p.m.

a What fraction of the guests arrived between 7.30 p.m. and 9.00 p.m.?

b How many guests were there at the party altogether?

c How many guests arrived at least one hour late?

d How many guests arrived at least half an hour early?

16 It takes Felicity $\frac{3}{4}$ of an hour to lay a row of 50 bricks.

a How many rows will she lay in $4\frac{1}{2}$ hours?

b How many bricks will she lay in that time?

c How long will it take her to build a wall made up of 22 rows?

d How long will it take her to build a section made up of 462 bricks?

Be careful with the following—they are trick questions.

17 Claudius halved twelve and got seven. How did he manage to do this?

18 How far can a dog run into a forest?

19 Molly was given 12 tablets by her doctor and was told to take one every half hour. If she did this, how long would they last?

20 Athena needed to travel from the town of Ariathe to the city of Troy. The distance is 120 km. The first day she travelled exactly half the distance. The second day she travelled exactly half of the distance she still had left to travel. The third day she again travelled exactly half of the distance she still had left to travel. If she continued doing this, would she ever get to Troy?