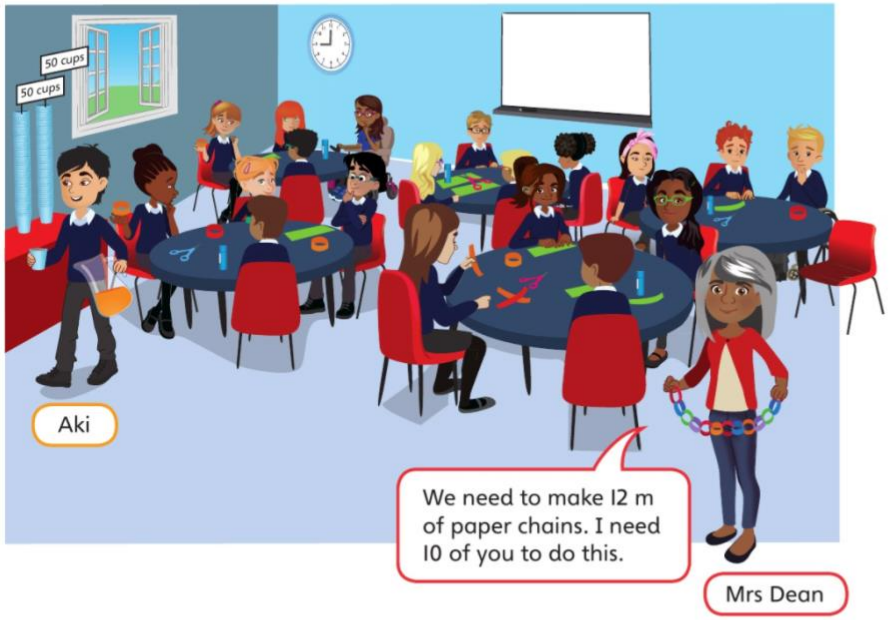
Dividing by multiples of 10, 100 and 1,000

Discover



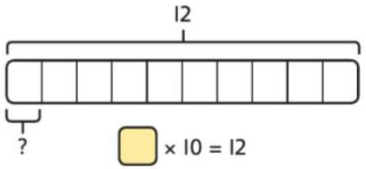
1 **a)** 10 children make 12 m of paper chains. They each make an equal length chain. What length do they each make?

b) There are 20 children in the class altogether. What length of paper chain would each child make if they each made an equal share of the 12 m?

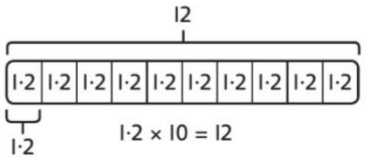
Share

a) 12 ÷ 10 = ?

Find out what number is multiplied by 10 to make 12.



H	T	O	•	Tth	Hth
	1	2	•		



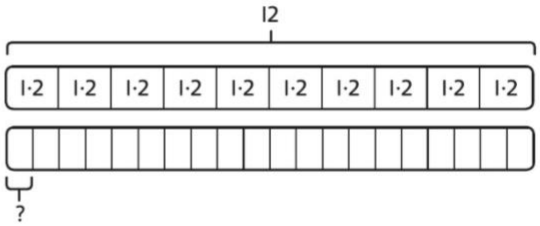
H	T	O	•	Tth	Hth
		1	•	2	

1·2 × 10 = 12 so 12 ÷ 10 = 1·2

Each child makes 1·2 m of paper chain.

Dividing by 10 is the inverse of multiplying by 10.

b) There are twice as many parts, so divide each into two equal parts.



12 ÷ 10 = 1·2 1·2 ÷ 2 = 0·6

Each child would make 0·6 m of paper chain.

Think together

1 Aki shares 15 litres of juice between 100 cups.

How much juice will he pour into each cup?

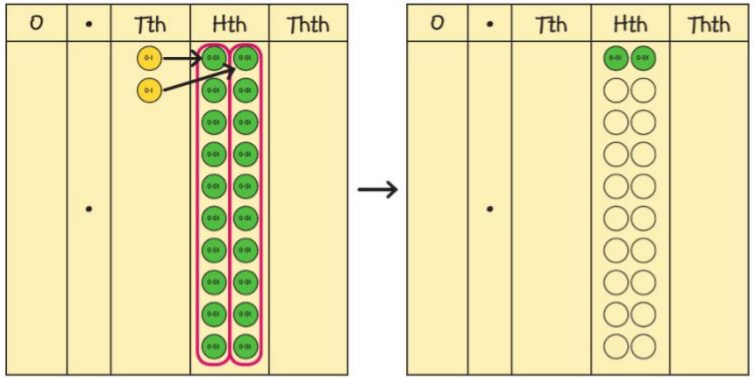
H	T	O	•	Tth	Hth
	1	5	•		

I wonder if I will get the same result if I convert into ml first.

15 ÷ 100 = ☐

Aki will pour ☐ litres of juice into each cup.

2 Reena draws this diagram to explain dividing 0·2 by 10.



Exchange each 0·1 for ten 0·01s. Divide 20 counters by 10.

She says, '0·2 ÷ 10 = 0·02, and that is why the digits move to the right.'

Do you agree with Reena? Discuss her explanation with your partner.

Make or draw a similar diagram to show 12·3 ÷ 100.

CHALLENGE

3 **a)** Complete these two divisions. Which method do you think is most efficient?

40 ÷ 50 = ☐

40 → ÷ 10 → ÷ 5 → ?

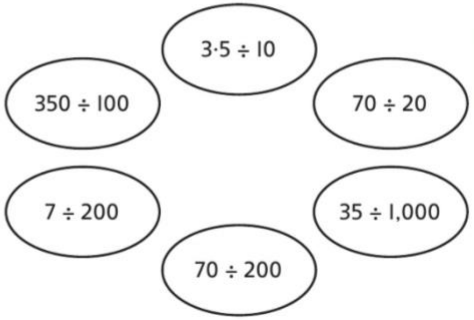
40 → ÷ 5 → ÷ 10 → ?

600 ÷ 3,000 = ☐

600 → ÷ 3 → ÷ 1,000 → ?

600 → ÷ 1,000 → ÷ 3 → ?

b) Find the pairs of calculations that have the same answer.



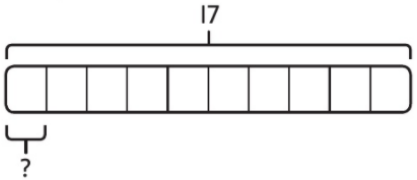
To work out 70 ÷ 20, I will divide by 2, then divide by 10.

→ Textbook 6B p12

Dividing by multiples of 10, 100 and 1,000

1 Complete each division.

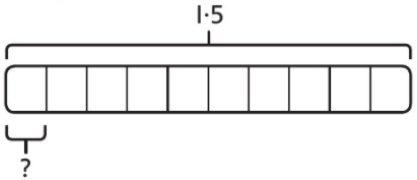
a)



H	T	O	•	Tth	Hth	Thth
	1	7	•			

17 ÷ 10 = ☐

b)



H	T	O	•	Tth	Hth	Thth
		1	•	5		

1·5 ÷ 10 = ☐

2 A leaking tap loses the same amount of water every day. After 100 days, it has lost 125 litres of water. How much water does it lose each day?

The tap loses ☐ litres of water each day.

3 Which of these represents the answer to 2,050 divided by 1,000?
Tick your answer.

O	•	Tth	Hth	Thth
2	•	0	0	5

☐

O	•	Tth	Hth	Thth
0	•	2	0	5

☐

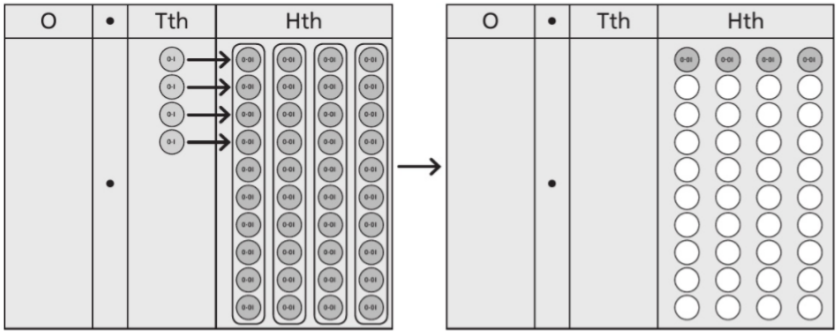
O	•	Tth	Hth
2	•	0	5

☐

O	•	Tth
2	•	5

☐

4 What division calculation does this diagram show?



☐ ÷ ☐ = ☐

5 Each number has been divided by 10, 100 or 1,000.
Complete the calculations.

O	•	Tth	Hth	Thth
0	•	3	0	6

30·6 ÷ ☐ = 0·306

O	•	Tth	Hth
0	•	3	6

3·6 ÷ ☐ = 0·36

O	•	Tth	Hth	Thth
0	•	0	3	6

36 ÷ ☐ = 0·036

6 Complete these calculations.

a) 240 ÷ 200 = ☐
240 ÷ 300 = ☐
240 ÷ 400 = ☐
240 ÷ 600 = ☐

b) 240 ÷ 6,000 = ☐
240 ÷ 4,000 = ☐
240 ÷ 3,000 = ☐
240 ÷ 8,000 = ☐

c) ☐ = 24 ÷ 20
☐ = 24 ÷ 30
☐ = 24 ÷ 40
☐ = 24 ÷ 120

7 Join the numbers to make six accurate divisions.
Write each division out in full. One has been done for you.

CHALLENGE

206	÷ 10	2·6	→	
26	÷ 100	0·206	→	206 ÷ 1,000 = 0·206
260	÷ 1,000	0·206	→	
20·6	÷ 10	0·026	→	
2·6	÷ 100	0·026	→	
2·06	÷ 1,000	2·06	→	

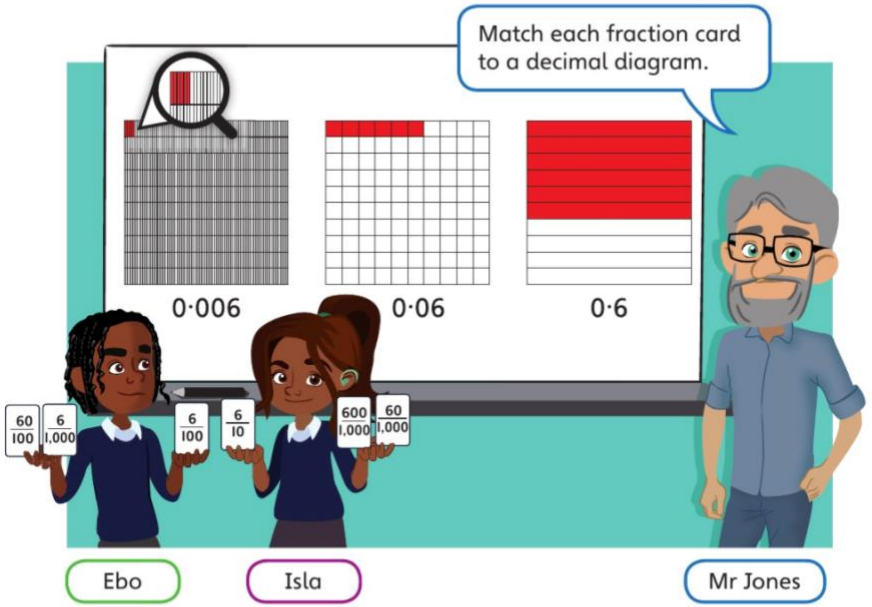
Reflect

Write a word problem that is solved by dividing by 10, 100 or 1,000 and gives a decimal answer. Find the answer to your word problem.

Thursday 7.1.21

Decimals as fractions

Discover



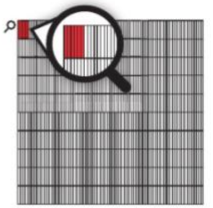
1 **a)** Isla and Ebo are matching fraction cards to decimal diagrams. Which fractions are equivalent to each decimal?

b) Simplify the fractions on the cards, if possible.

Share

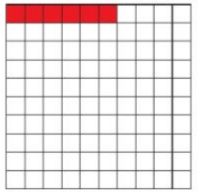
a) Use equivalent fractions to match the decimals.

O	•	Tth	Hth	Thth
0	•	0	0	6



$\frac{6}{1,000}$

O	•	Tth	Hth	Thth
0	•	0	6	



$\frac{6}{100} = \frac{60}{1,000}$

O	•	Tth	Hth	Thth
0	•	6		

$\frac{6}{10} = \frac{60}{100} = \frac{600}{1,000}$

$\frac{6}{1,000}$ is equivalent to 0·006.

$\frac{6}{100}$ and $\frac{60}{1,000}$ are equivalent to 0·06.

$\frac{6}{10}$, $\frac{60}{100}$ and $\frac{600}{1,000}$ are equivalent to 0·6.

b) $\frac{6}{1,000}$ can be simplified to $\frac{3}{500}$.

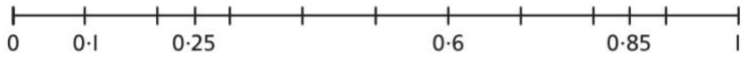
$\frac{6}{100}$ and $\frac{60}{1,000}$ can be simplified to $\frac{3}{50}$.

$\frac{6}{10}$, $\frac{60}{100}$ and $\frac{600}{1,000}$ can be simplified to $\frac{3}{5}$.

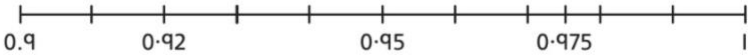
$\frac{6}{1,000} = \frac{3}{500}$ (÷ 2)

Think together

1 Write each decimal as a fraction. The first has been done for you.



$0{\cdot}1 = \frac{1}{10}$ $0{\cdot}25 = \frac{\square}{\square}$ $0{\cdot}6 = \frac{\square}{\square}$ $0{\cdot}85 = \frac{\square}{\square}$

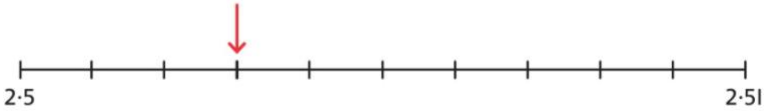


$0{\cdot}92 = \frac{92}{100}$ $0{\cdot}95 = \frac{\square}{\square}$ $0{\cdot}975 = \frac{\square}{\square}$

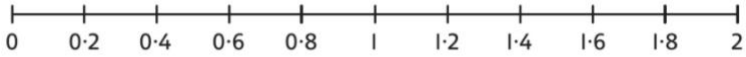
2 Write each of these decimals as an improper fraction and as a mixed number.

2·3	
2	0·3

O	•	Tth	Hth
2	•	5	3



3 **a)** Complete the simplifications.



To simplify a fraction, you need to find a common factor of the numerator and the denominator.

$0{\cdot}2 \rightarrow \frac{2}{10} \rightarrow \frac{1}{5}$ $1{\cdot}2 \rightarrow \frac{12}{10} \rightarrow \frac{\square}{\square}$

$0{\cdot}4 \rightarrow \frac{4}{10} \rightarrow \frac{\square}{\square}$ $1{\cdot}4 \rightarrow \frac{\square}{\square} \rightarrow \square\frac{\square}{\square}$

$0{\cdot}6 \rightarrow \frac{\square}{\square} \rightarrow \frac{\square}{\square}$ $1{\cdot}6 \rightarrow \frac{\square}{\square} \rightarrow \square\frac{\square}{\square}$

$0{\cdot}8 \rightarrow \frac{\square}{\square} \rightarrow \frac{\square}{\square}$ $1{\cdot}8 \rightarrow \frac{\square}{\square} \rightarrow \square\frac{\square}{\square}$

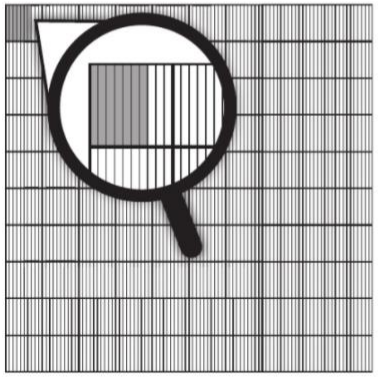
b) Convert these decimals into fractions and simplify them as far as you can.

0·25 0·125 0·875 0·35 0·95

Decimals as fractions

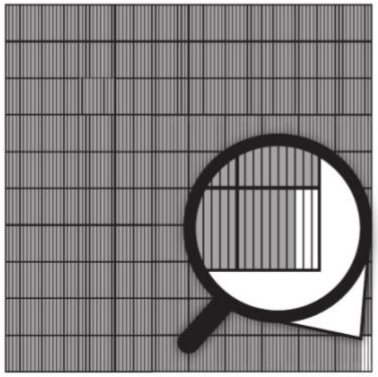
1 Write each decimal as a fraction.

a)



0·007 is equivalent to $\frac{\square}{\square}$

c)

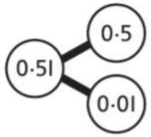


0·997 is equivalent to $\frac{\square}{\square}$

b)

$\square$ is equivalent to $\frac{\square}{\square}$

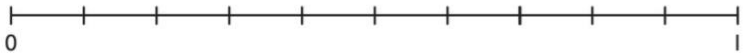
d)



$\square$ is equivalent to $\frac{\square}{\square}$

2 Convert these fractions to decimals then mark their position on the number line.

$\frac{900}{1,000}$ $\frac{15}{100}$ $\frac{3}{10}$ $\frac{550}{1,000}$ $\frac{50}{1,000}$



3 Match each decimal to the equivalent fraction.

0·3	$\frac{33}{10}$
0·03	$\frac{303}{1,000}$
0·33	$\frac{30}{1,000}$
0·303	$\frac{33}{100}$
3·3	$\frac{3}{1,000}$
0·003	$\frac{300}{1,000}$

4 Write each decimal as a fraction, then simplify as far as you can.

a) 0·04 _____

b) 0·05 _____

c) 0·004 _____

d) 0·005 _____

5 a) Which of these fractions is equivalent to 1·823? Circle your answer.

$1\frac{823}{1,000}$ $1\frac{823}{100}$ $\frac{8}{23}$ $\frac{1,000}{823}$

b) Which of these fractions is equivalent to 0·85? Circle your answer.

$\frac{85}{10}$ $\frac{17}{10}$ $\frac{8}{5}$ $\frac{17}{20}$

CHALLENGE

6 **a)** Which of these decimals add together to make $\frac{3}{25}$?

0·1 0·105 0·02 0·015 0·01 0·2

Is there more than one possibility?

b) Which pairs of decimals have a difference of $\frac{5}{250}$?

0·2 0·04 2 1·02 2·04 1·98 1 2·6 10·4

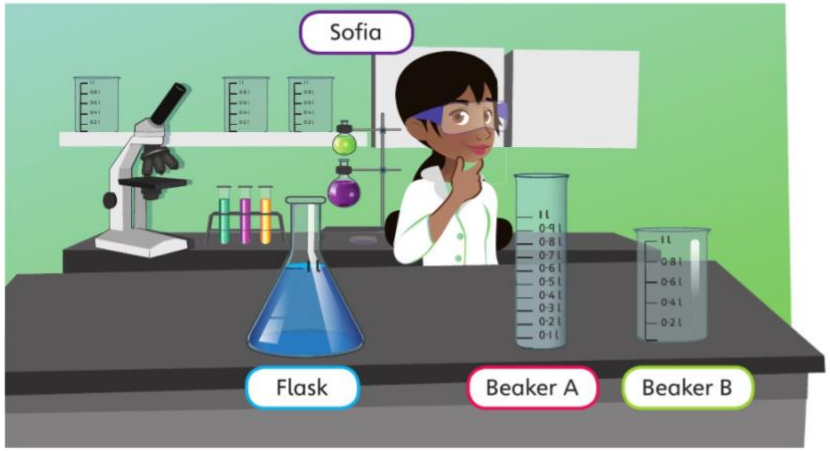
Reflect

Explain how to write 0·555 as a fraction and how to simplify it as far as you can.

Friday 8.1.21

Fractions as decimals 1

Discover



1 **a)** Sofia pours $\frac{1}{10}$ of a litre of liquid from the flask into beaker A.

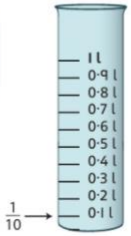
She then pours $\frac{3}{4}$ of a litre of the liquid into beaker B.

If Sofia reads the scale of each beaker, what measurements will she record?

b) How much liquid is left in the flask?

Share

a) The scale on beaker A is in decimals.
Work out what $\frac{1}{10}$ of a litre is in decimals.

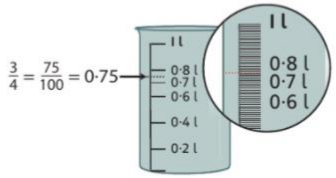


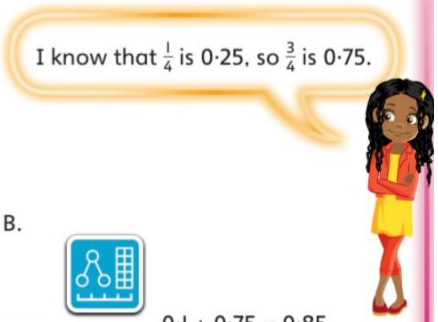
O	•	Tth	Hth
0	•	1	

$\frac{1}{10}$ is equivalent to 0·1.

Sofia will record 0·1 l for beaker A.

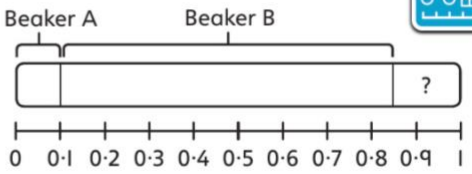
For beaker B, work out what $\frac{3}{4}$ of a litre is in decimals.





Sofia will record 0·75 l for beaker B.

b)



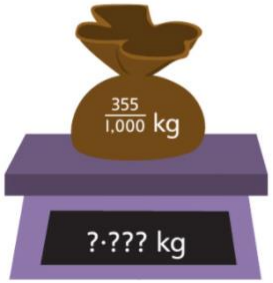
0·1 + 0·75 = 0·85

1 − 0·85 = 0·15

There is 0·15 l of liquid left in the flask.

Think together

1 What will $\frac{355}{1{,}000}$ kg look like on the display of this balance?

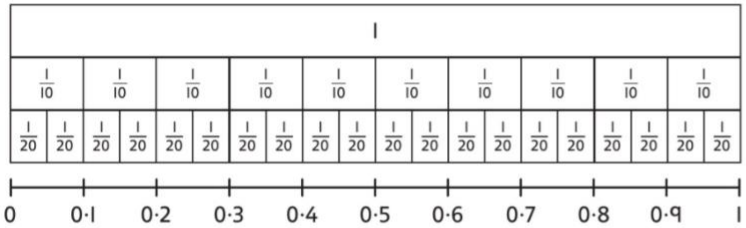


$\frac{355}{1{,}000}$		
$\frac{\square}{10}$	$\frac{\square}{100}$	$\frac{\square}{1{,}000}$

The display will show $\square\square\square\square$ kg.

2 Convert these fractions into decimals.

$\frac{6}{20}$ $\frac{7}{20}$ $\frac{16}{20}$ $\frac{17}{20}$



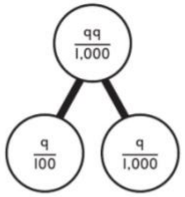
$\frac{7}{20} = \frac{\square}{100}$ (×5)

3 Convert these fractions to decimals and arrange them from smallest to largest.

CHALLENGE

$\frac{9}{10}$ $\frac{9}{20}$ $\frac{19}{10}$ $\frac{109}{100}$ $\frac{9}{50}$ $\frac{9}{25}$ $\frac{99}{1{,}000}$ $\frac{909}{10}$ $\frac{90}{250}$

I will use a part-whole model.



I will convert some of the fractions into mixed numbers.

For example, $\frac{109}{100} = 1\frac{9}{100}$.

____, ____, ____, ____, ____, ____, ____, ____, ____

Smallest Largest

→ Textbook 6B p20

Fractions as decimals 1

1 Write each fraction on a place value grid.

a) $\frac{3}{100}$

O	•	Tth	Hth	Thth
	•			

c) $\frac{3}{1{,}000}$

O	•	Tth	Hth	Thth
	•			

b)

O	•	Tth	Hth	Thth
	•			

d)

$\frac{345}{1{,}000}$		
$\frac{3}{10}$	$\frac{4}{100}$	$\frac{5}{1{,}000}$

O	•	Tth	Hth	Thth
	•			

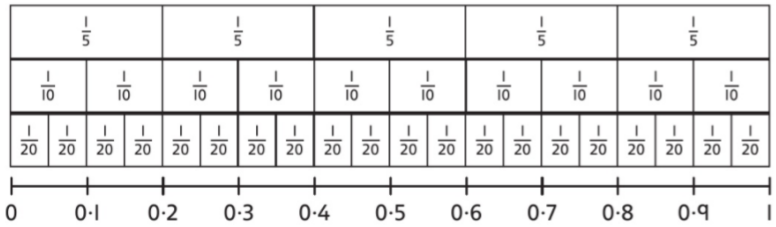
2 **a)** Which decimal is equivalent to $\frac{77}{10}$? Circle your answer.

0·77 77·10 7·7 77·7

b) Which decimal is equivalent to $\frac{370}{100}$? Circle your answer.

0·37 0·037 0·307 3·7

3 Use the fraction wall to help convert these fractions to decimals.



a) $\frac{2}{5} = \square$

b) $\frac{8}{20} = \square$

c) $\frac{17}{20} = \square$

d) $\frac{4}{5} = \square$

e) $\frac{11}{20} = \square$

4 Use equivalent fractions to convert these fractions to decimals.

a) $\frac{1}{50} = \frac{\square}{100} = 0.\square$

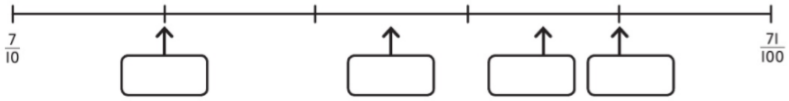
b) $\frac{3}{200} = \frac{\square}{1{,}000} = \square$

c) $\frac{99}{250} = \frac{\square}{\square} = \square$

d) $\frac{3}{50} = \frac{\square}{100} = \square$

e) $\frac{99}{500} = \frac{\square}{\square} = \square$

5 Write the decimals that the arrows are pointing to.



CHALLENGE

6 Use these digit cards to make fractions, where one card is the denominator and one card is the numerator. Convert each fraction to a decimal and write it in the correct column of the table.

2	4	5	25	50	200	250	500

Between 0 and 1	Between 1 and 10	Greater than 10

Reflect

What is the same and what is different about converting from decimals to fractions and converting from fractions to decimals?

Answers- Remember to correct your answer if it is wrong using the videos to help you use the correct methods.

Lesson 2: Dividing by multiples of 10, 100 and 1,000

→ pages 9–11

1. a) 1·7 b) 0·15

2. The tap loses 1·25 litres of water each day.

3. 2·05; tick bottom left-hand image.

4. 0·4 ÷ 10 = 0·04

5. 30·6 ÷ 100 = 0·306 3·6 ÷ 10 = 0·36 36 ÷ 1,000 = 0·036

6.

a)	b)	c)
1·2	0·04	1·2
0·8	0·06	0·8
0·6	0·08	0·6
0·4	0·03	0·2

7. Completed divisions to say:
206 ÷ 1,000 = 0·206
26 ÷ 1,000 = 0·026
260 ÷ 100 = 2·6
20·6 ÷ 10 = 2·06
2·6 ÷ 100 = 0·026
2·06 ÷ 10 = 0·206

Reflect

Answers will vary; for example: Danny has a rope that is 5·7 m in length and wants to cut 10 equal pieces. How long should each piece be? (5·7 ÷ 10 = 0·57)

Lesson 3: Decimals as fractions

➜ pages 12–14

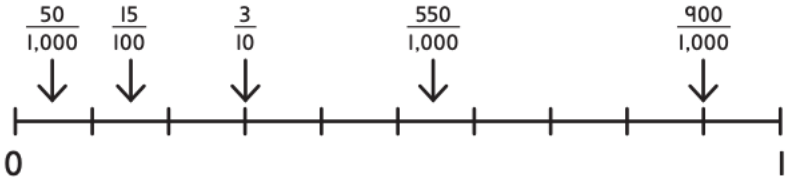
1. a) 0·007 is equivalent to $\frac{7}{1{,}000}$

b) 0·131 is equivalent to $\frac{131}{1{,}000}$

c) 0·997 is equivalent to $\frac{997}{1{,}000}$

d) 0·51 is equivalent to $\frac{51}{100}$

2. $\frac{900}{1{,}000} = 0{\cdot}9$ $\frac{15}{100} = 0{\cdot}15$ $\frac{3}{10} = 0{\cdot}3$ $\frac{550}{1{,}000} = 0{\cdot}55$ $\frac{50}{1{,}000} = 0{\cdot}05$



3. 0·3 ➜ $\frac{300}{1{,}000}$

0·03 ➜ $\frac{30}{1{,}000}$

0·33 ➜ $\frac{33}{100}$

0·303 ➜ $\frac{303}{1{,}000}$

3·3 ➜ $\frac{33}{10}$

0·003 ➜ $\frac{3}{1{,}000}$

4. a) $0{\cdot}04 = \frac{4}{100} = \frac{1}{25}$ c) $0{\cdot}04 = \frac{4}{1{,}000} = \frac{1}{250}$

b) $0{\cdot}05 = \frac{5}{100} = \frac{1}{20}$ d) $0{\cdot}005 = \frac{5}{1{,}000} = \frac{1}{200}$

5. a) Circled: $1\frac{823}{1{,}000}$ b) Circled: $\frac{17}{20}$

6. a) Two possible answers:

$0{\cdot}1 + 0{\cdot}02 = \frac{3}{25}$ (= 0·12)

$0{\cdot}105 + 0{\cdot}015 = \frac{3}{25}$ (= 0·12)

b) Two pairs:

$2 - 1{\cdot}98 = \frac{5}{250}$ (= 0·02)

$1{\cdot}02 - 1 = \frac{5}{250}$ (= 0·02)

Reflect

Explanations will vary; for example:

0·555 is a decimal involving tenths, hundredths and thousandths; there are 5 tenths, 5 hundredths and 5 thousandths which are equivalent to 555 thousandths or $\frac{555}{1{,}000}$. Both 555 and 1,000 are divisible by 5 (they end in a 0 or a 5), so $\frac{555}{1{,}000}$ can be simplified to $\frac{111}{200}$ ($111 \times 5 = 555$ and $200 \times 5 = 1{,}000$).

Lesson 4: Fractions as decimals (I)

→ pages 15–17

1. a)

O	•	Tth	Hth	Thth
0	•	0	3	

b)

O	•	Tth	Hth	Thth
0	•	3	4	

c)

O	•	Tth	Hth	Thth
0	•	0	0	3

d)

O	•	Tth	Hth	Thth
0	•	3	4	5

2. a) Circled: 7·7 b) Circled: 3·7

3. a) $\frac{2}{5} = 0{\cdot}4$ d) $\frac{4}{5} = 0{\cdot}8$

b) $\frac{8}{20} = 0{\cdot}4$ e) $\frac{11}{20} = 0{\cdot}55$

c) $\frac{17}{20} = 0{\cdot}85$

4. a) $\frac{1}{50} = \frac{2}{100} = 0{\cdot}02$ d) $\frac{3}{50} = \frac{6}{100} = 0{\cdot}06$

b) $\frac{3}{200} = \frac{15}{1{,}000} = 0{\cdot}515$ e) $\frac{99}{500} = \frac{198}{1{,}000} = 0{\cdot}198$

c) $\frac{99}{250} = \frac{396}{1{,}000} = 0{\cdot}396$

5. Missing numbers:

6. Answers will vary; for example:

Between 0 and 1	Between 1 and 10	Greater than 10
$\frac{2}{4} = 0{\cdot}5$	$\frac{500}{250} = 2$	$\frac{500}{25} = 20$
$\frac{2}{5} = 0{\cdot}4$	$\frac{500}{200} = 2{\cdot}5$	$\frac{250}{5} = 50$
$\frac{2}{25} = 0{\cdot}08$	$\frac{25}{5} = 5$	$\frac{50}{4} = 12{\cdot}5$
$\frac{5}{50} = 0{\cdot}1$	$\frac{200}{25} = 8$	$\frac{200}{4} = 50$

Reflect

Answers will vary; check that children recognise that in both cases they need to use equivalent fractions to either simplify a fraction or convert it to a fraction in tenths, hundredths, or thousandths. When writing fractions as tenths, hundredths or thousandths, the digits in the numerator are the same as the digits in the decimal.

The difference is that when converting from decimals to fractions they need to simplify the fractions using division and common factors, whereas when converting from fractions to decimals they need to use multiplication so that they can write the fractions with 10, 100 or 1,000 as a denominator (as appropriate).