Represent tenths and hundredths as diagrams

1 Match the representation to the fraction.
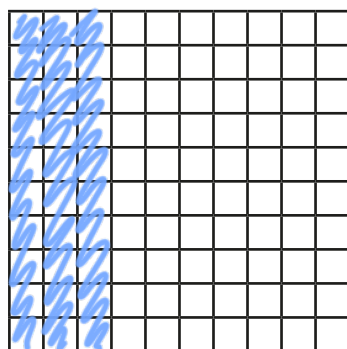
2 tenths

70 hundredths
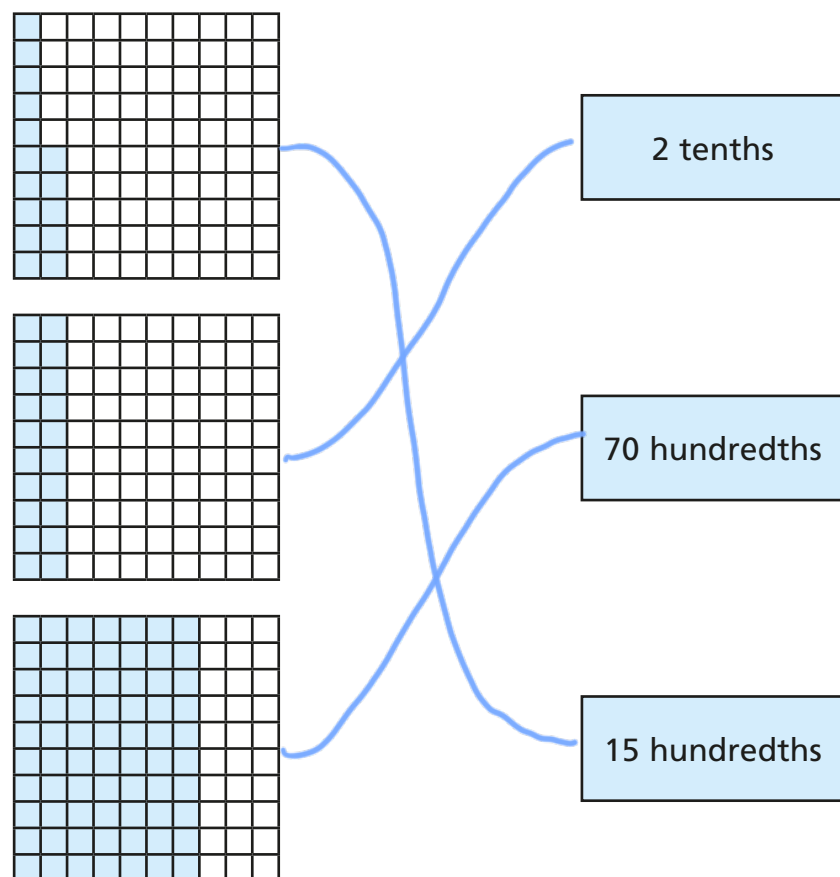
15 hundredths

2 Represent the fractions on the hundred squares.
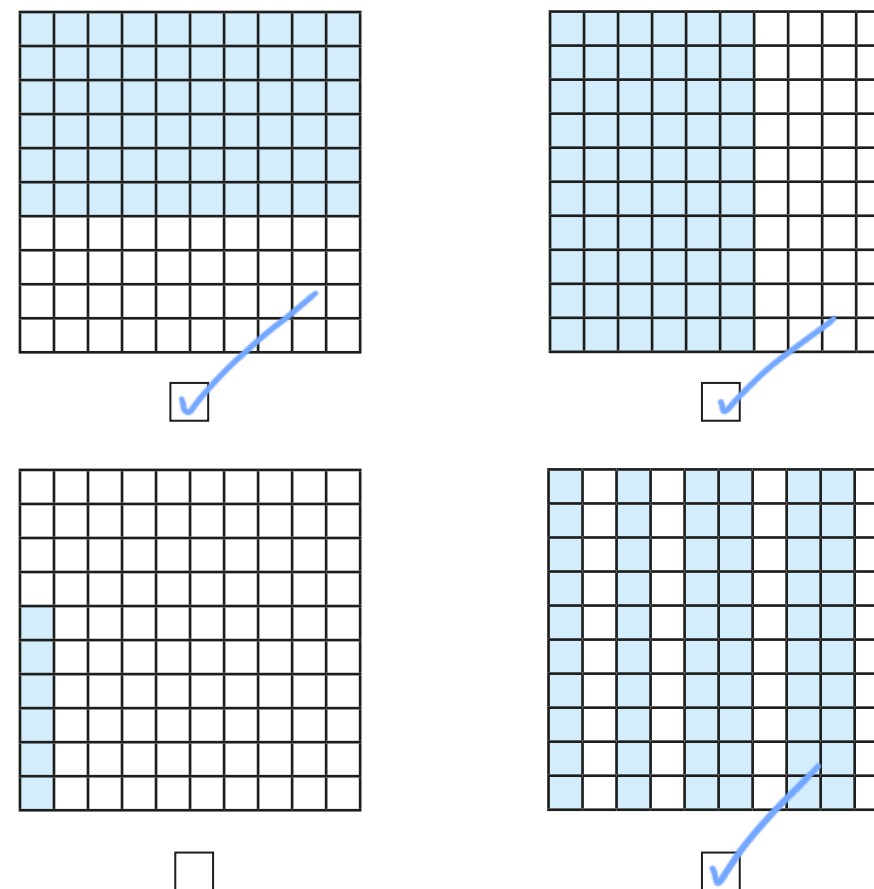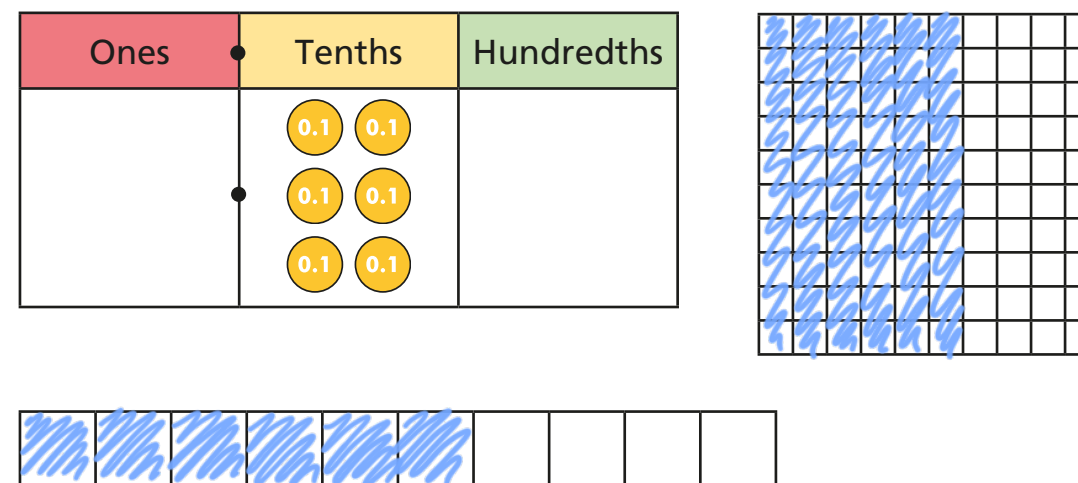
a) 3 tenths
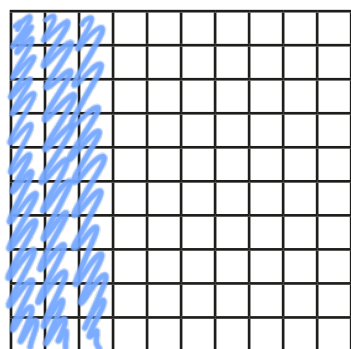
b) 30 hundredths

What do you notice? Discuss with a partner.

3 Huan uses a hundred square to represent 60 hundredths.

Tick the diagrams that represent this.

**4** Shade the grids so that each representation shows the same number.

Ones	Tenths	Hundredths
	0.1 0.1 0.1 0.1 0.1 0.1	

5 Complete the sentences.

a) You need to shade [**23**] squares on a hundred square

to represent $\frac{23}{100}$

b) You need to shade [**70**] squares on a hundred square

to represent $\frac{7}{10}$

6 Complete the place value chart so that it is equivalent to the shaded hundred square.

Ones	•	Tenths	Hundredths
		0.1 0.1	0.01 0.01
		0.1 *0.1*	*0.01* *0.01*
		0.1	*0.01* *0.01*
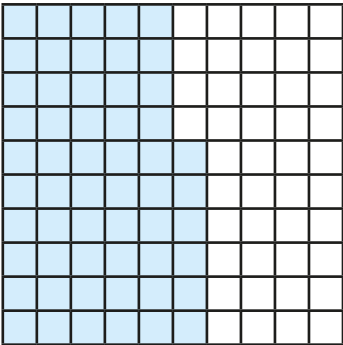
7 Teddy shades $\frac{6}{10}$ on a hundred square.

Eva shades $\frac{4}{100}$ on a hundred square.

Jack shades $\frac{16}{100}$ on a hundred square.

What is the range of the number of squares they have shaded?

$\frac{14}{25}$

8 Alex shades a hundredths on a hundred square.

Rosie shades b hundredths on a hundred square.

Rosie has shaded 40 more squares than Alex.

a) Write possible values for a and b. *Various answers e.g.*

$a =$ [**20**] $b =$ [**60**]

b) What is the maximum number of squares Alex could have shaded?

[**60**]

9 Dora shades a grid using three colours.

She shades the grid in the following way.

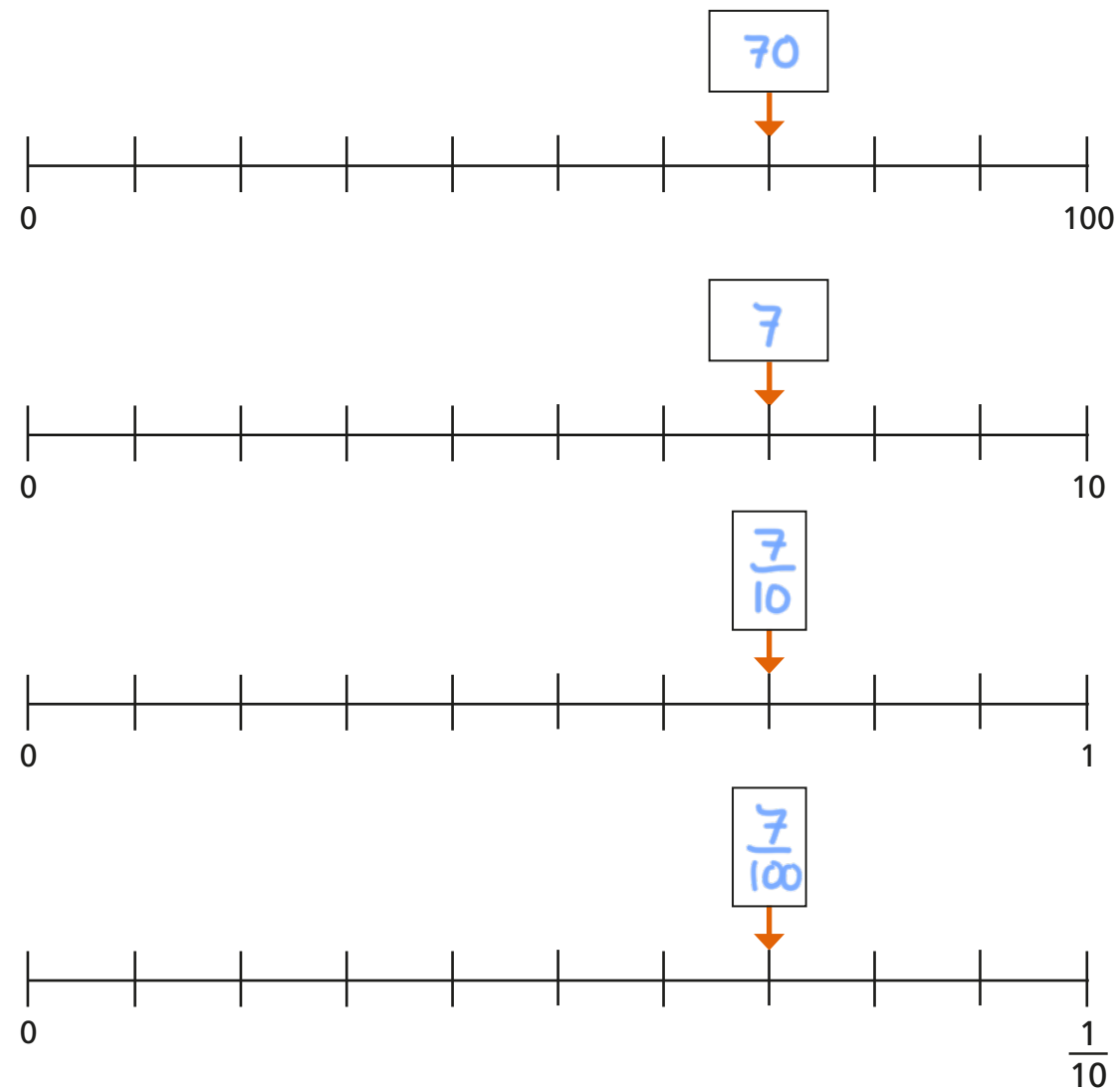| Colour	Red	Blue	Green
Fraction shaded	$\frac{3}{10}$	$\frac{5}{10}$	$\frac{7}{100}$

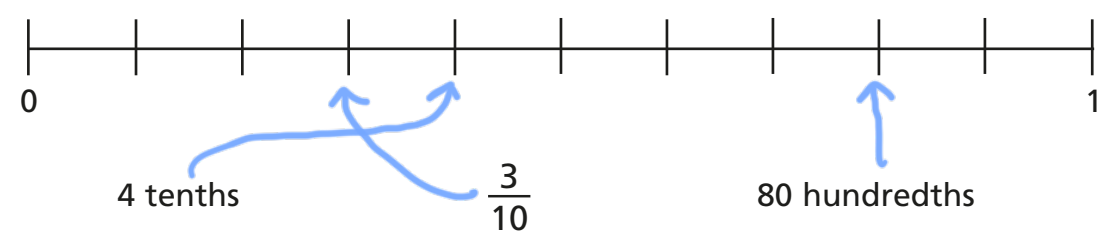How many hundredths of the grid are not shaded?

$\frac{13}{100}$
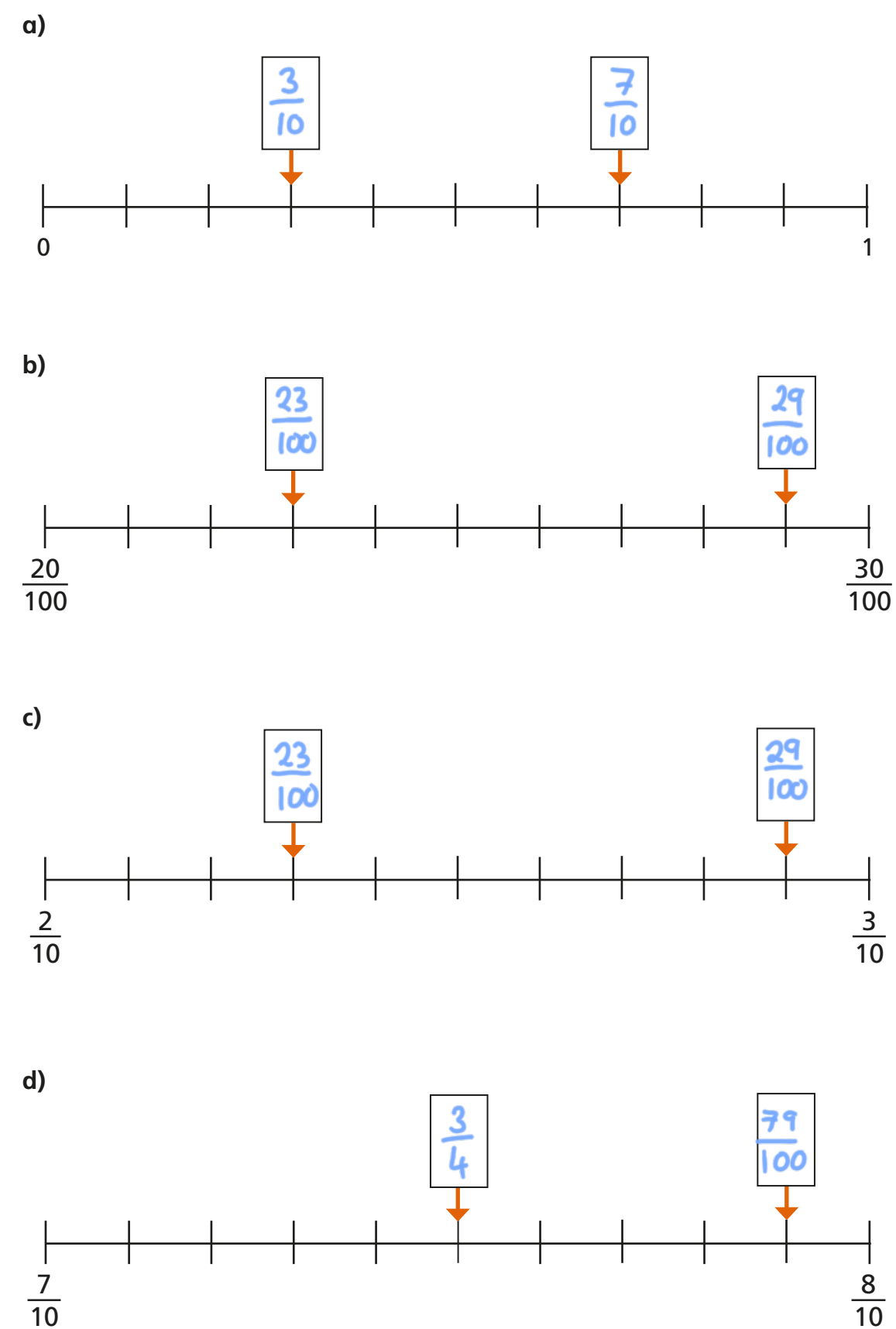
Represent tenths and hundredths on number lines

1 What numbers are the arrows pointing to?

70

0 ———————————— 100

7

0 ———————————— 10

$\frac{7}{10}$

0 ———————————— 1

$\frac{7}{100}$

0 ———————————— $\frac{1}{10}$

2 Draw arrows to show the position of the numbers on the number line.

0 ———————————— 1

4 tenths $\frac{3}{10}$ 80 hundredths

3 What fractions are the arrows pointing to?

a)

$\frac{3}{10}$ $\frac{7}{10}$

0 ———————————— 1

b)

$\frac{23}{100}$ $\frac{29}{100}$

$\frac{20}{100}$ ———————————— $\frac{30}{100}$

c)

$\frac{23}{100}$ $\frac{29}{100}$

$\frac{2}{10}$ ———————————— $\frac{3}{10}$

d)

$\frac{3}{4}$ $\frac{79}{100}$

$\frac{7}{10}$ ———————————— $\frac{8}{10}$
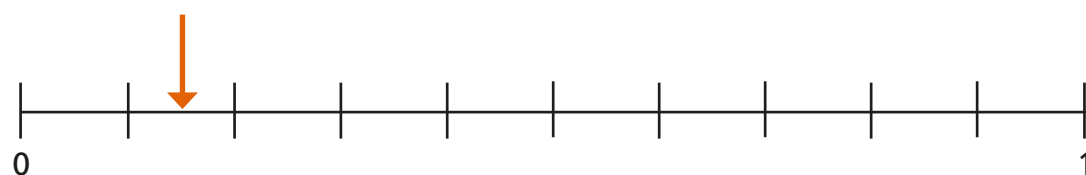
Discuss with a partner your answers to parts b) and c).

4 Draw arrows to show the position of the numbers on the number line.

| seven-tenths | $\frac{8}{10}$ | 0.2 |

0 ———————————— 1
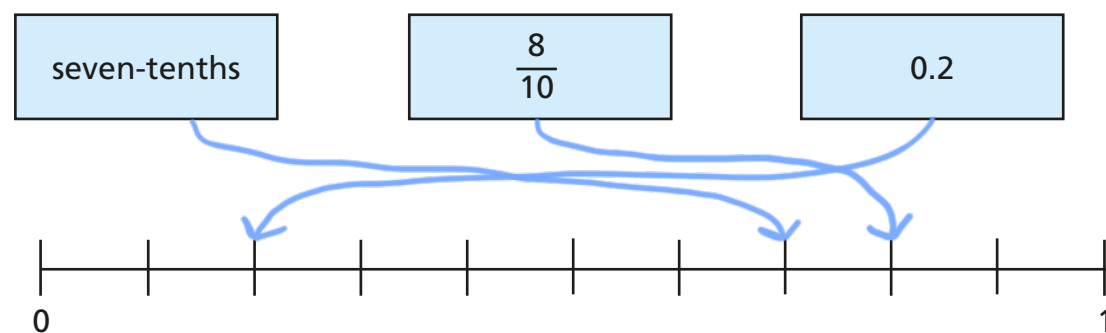
5 Ron says he has labelled $\frac{15}{10}$ on the number line.

0 ———————————— 1

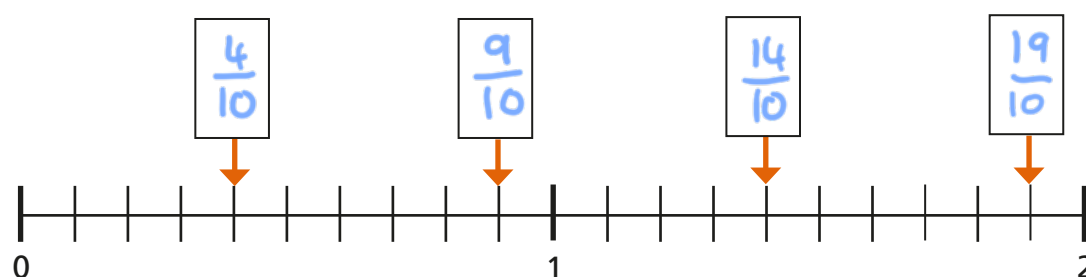Whitney says that he is wrong and that he cannot label $\frac{15}{10}$ on this number line.
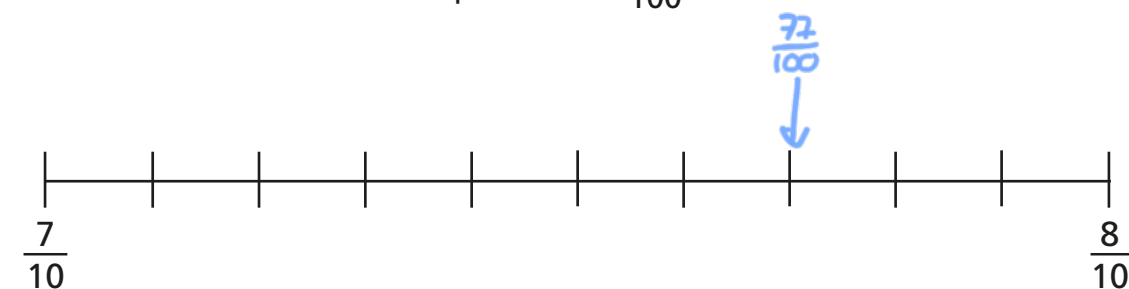
Who do you agree with? __Whitney__

Explain your answer.

$\frac{15}{10}$ > 1 and the number line only goes up to 1

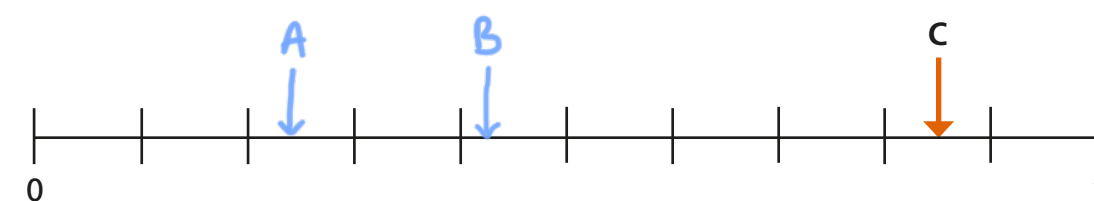**6** What numbers are the arrows pointing to?

Write your answers as tenths.

| $\frac{4}{10}$ | $\frac{9}{10}$ | $\frac{14}{10}$ | $\frac{19}{10}$ |

0 ———— 1 ———— 2

7 Draw an arrow to show the position of $\frac{77}{100}$ on the number line.

$\frac{7}{10}$ ———————————— $\frac{8}{10}$

8 Draw and label arrows for numbers A and B on the number line.

0 ———————————— 1

A

Ones	•	Tenths	Hundredths
	•	0.1 0.1	0.01 0.01 0.01 0.01

B

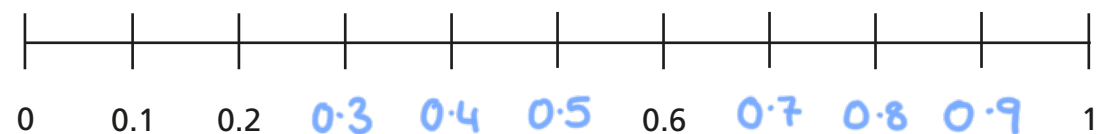| Ones	•	Tenths	Hundredths
	•	0.1 0.1 0.1 0.1	0.01 0.01

Draw some counters to show C.

Interchange between fractional and decimal number lines

1 Complete the number lines.

a)

| 0 | 0.1 | 0.2 | 0·3 | 0·4 | 0·5 | 0.6 | 0·7 | 0·8 | 0·9 | 1 |

b)

| 0 | $\frac{1}{10}$ | $\frac{2}{10}$ | $\frac{3}{10}$ | $\frac{4}{10}$ | $\frac{5}{10}$ | $\frac{6}{10}$ | $\frac{7}{10}$ | $\frac{8}{10}$ | $\frac{9}{10}$ | 1 |
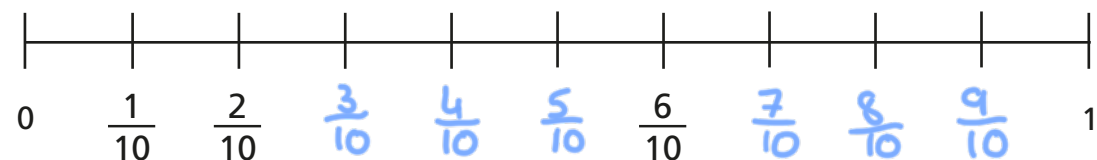
c) Are the number lines identical? Discuss with a partner.

2 Complete the number lines.

a)

| 0.6 | 0·61 | 0·62 | 0·63 | 0·64 | 0·65 | 0·66 | 0·67 | 0·68 | 0·69 | 0.7 |

b)

| $\frac{6}{10}$ | $\frac{61}{100}$ | $\frac{62}{100}$ | $\frac{63}{100}$ | $\frac{64}{100}$ | $\frac{65}{100}$ | $\frac{66}{100}$ | $\frac{67}{100}$ | $\frac{68}{100}$ | $\frac{69}{100}$ | $\frac{7}{10}$ |

3 Complete the number line by filling in the empty boxes.

| 0.6 | 0·7 | 0·8 | 0·9 | 1 | 1.1 |

| $\frac{6}{10}$ | $\frac{7}{10}$ | $\frac{8}{10}$ | $\frac{9}{10}$ | 1 | $\frac{11}{10}$ |
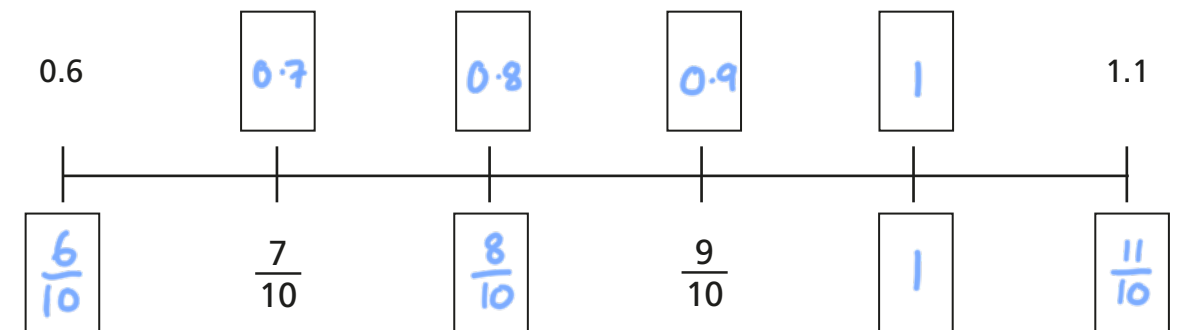
4 What numbers are the arrows pointing to?

Give each answer as a fraction and a decimal.

a)

fraction = $\frac{45}{100}$ decimal = 0·45

b)

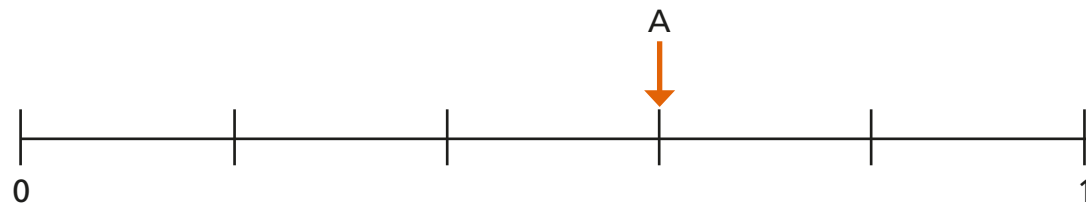fraction = $\frac{57}{100}$ decimal = 0·57
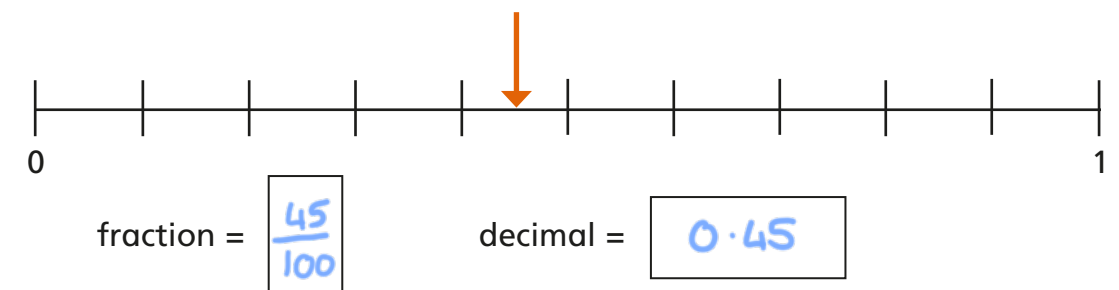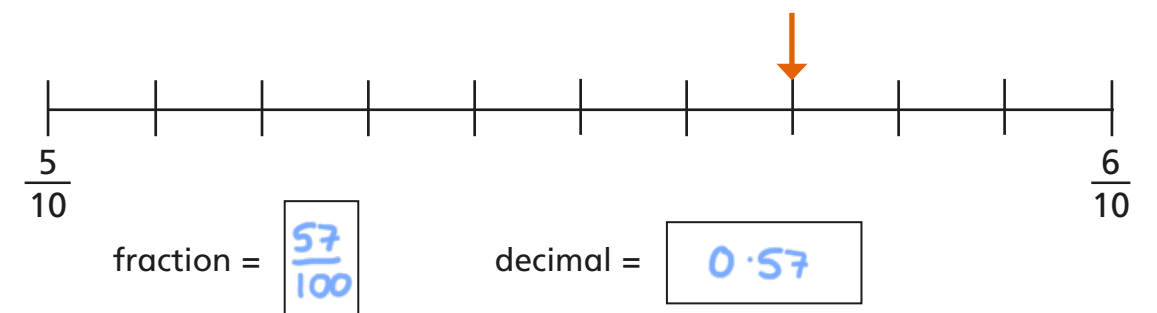
c) Point to another point on one of the number lines.

Ask your partner to tell you what the point is.

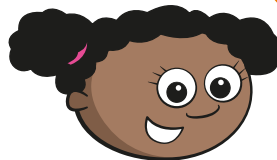**5** Ron and Whitney are reading numbers from a number line.

A

|———|———|———↓|———|———|
0   1

a)
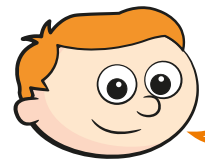
A is pointing to 0.3

Ron is incorrect.

Explain the mistake that he has made.

He has assumed the number line is going up in 0·1s

b)

A is pointing to $\frac{6}{100}$

Whitney is incorrect.

Explain the mistake that she has made.

She has mixed up tenths and hundredths.
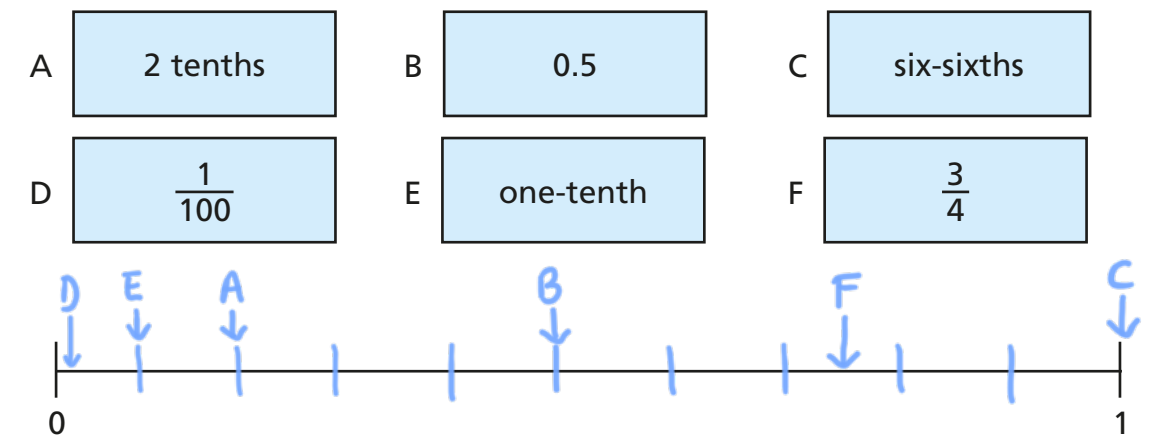
c) What number is A pointing to?

Give your answer as a fraction and a decimal.
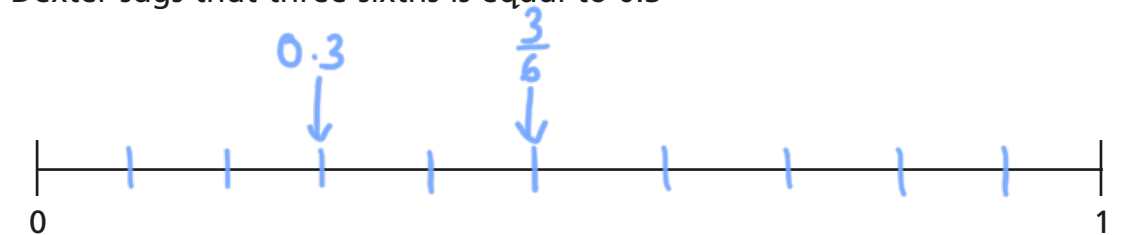
A = $\frac{6}{10}$ A = $0·6$

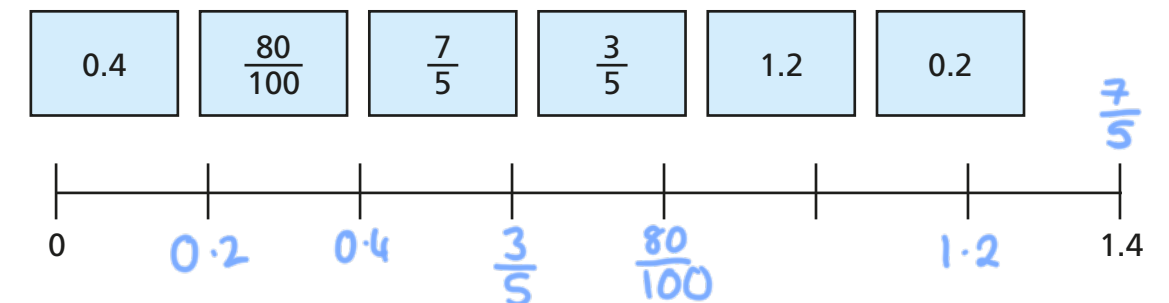**6** Show the approximate position of the numbers on the number line.

A	2 tenths	B	0.5	C	six-sixths
D	$\frac{1}{100}$	E	one-tenth	F	$\frac{3}{4}$

D E A   B   F   C
↓ ↓ ↓   ↓   ↓   ↓
|——|——|——|——|——|——|——|——|——|——|
0   1

7 Dexter says that three-sixths is equal to 0.3

0·3 $\frac{3}{6}$
↓   ↓
|——|——|——|——|——|——|——|——|——|——|
0   1

Mark both of these numbers on the number line to show that Dexter is incorrect.

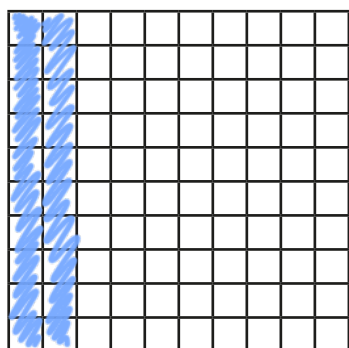**8** Complete the number line, using the numbers in the boxes.

0.4	$\frac{80}{100}$	$\frac{7}{5}$	$\frac{3}{5}$	1.2	0.2

$\frac{7}{5}$

|——|——|——|——|——|——|——|
0   0·2   0·4 $\frac{3}{5}$ $\frac{80}{100}$ 1·2   1.4

9 Explain why 11 tenths is a greater number than 73 hundredths.

$\frac{11}{10} > 1$ and $\frac{73}{100} < 1$ so $\frac{11}{10} > \frac{73}{100}$

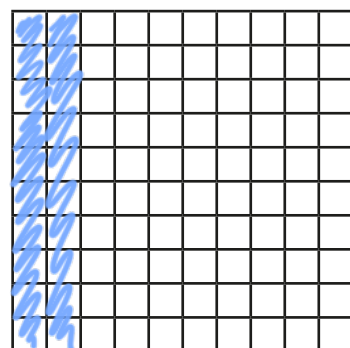White Rose Maths

1 a) Shade $\frac{2}{10}$ of the hundred square.

b) Shade $\frac{20}{100}$ of the hundred square.

c) Complete the equivalent fractions.

$\frac{2}{10} = \frac{20}{100}$　　　　$0.2 = \frac{2}{10}$　　　　$0.2 = \frac{20}{100}$

2 Complete the statements.

a) $\frac{8}{10} = \frac{80}{100}$　　　　d) $\frac{17}{100} = 0.17$
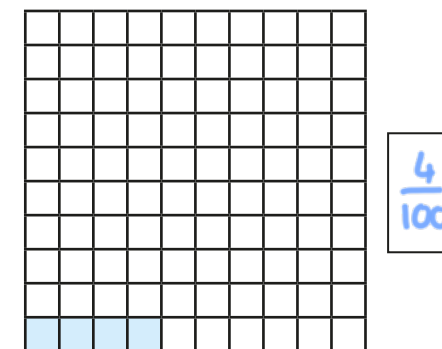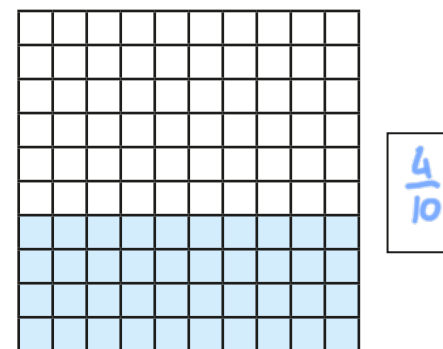
b) $\frac{70}{100} = \frac{7}{10}$　　　　e) $0.37 = \frac{37}{100}$

c) $0.5 = \frac{5}{10}$　　　　f) $0.03 = \frac{3}{100}$

3 Part of a grid is shaded.

a) What fraction of each grid is shaded?

$\frac{4}{10}$　　　　$\frac{4}{100}$

b) Use your answers to part a) to explain why 0.4 is greater than 0.04

$\frac{4}{10} = 0.4$ and $\frac{4}{100} = 0.04$ therefore $0.4 > 0.04$

4 Write <, > or = to complete the statements.

a) 0.6 ⟩ $\frac{6}{100}$　　　　d) 0.79 = $\frac{79}{100}$

b) $\frac{9}{10}$ = 0.9　　　　e) $\frac{15}{100}$ < 0.2

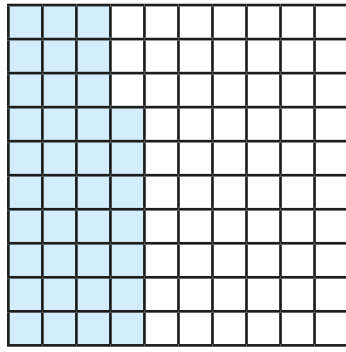c) 0.7 < $\frac{70}{10}$　　　　f) $\frac{29}{100}$ < $\frac{3}{10}$

5 Continue the linear sequences.

a) $\frac{1}{10}, \frac{11}{100}, \frac{12}{100},$ $\frac{13}{100}, \frac{14}{100}, \frac{15}{100}$

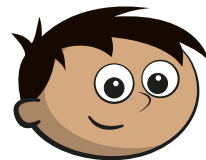b) $\frac{35}{100}, \frac{5}{10}, \frac{65}{100},$ $\frac{8}{10}, \frac{95}{100}, \frac{11}{10}$

c) $\frac{4}{10}, 0.29,$ $0.18, 0.07, -0.04$

6

Use the diagram to explain why $\frac{37}{100} = \frac{3}{10} + \frac{7}{100}$

_____

_____

7

There are no tenths in $\frac{42}{100}$ because the denominator is 100, not 10

Explain to a partner why Amir is not correct.

You can use a hundred square to help you.

8 a) Write a digit to make the statement correct.

$\frac{37}{100} < 0.\_9$

b) Is there more than one possible answer? Record all the possibilities.

_____

_____

9 Complete the calculations.

You may use a hundred square to help you.

Give your answers as fractions.

a) $\frac{3}{10} - \frac{20}{100} = \frac{\boxed{}}{10}$

b) $1 - \frac{91}{100} = \boxed{}$

c) $\frac{5}{10} - 0.17 = \boxed{}$

10 Complete the number sentence in three different ways.

$\frac{49}{100} + \frac{\boxed{}}{10} + 0.3 + 0.\_\_ = 2$

$\frac{49}{100} + \frac{\boxed{}}{10} + 0.3 + 0.\_\_ = 2$

$\frac{49}{100} + \frac{\boxed{}}{10} + 0.3 + 0.\_\_ = 2$

Compare answers with a partner.

Can you find another way?

White Rose Maths

1 Use the diagrams to help you complete the statements.

a)
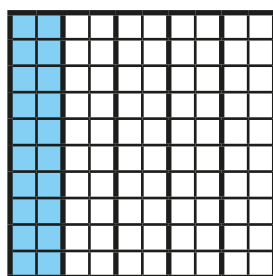
$\frac{1}{5} = \frac{\boxed{2}}{10}$

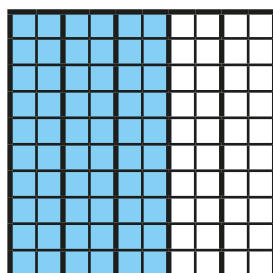$\frac{1}{5} = \frac{\boxed{20}}{100}$

$\frac{1}{5} = 0.\underline{2}$

b)
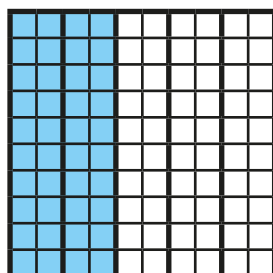
$\frac{\boxed{2}}{5} = \frac{\boxed{4}}{10}$

$\frac{\boxed{2}}{5} = \frac{\boxed{40}}{100}$

$\frac{\boxed{2}}{5} = 0.\underline{4}$

c)

$\frac{\boxed{3}}{5} = \frac{\boxed{6}}{10}$

$\frac{\boxed{3}}{5} = \frac{\boxed{60}}{100}$

$\frac{\boxed{3}}{5} = 0.\underline{6}$

2 Use a hundred square to help you complete the statement.

a) $\frac{1}{4} = \frac{\boxed{25}}{100} = 0.\underline{25}$
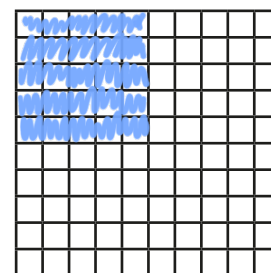
b) Use your answer to part a) to help you to complete the statement.

$\frac{3}{4} = \frac{\boxed{75}}{100} = \boxed{0.75}$

3 Use the fraction wall to help you complete the statements.
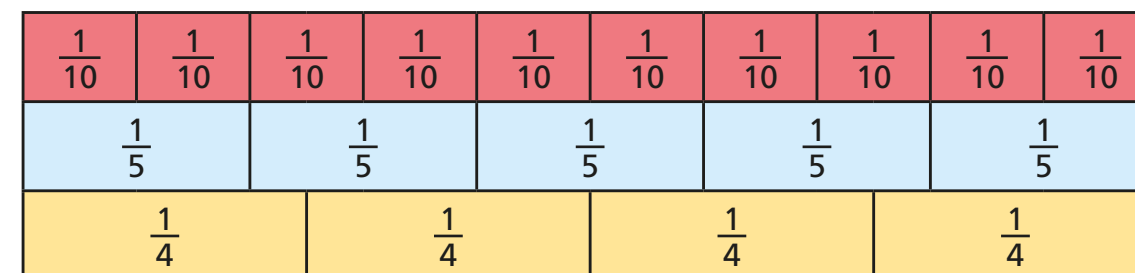
a) $\frac{4}{5} = \frac{\boxed{8}}{10} = 0.\underline{8}$

d) $\frac{3}{10}$ $<$ $\frac{2}{5}$

b) $\frac{6}{10} = \frac{\boxed{3}}{5} = 0.\underline{6}$

e) $\frac{4}{5}$ $>$ $\frac{1}{4}$

c) $\frac{2}{4} = \frac{\boxed{5}}{10} = 0.\underline{5}$
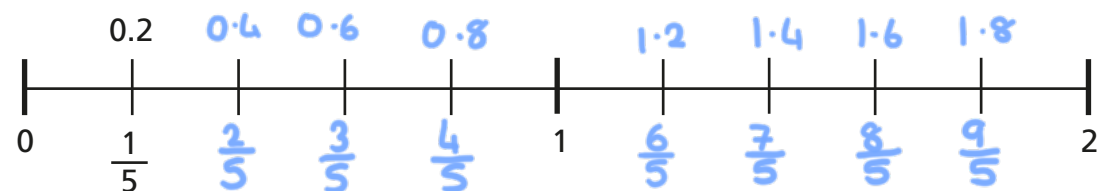
f) $\frac{10}{10}$ $=$ $\frac{4}{4}$

4 Which is greater, $\frac{3}{4}$ or $\frac{4}{5}$? Explain how you know.

$$\frac{3}{4} = \frac{75}{100} \qquad \frac{4}{5} = \frac{80}{100}$$

$\frac{4}{5}$ is greater than $\frac{3}{4}$

5 Fill in the missing numbers.

Use the number line to help you.

0.2   0.4   0.6   0.8   1.2   1.4   1.6   1.8

0   $\frac{1}{5}$ $\frac{2}{5}$ $\frac{3}{5}$ $\frac{4}{5}$ 1 $\frac{6}{5}$ $\frac{7}{5}$ $\frac{8}{5}$ $\frac{9}{5}$ 2

a) $\frac{6}{5} = 1.\underline{2}$

b) $\frac{9}{5} = \underline{1}.\underline{8}$

c) $0.8 = \frac{\boxed{4}}{5}$

d) $1.6 = \frac{\boxed{8}}{5}$

6 Which is greater, $15\frac{3}{4}$ or $15\frac{7}{10}$?

Explain how you know.

$$\frac{3}{4} = \frac{75}{100} \qquad \frac{7}{10} = \frac{70}{100} \qquad \frac{75}{100} > \frac{70}{100}$$

$15\frac{3}{4}$ is greater than $15\frac{7}{10}$

7 Here is a number line from 0 to 1

A   B

0   0.2 $\frac{1}{4}$ 1
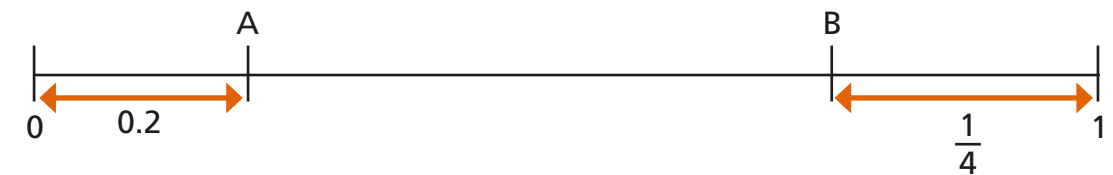
a) Write a fraction with a denominator of 10, which could go after B on the number line.

e.g. $\boxed{\frac{8}{10}}$

b) Write a fraction with a denominator of 100, which could go before A on the number line.

e.g. $\boxed{\frac{1}{100}}$

c) Write three fractions that could be in between A and B on the number line.

e.g. $\boxed{\frac{21}{100}}$ $\boxed{\frac{1}{2}}$ $\boxed{\frac{7}{10}}$

Compare answers with a partner.

8 Tick the expressions that are equivalent to four-fifths of x.

$x + \frac{4}{5}$ ☐   0.4x ☐ $\frac{4x}{5}$ ✓

0.8x ✓ $x - \frac{4}{5}$ ☐   0.45x ☐
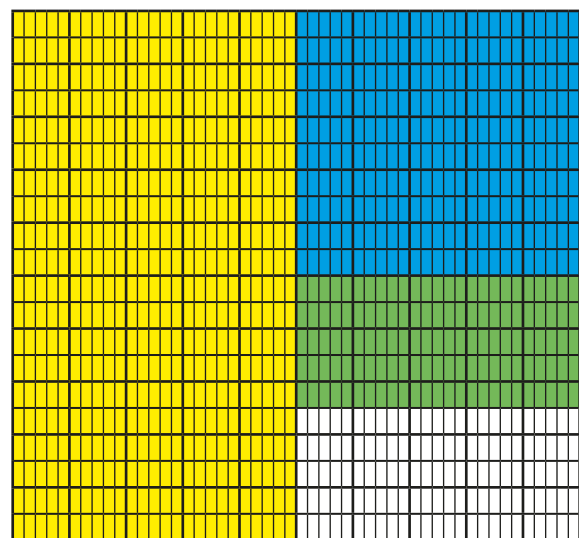
Talk about your answers with a partner.

White Rose Maths

1 Use the thousand square to complete the equivalent fractions.

a) $\dfrac{1}{2} = \dfrac{\boxed{500}}{1000}$

b) $\dfrac{1}{4} = \dfrac{\boxed{250}}{1000}$

c) $\dfrac{1}{8} = \dfrac{\boxed{125}}{1000}$

d) Use your answer to part c) to write $\dfrac{1}{8}$ as a decimal.

Discuss any patterns you spot with a partner.

$\boxed{0.125}$

2 Complete the statements.

a) $\dfrac{1}{4}$ is a half of $\dfrac{1}{2}$ so $\dfrac{1}{8}$ is __a half__ of $\dfrac{1}{4}$

b) $0.25 = \dfrac{\boxed{1}}{4}$

c) $0.75 = \dfrac{\boxed{3}}{4}$

$0.25 = \dfrac{\boxed{2}}{8}$

$0.75 = \dfrac{\boxed{6}}{8}$

3 What fraction of the thousand square is shaded?

a)   b)
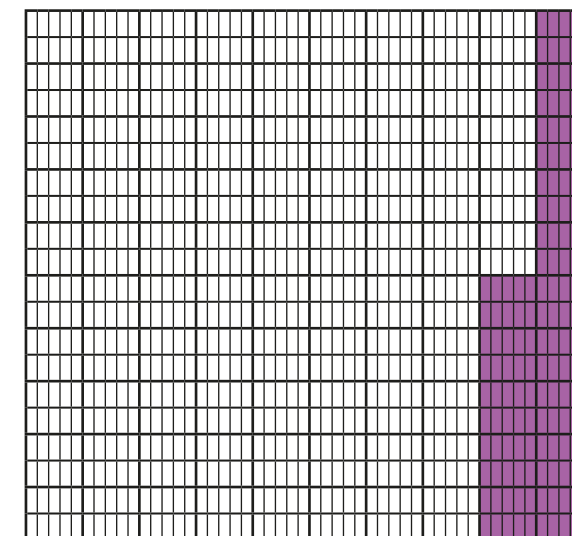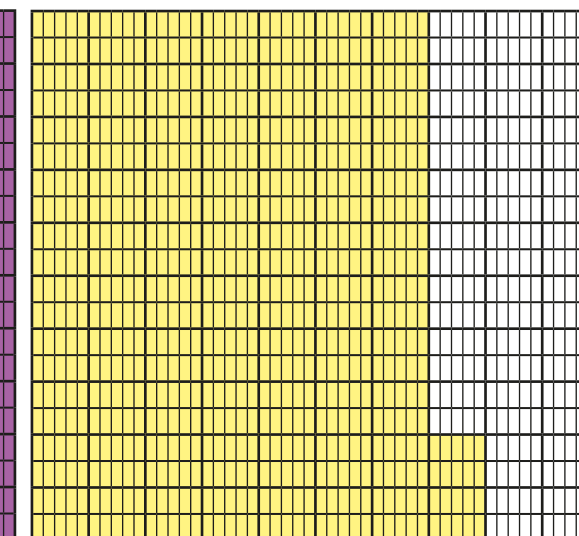
$\dfrac{\boxed{150}}{1000}$ $\dfrac{\boxed{720}}{1000}$

4 Use the thousand square to help you.
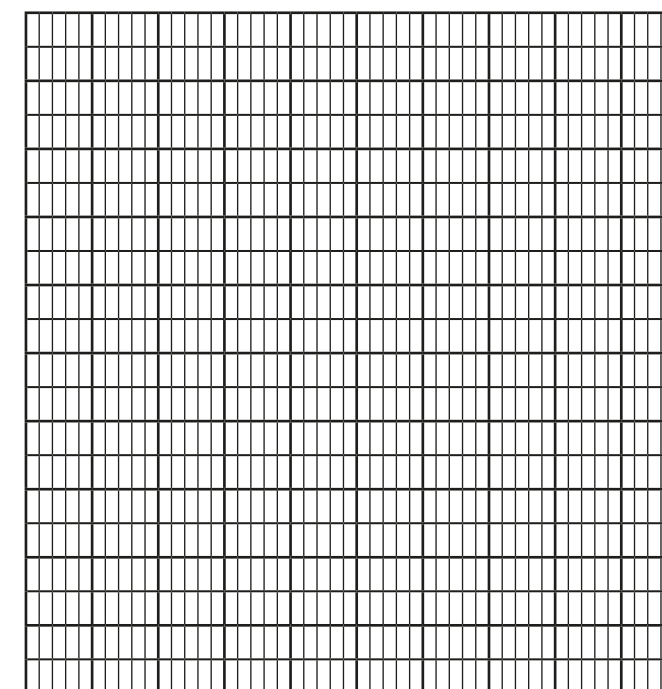
a) How many thousandths are equal to two-hundredths? $\boxed{20}$

b) How many thousandths are equal to $\dfrac{2}{10}$? $\boxed{200}$

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5 Complete the statements.

a) $\frac{300}{1000} = \frac{\boxed{30}}{100} = \frac{\boxed{3}}{10} = 0.\underline{3}$

b) $\frac{800}{1000} = \frac{\boxed{80}}{100} = \frac{\boxed{8}}{10} = \frac{\boxed{4}}{5} = 0.\underline{8}$

c) $\frac{480}{1000} = \frac{\boxed{48}}{100} = 0.\underline{4}\ \underline{8}$

e) $0.6 = \frac{\boxed{6}}{10} = \frac{\boxed{60}}{100} = \frac{\boxed{600}}{1000}$

d) $\frac{389}{1000} = 0.\underline{3}\ \underline{8}\ \underline{9}$

f) $0.67 = \frac{\boxed{67}}{100} = \frac{\boxed{670}}{1000}$

6 Annie is trying to work out $\frac{3}{8}$ as a decimal.
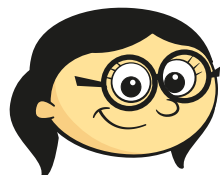
> $\frac{3}{8}$ is equal to $\frac{375}{1000}$, which is 375

Explain and correct Annie's error.

It is equal to 375 thousandths which is 0·375 not 375

7 Given that $\frac{1}{8}$ = 0.125, complete the table.

Fraction	$\frac{2}{8}$	$\frac{3}{8}$	$\frac{5}{8}$	$\frac{10}{8}$	$\frac{11}{8}$
Decimal	0·25	0·375	0·625	1·25	1·375

8 Write the fractions in descending order.

| $\frac{3}{5}$ | $\frac{4}{10}$ | $\frac{5}{8}$ | $\frac{71}{100}$ |

$\frac{71}{100} \qquad \frac{5}{8} \qquad \frac{3}{5} \qquad \frac{4}{10}$

9

$\frac{3}{8}$

0    $\frac{1}{8}$ 0.25   A $\frac{6}{8}$ $\frac{875}{1000}$ 1
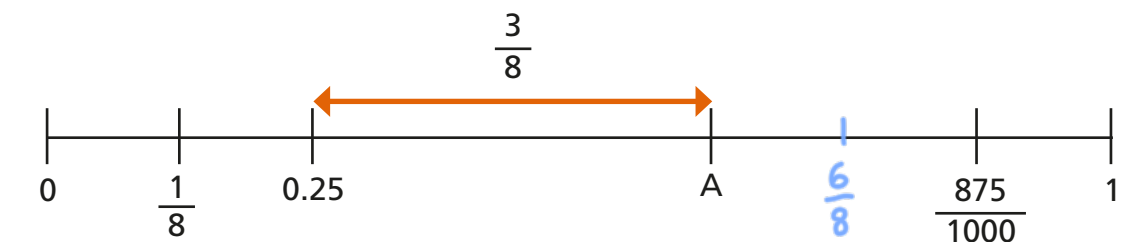
a) What is the fraction at point A?

$\boxed{\frac{5}{8}}$

b) Label $\frac{6}{8}$ in approximately the correct place on the number line.

10 a) Circle all the fractions that cannot be simplified to quarters.

$\boxed{\frac{1}{8}} \qquad \frac{2}{8} \qquad \boxed{\frac{3}{8}} \qquad \frac{4}{8} \qquad \boxed{\frac{5}{8}} \qquad \frac{6}{8} \qquad \boxed{\frac{7}{8}} \qquad \frac{8}{8}$
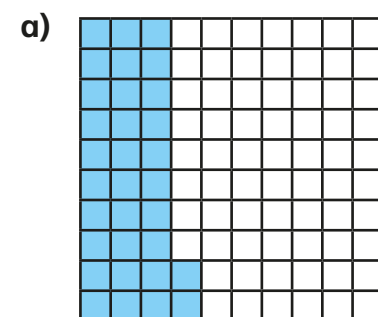
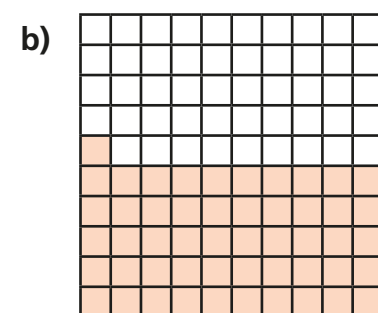b) What do you notice about all of the circled fractions?

The numerators are odd.

Understand the meaning of percentage using a hundred square

1) For each hundred square, write how many squares have been shaded.

Then write the percentage of the square that is shaded.
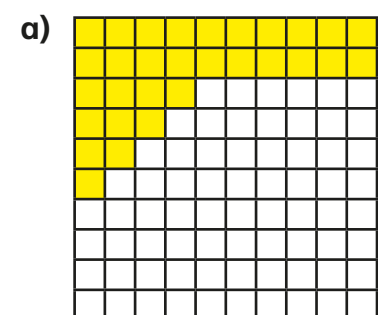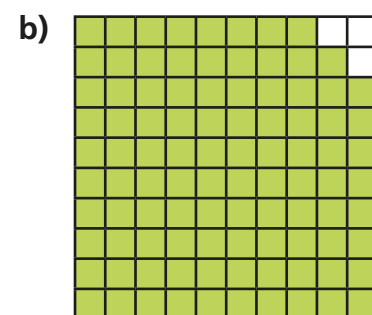
a)

squares shaded: 32

percentage shaded: 32%

b)

squares shaded: 51

percentage shaded: 51%

2) What fraction of each hundred square has been shaded?
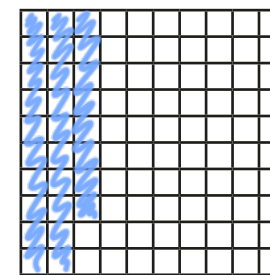
Also write your answer as a percentage.
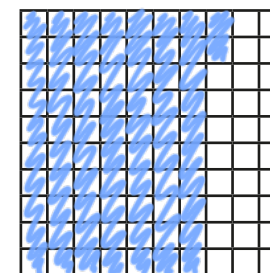
a)

$\dfrac{30}{100}$ = 30%

b)

$\dfrac{97}{100}$ = 97%

Discuss how you worked out the percentages.

3) a) Shade 28% of the hundred square.

b) Shade 72% of the hundred square.

c) Dani shades 100% of the squares on a hundred grid.

How many squares has she shaded? 100

4) Shade $\dfrac{11}{100}$ of the grid red and 27% of the grid blue.
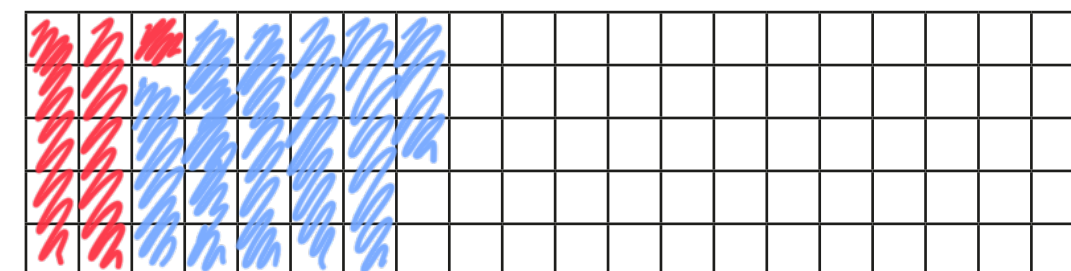
What percentage of the grid is not shaded? 62%

Explain or show your method.

62 squares out of 100 is equal to 62% or $\dfrac{11}{100}$ = 11%, 11% + 27% = 38% and 100% - 38% = 62%

5 **a)** Complete the table for the hundred square.
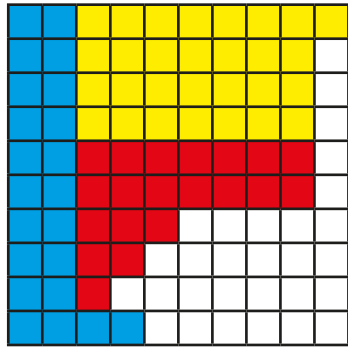
Colour	% shaded
blue	22%
red	20%
yellow	29%
white	29%

b) What check could you make to help you work out if you are right?

Check they add up to 100%

6 Complete the statements.

a) $\frac{1}{5} = \frac{2}{10} = \frac{20}{100} = \boxed{20}$ %

c) $\frac{3}{4} = \frac{75}{100} = \boxed{75}$ %

b) $\frac{1}{4} = \frac{25}{100} = \boxed{25}$ %

7 **a)** Complete the table.

Fraction shaded	$\frac{40}{100}$	$\frac{8}{10}$	$\frac{20}{1000}$
Percentage shaded	40%	80%	2%

b) If you shade 73% of a hundred square, what fraction is unshaded? $\frac{27}{100}$

8 A rectangle is made up of 50 squares.

Shade 46% of this rectangle.

Compare answers with a partner.

Did you get the same answer?

What mistakes do you think some people make?

9 What percentage of each diagram is shaded?

70%
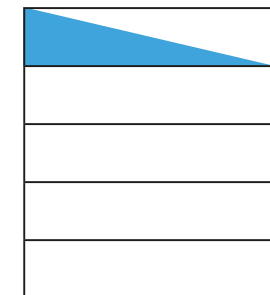
10%

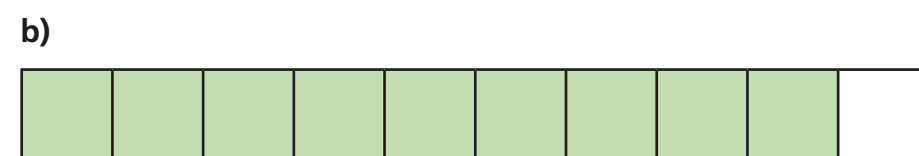# Convert fluently between simple fractions, decimals and percentages

White Rose Maths

1 What fraction, decimal and percentage of each diagram are shaded?
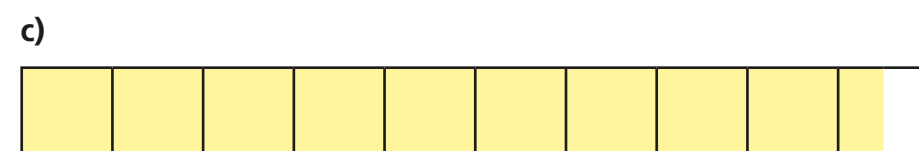
a)
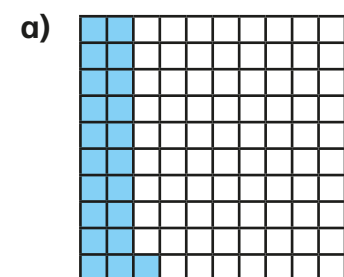
fraction = $\dfrac{21}{100}$

decimal = 0·21

percentage = 21 %

b)

fraction = $\dfrac{9}{10}$ decimal = 0·9   percentage = 90 %

c)

fraction = $\dfrac{95}{100}$ decimal = 0·95   percentage = 95 %

2 What fraction, decimal and percentage of the bar model is shaded?

fraction = $\dfrac{4}{5}$ decimal = 0·8   percentage = 80%

3 **a)** Sort the statements into those that are correct and those that are incorrect.

| 0.09 is the same as $\dfrac{9}{10}$ | 25% is equivalent to $\dfrac{1}{4}$ |

| $\dfrac{7}{100}$ is equal to 0.07 | 50% is the same as 0.05 |

| $\dfrac{3}{10}$ is equivalent to 30% | 0.4 is the same as $\dfrac{1}{4}$ |

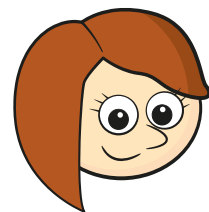| Correct statements	Incorrect statements
$\dfrac{7}{100}$ is equal to 0·07	0·09 is the same as $\dfrac{9}{10}$
$\dfrac{3}{10}$ is equivalent to 30%	50% is the same as 0·05
25% is equivalent to $\dfrac{1}{4}$	0·4 is the same as $\dfrac{1}{4}$

b) For the ones that are incorrect, change the statement to make it correct.

E.g. 0·09 is the same as $\dfrac{9}{100}$

50% is the same as 0·5

0·4 is the same as $\dfrac{2}{5}$

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4

$\frac{4}{5}$ is the same as 45%.

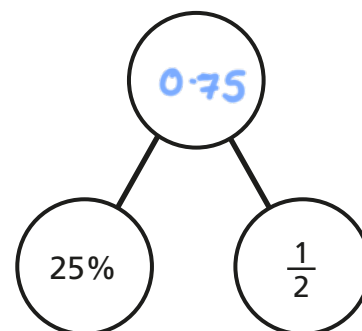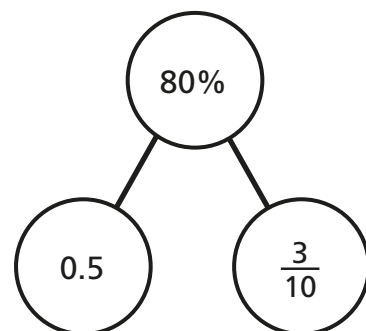Is Rosie correct? __NO__

Explain your reasoning.
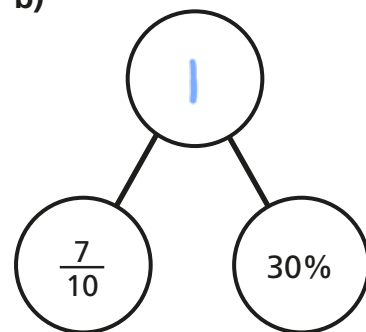
$\frac{4}{5} = \frac{8}{10} = \frac{80}{100} = 80\%$

---

5 Complete the missing values.

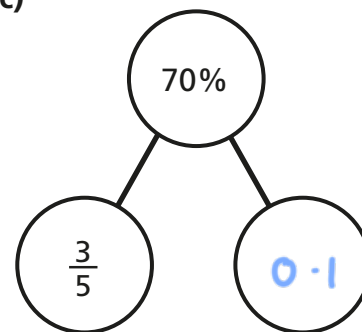Give your answers as decimals. One has been done for you.

a)

80%
0.5 $\frac{3}{10}$

0.75
25% $\frac{1}{2}$

b)

1
$\frac{7}{10}$ 30%

c)

70%
$\frac{3}{5}$ 0.1

---

6 Complete the statements with possible decimal answers.

E.g.

a) $\frac{1}{5}$ < 0.3 < 0.5 < 60%

b) 5% < 0.07 < $\frac{1}{10}$ < 0.4

c) $\frac{3}{100}$ < 0.21 < 30% < 0.99

---

7 Tick the odd one out.
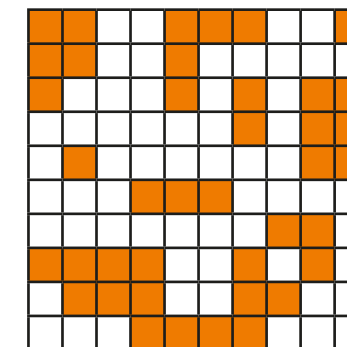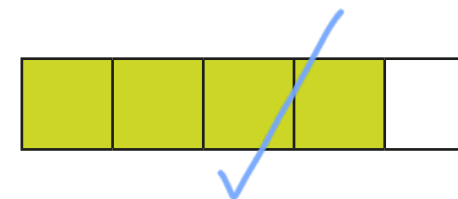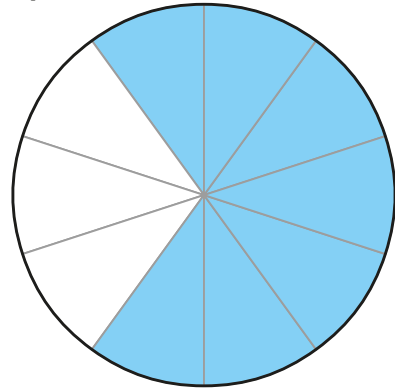

0.4

two-fifths

How did you work this out?

All the others are equivalent to 0.4

Create your own problem like this for a partner.

Use and interpret pie charts

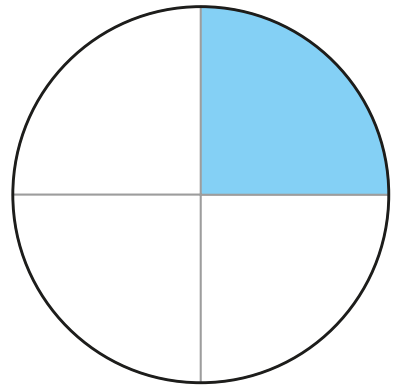**1** What fraction and percentage of each pie chart is shaded?

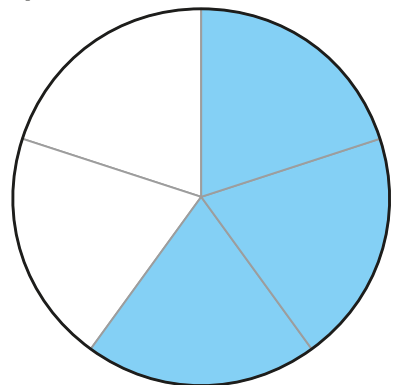**a)**

fraction shaded = $\dfrac{7}{10}$

percentage shaded = 70%

b)

fraction shaded = $\dfrac{1}{4}$

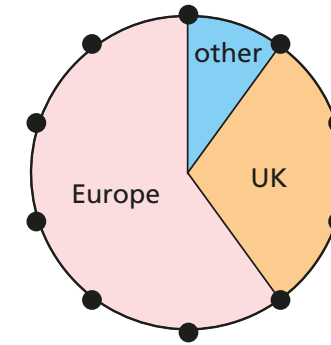percentage shaded = 25%

c)

fraction shaded = $\dfrac{3}{5}$

percentage shaded = 60%

2 The pie chart shows where some families went on holiday.

a) What fraction of the families took a holiday in the UK? $\dfrac{3}{10}$

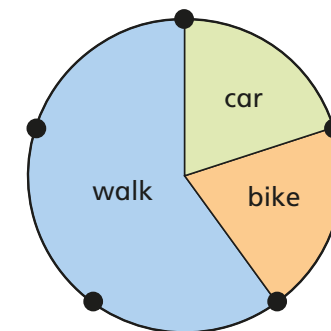**b)** What percentage of the families went to Europe? 60%

c) What proportion of families went to somewhere other than the UK or Europe?

Give your answer as a decimal.

0·1

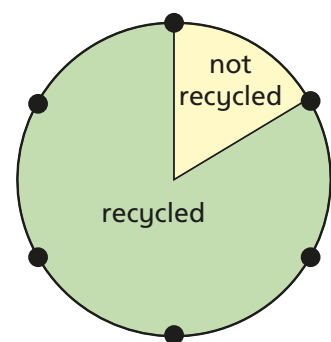**3** The pie chart shows how students travel to school.

a) What percentage of students travelled to school by car? 20%

b) What proportion of children walk to school?

Give your answer as a fraction, decimal and percentage.

fraction = $\dfrac{3}{5}$ decimal = 0·6   percentage = 60%

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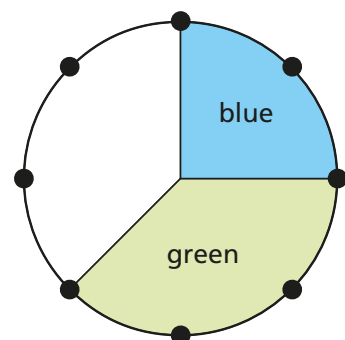**4** The pie chart shows the amount of waste recycled by a school.

a) How does the pie chart show that the school recycled more than they did not recycle?

The sector for recycled is larger.

b) What fraction of the waste is recycled by the school? $\frac{5}{6}$
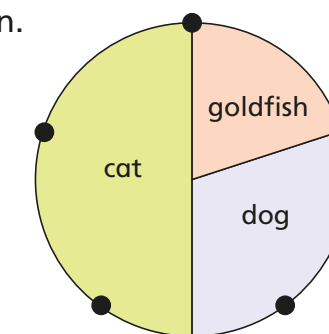
5 Part of this pie chart is shaded blue.

a) What percentage of the pie chart is not blue? 75%

b) What fraction of the pie chart is green? $\frac{3}{8}$

6 The pie chart shows the pets that some students own.

a) What percentage of students own a goldfish? 20%
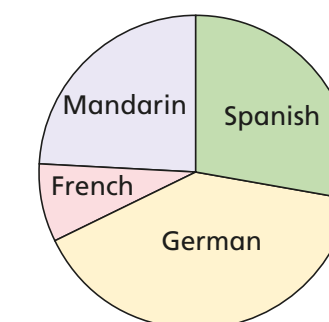
b) What percentage of students own a dog? 30%
Explain how you worked out your answer.

e.g. 20% own a goldfish, 50% own a cat so the remaining 30% is dog.

7 Some students took part in a survey about their favourite language.

The pie chart shows the results.

a) Estimate the percentage of students that chose each language.

E.g

Mandarin = 20%   Spanish = 30%

French = 10%   German = 40%

b) Add up your percentages.
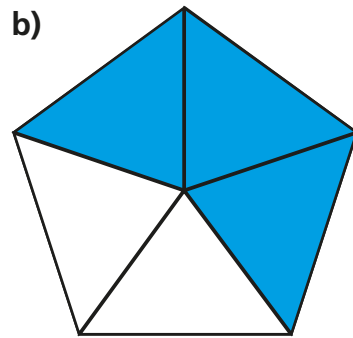
What do you notice?

Represent any fraction as a diagram

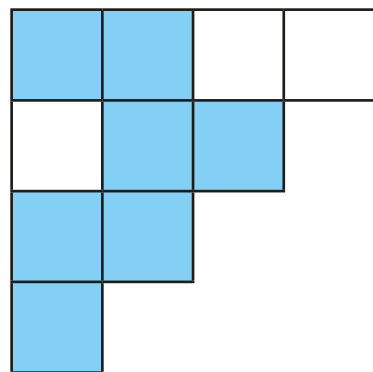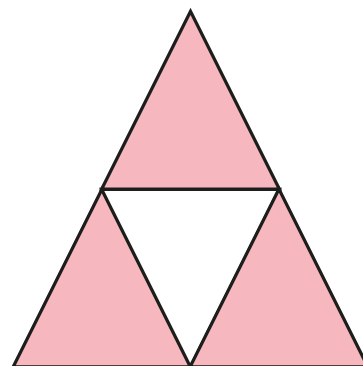**1** What fraction of the shapes is shaded?

a)

$\dfrac{2}{7}$

b)

$\dfrac{3}{5}$

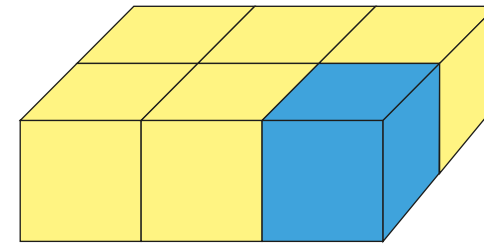**2** What fraction of the shapes are shaded?
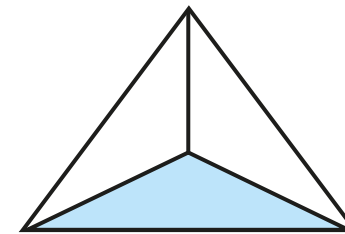
$\dfrac{7}{10}$

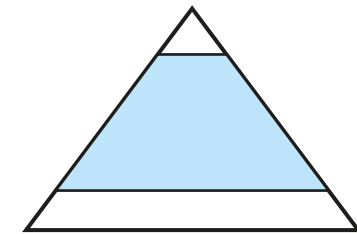$\dfrac{3}{4}$

3

What fraction of the cubes are yellow?

$\dfrac{5}{6}$

4 One of these triangles has $\frac{1}{3}$ shaded?

A

B

a) Which shape has $\frac{1}{3}$ shaded? _____ A _____

b) Explain why one shape has $\frac{1}{3}$ shaded and the other does not.
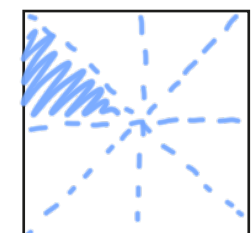
One is split into equal parts and one is not.

5 Shade the stated fractions of the squares. E.g.
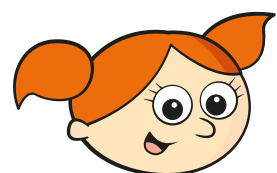
$\dfrac{1}{2}$ shaded $\dfrac{1}{4}$ shaded $\dfrac{1}{8}$ shaded

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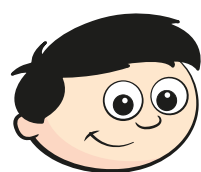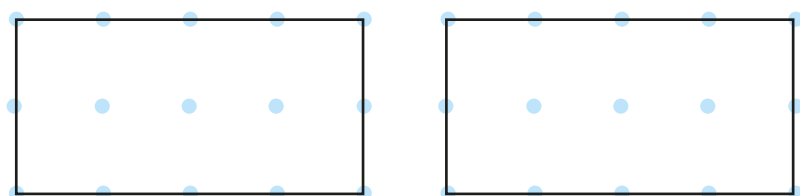**6** Alex and Dexter are dividing rectangles into quarters.

They can only join up dots.

> I divided my shape into quarters and I made 4 identical shapes.

a) How might Alex have divided her shape?

Show two different ways.

> All 4 of my shapes are different, but they are still quarters.

b) How might Dexter have divided his shape?

Show two different ways.
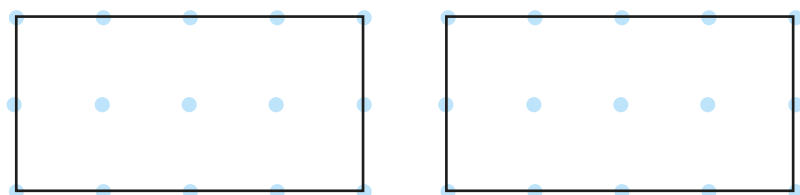
Compare answers with a partner.

Can you find more ways to divide the shapes?

7 **a)** What fraction of the shapes are shaded?

b) Did you have to make any assumptions?

Discuss with a partner.

8 All the sides of this shape are the same length.

a) Divide the shape into fifths.

c) Shade 10% of the shape.

b) Shade $\frac{3}{4}$ of the shape.
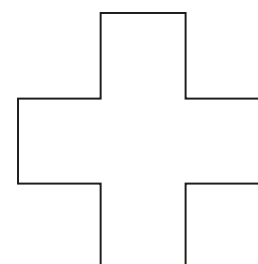
d) Shade 0.375 of the shape.
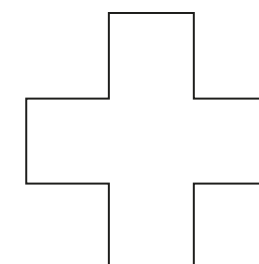
Represent fractions on number lines

1 What fraction is each arrow pointing to?

a)

$\frac{3}{10}$

0 ————————————————— 1

b)

$\frac{3}{8}$

0 ————————————————— 1

c)

$\frac{3}{5}$

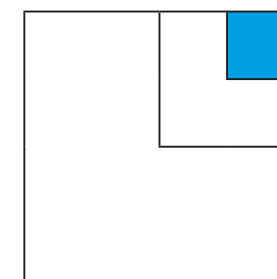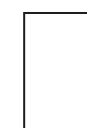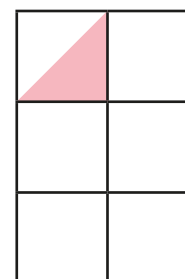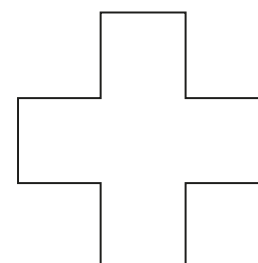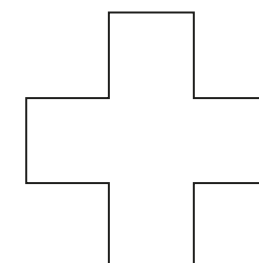0 ————————————————— 1
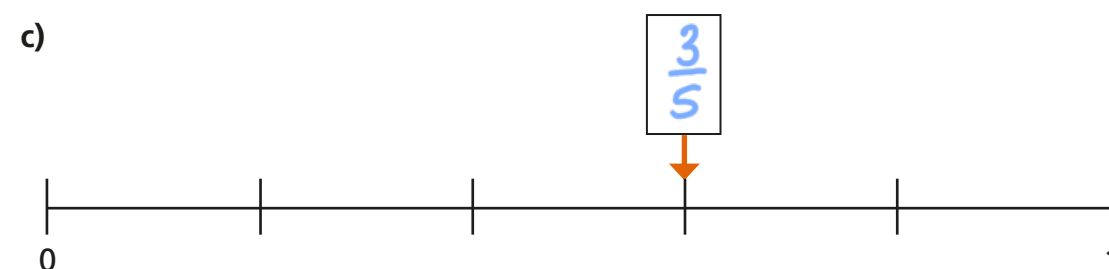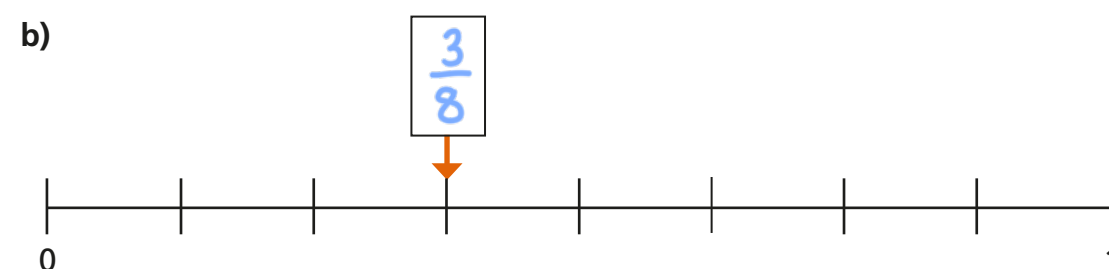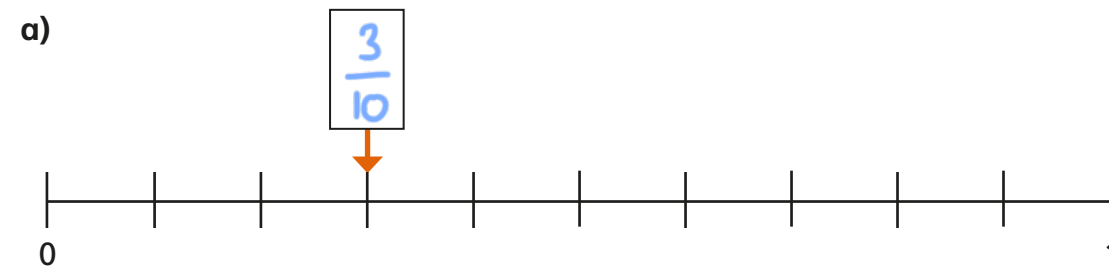
2 Aisha says that the arrow is pointing to $\frac{1}{3}$

0 ————————————————— 1
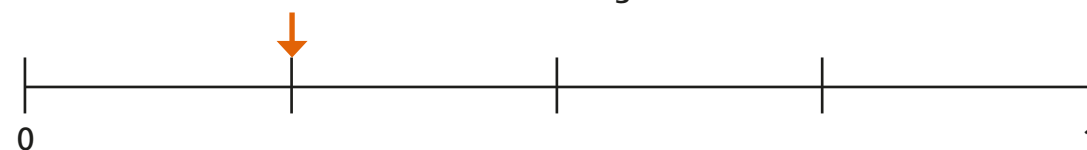
a) Aisha is not correct. Why do you think she might have thought that?
Discuss with a partner.

b) What fraction is the arrow pointing to? $\frac{1}{4}$

3 Draw an arrow from each fraction to its correct position on the number line.

0 ————————————————— 1

$\frac{1}{7}$ $\frac{3}{7}$ $\frac{7}{7}$
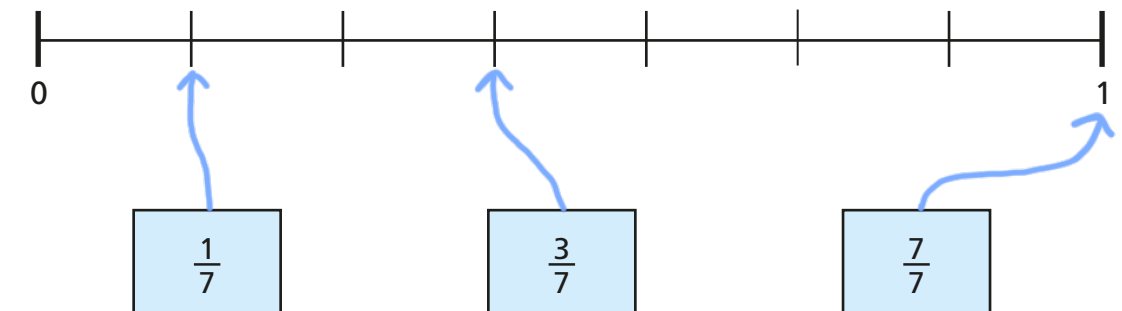
4 Here is a number line from 0 to 1

X

0 ————————————————— 1
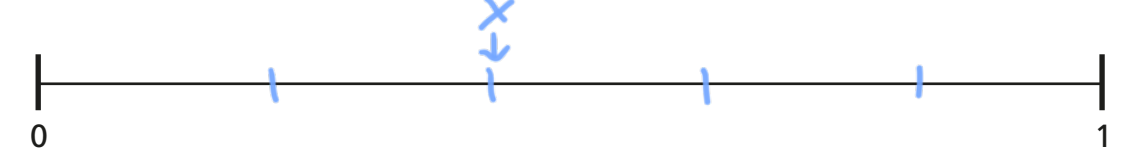
Label the point X at $\frac{2}{5}$

Explain how you decided where the point X would be.

Split the number line into 5 equal parts and then X is two-fifths of the way along.

5 Scott's school is 1 km from his house.

The coffee shop is $\frac{1}{2}$ km from Scott's house.

The factory is $\frac{2}{7}$ km from Scott's house.

Scott's house   Coffee shop   Scott's school

factory

0 ————————————————— 1

Indicate on the number line where the coffee shop and factory are.

6 Are these arrows pointing to the same fraction? ___NO___

0·7

0   1

1·4

0   2
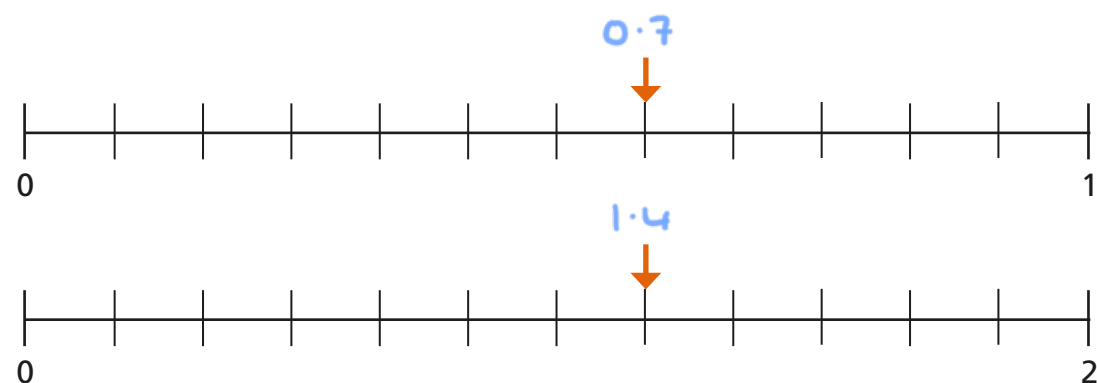
Explain your answer.

The number lines are split into the same number of intervals and the arrow is pointing to the same point but the end points are different.

7 **a)** How far along the number line is the point marked? $\dfrac{7}{18}$

0   1
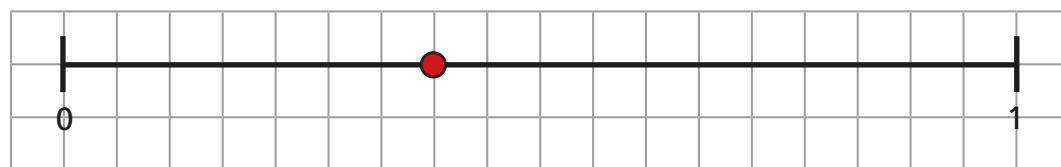
b) Mark the point $\dfrac{8}{9}$ of the way along the number line.

0 $\frac{8}{9}$ 1
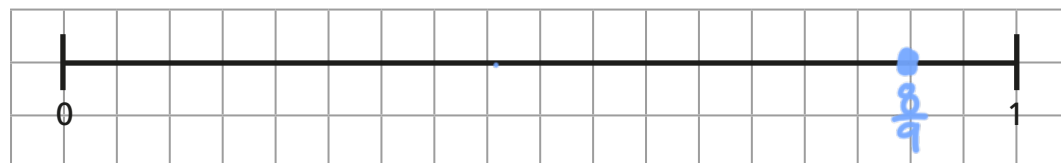
8 The number line shows both fifths and tenths.

$\dfrac{2}{5}$

0   1

$\dfrac{7}{10}$
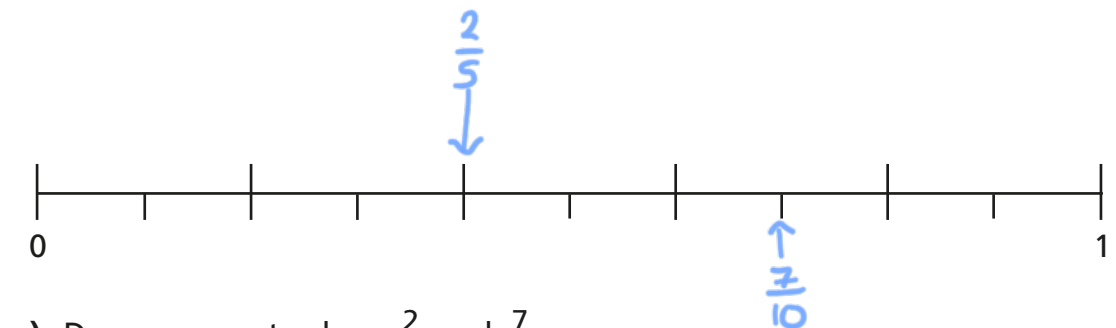
a) Draw arrows to show $\dfrac{2}{5}$ and $\dfrac{7}{10}$

b) Use the number line to complete:

$\dfrac{2}{5} = \dfrac{\boxed{4}}{10}$ $\dfrac{6}{10} = \dfrac{\boxed{3}}{5}$

c) Use < or > to make the statements correct.

$\dfrac{3}{10}$ ⬤< $\dfrac{3}{5}$ $\dfrac{4}{5}$ ⬤< $\dfrac{9}{10}$

d) Compare methods with a partner.

9 **a)** How can you mark eighths on this number line?

$\dfrac{3}{8}$

0   1
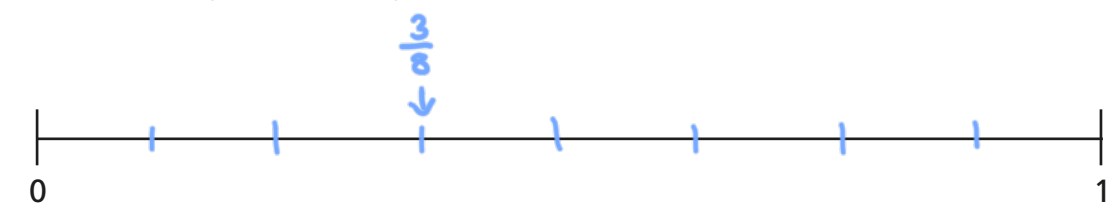
Explain your method to a partner.

b) Using the number line, show that $\dfrac{3}{8}$ is less than $\dfrac{7}{12}$

Identify and use simple equivalent fractions

1 Use the diagrams to work out equivalent fractions.

a)

$$\frac{3}{4} = \frac{6}{8} = \frac{9}{12}$$

b)

$$\frac{1}{3} = \frac{2}{6} = \frac{4}{12}$$
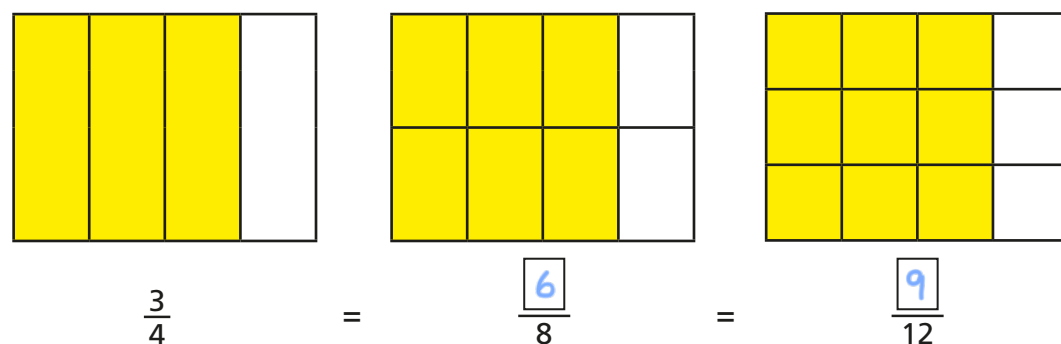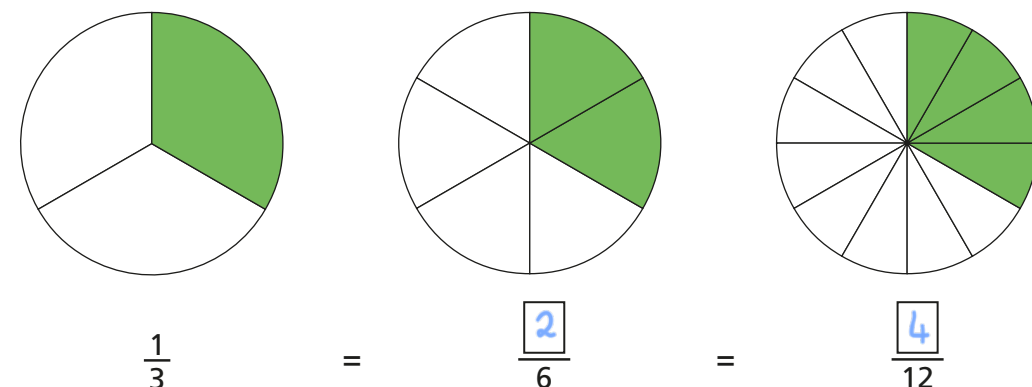
2 Divide the shape to show the equivalent fractions.

$$\frac{4}{5} = \frac{12}{15} = \frac{16}{20}$$
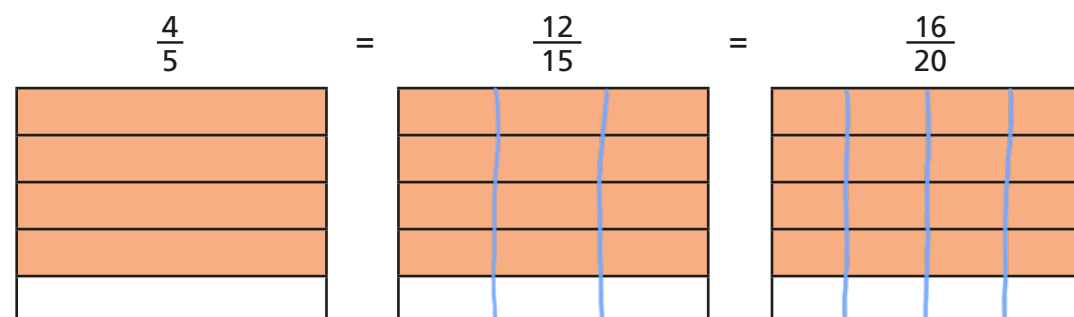
3 **a)** Use a drawing to show that $\frac{2}{3}$ is equivalent to $\frac{6}{9}$
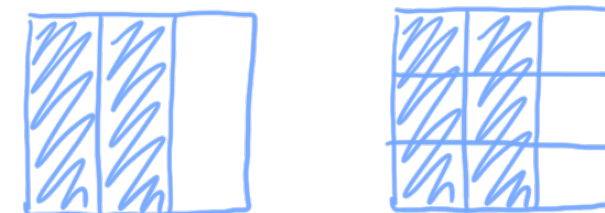
b) Use a diagram to show that $\frac{5}{10} = \frac{1}{2}$
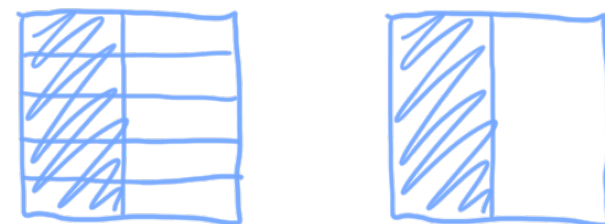
4 Filip and Esther are writing fractions equivalent to $\frac{1}{4}$

Filip
$\frac{1}{4}$ $\frac{2}{8}$ $\frac{4}{16}$ $\frac{8}{32}$ $\frac{16}{64}$

Esther
$\frac{1}{4}$ $\frac{2}{8}$ $\frac{3}{12}$ $\frac{4}{16}$ $\frac{5}{20}$
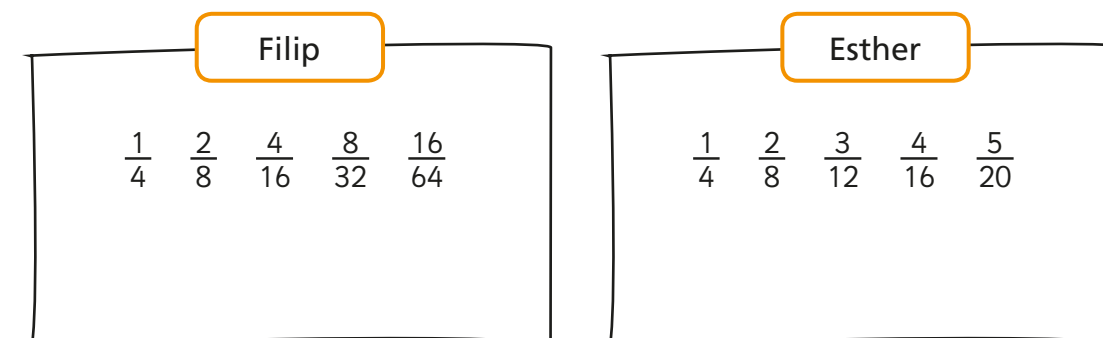
a) Explain the method that Filip has used to find equivalent fractions.

Filip has doubled the numerator and denominator each time.

b) Explain the method that Esther has used find equivalent fractions.

Esther has multiplied the numerator and denominator of $\frac{1}{4}$ by consecutive numbers (2, 3, 4, 5)

c) Write two more fractions for each method.

5 a) All these fractions are equivalent to $\frac{2}{5}$

Complete the fractions.

$$\frac{2}{5} = \frac{4}{10} = \frac{6}{15} = \frac{8}{20} = \frac{10}{25} = \frac{12}{30}$$

b) Discuss with a partner how many fractions are equivalent to $\frac{2}{5}$

c) Write five fractions that are equivalent to $\frac{60}{70}$

Show your method.

Various answers. E.g.

$$\frac{6}{7} \qquad \frac{30}{35} \qquad \frac{600}{700} \qquad \frac{12}{14} \qquad \frac{120}{140}$$

6 A shape is made up of squares and rectangles.

Show that $\frac{1}{2}$ of the shape is shaded.
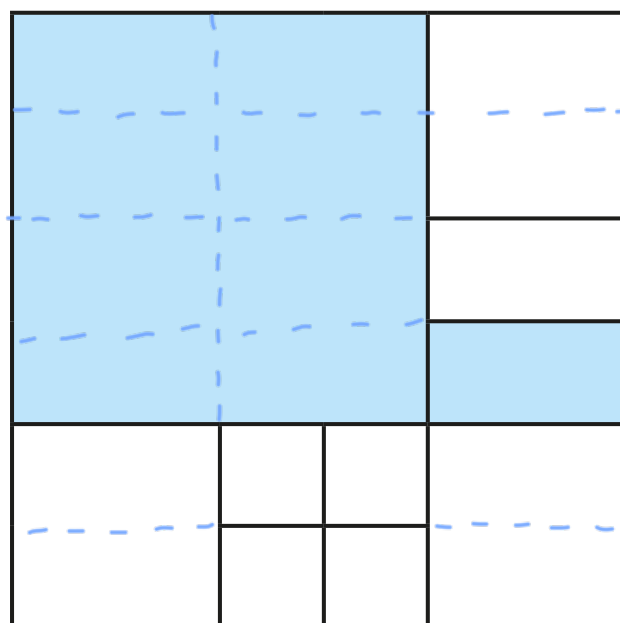
$$\frac{9}{18} = \frac{1}{2}$$

7 Eva, Jack and Dora have some counters.

Eva
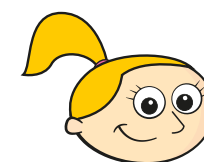
Jack

Dora
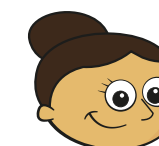
18 counters   36 counters   48 counters

Eva gives 12 counters to her teacher.

The rest of the children give the same fraction of their counters to their teacher.

How many counters do Jack and Dora each give their teacher?

Jack gives 24 counters.   Dora gives 32 counters.

8 Find the missing numbers to complete the comparisons.

$$\frac{A}{8} < \frac{15}{25} < \frac{B}{32}$$

What could each missing number be? What numbers would not work?

A ≤ 4 and B ≥ 20 are possible values.

A > 4 and/or B < 20 would not work.

White Rose Maths

1 Use a calculator to help you match up the fraction with its division.

Then match up the division to the decimal answer.

| $\frac{3}{4}$ | $23 \div 100$ | 0.8 |

| $\frac{4}{5}$ | $4 \div 5$ | 0.23 |

| $\frac{3}{10}$ | $3 \div 4$ | 0.3 |

| $\frac{23}{100}$ | $3 \div 10$ | 0.75 |
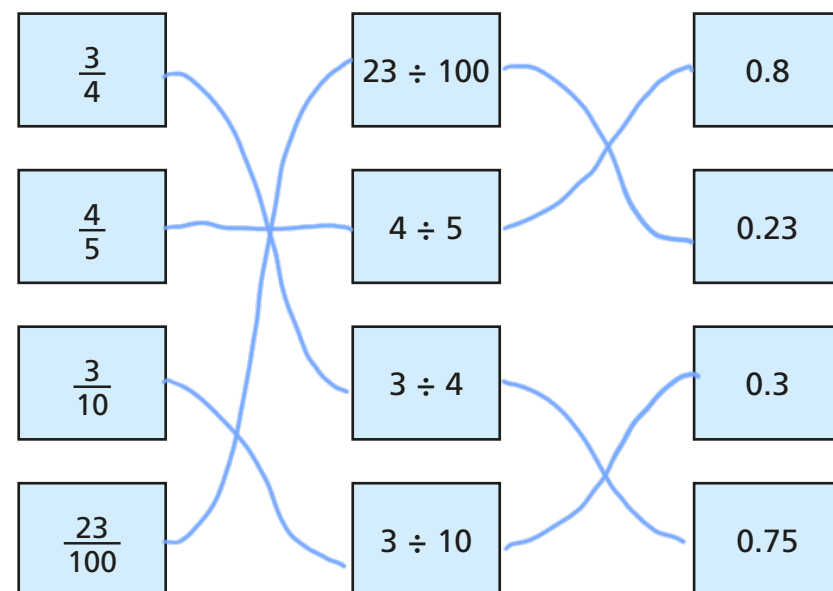
2 Huan is writing $\frac{8}{10}$ as a division on his calculator.

$10 \div 8$

1.25
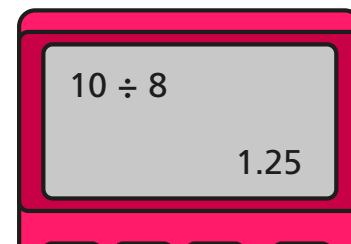
a) What mistake has Huan made?

He has divided the numbers the wrong way

b) What should he have typed on the calculator? $8 \div 10$

3 Write the fractions as divisions.

Use your calculator to work out the answer as a decimal.

a) $\frac{3}{5} = \boxed{3} \div \boxed{5} = \boxed{0.6}$

b) $\frac{7}{8} = \boxed{7} \div \boxed{8} = \boxed{0.875}$

c) $\frac{7}{20} = \boxed{7} \div \boxed{20} = \boxed{0.35}$

d) $\frac{37}{50} = \boxed{37} \div \boxed{50} = \boxed{0.74}$

e) $\frac{7}{4} = \boxed{7} \div \boxed{4} = \boxed{1.75}$

f) $\frac{15}{6} = \boxed{15} \div \boxed{6} = \boxed{2.5}$

4 Write the divisions as fractions.

a) $6 \div 9 = \boxed{\frac{6}{9}}$

b) $2 \div 5 = \boxed{\frac{2}{5}}$

c) $7 \div 12 = \boxed{\frac{7}{12}}$

d) $7 \div 19 = \boxed{\frac{7}{19}}$

e) $10 \div 4 = \boxed{\frac{10}{4}}$

f) $27 \div 5 = \boxed{\frac{27}{5}}$

5 Circle the fractions that are equivalent to $\frac{45}{60}$

You should use division on a calculator to help you.

$\frac{8}{2}$ $\frac{11}{44}$ $\boxed{\frac{33}{44}}$ $\boxed{\frac{12}{16}}$ $\boxed{\frac{360}{480}}$

Discuss with a partner the method you used.

6 Show that the statements are true.

a) $\frac{30}{50}$ and $\frac{17}{40}$ are not equal.

$30 \div 50 = 0.6 \qquad 17 \div 40 = 0.425$

$0.6 \neq 0.425$

b) $\frac{170}{200}$ is less than $\frac{9}{10}$

$170 \div 200 = 0.85 \qquad 9 \div 10 = 0.9$

$0.85 < 0.9$

7 Circle the smaller fraction in each pair.

a) $\boxed{\frac{3}{4}}$ $\frac{4}{5}$ **b)** $\boxed{\frac{9}{10}}$ $\frac{23}{25}$ **c)** $\boxed{\frac{19}{30}}$ $\frac{15}{20}$ **d)** $\frac{11}{19}$ $\boxed{\frac{53}{99}}$

8 These 3 pizzas are divided equally between 5 people.
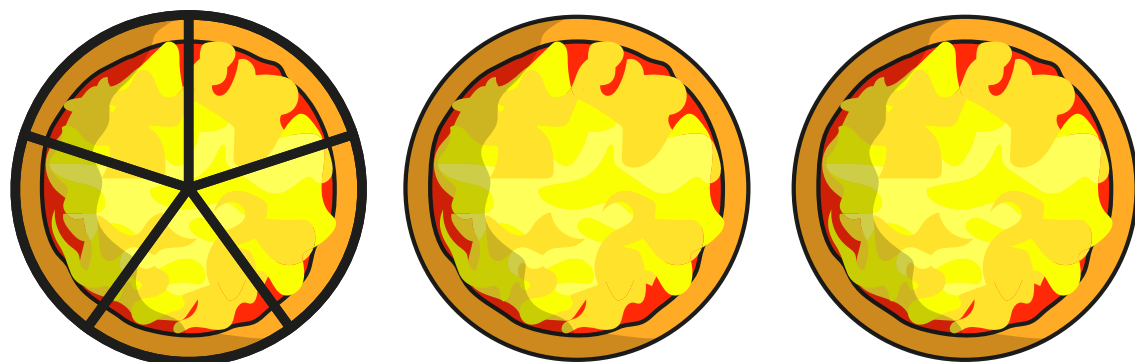
What fraction of one pizza does each person receive?

Each person receives $\boxed{\dfrac{3}{5}}$ of a pizza.

9 a) £2 is shared equally between 8 people.

What fraction of £1 does each person get?

Each person gets $\boxed{\dfrac{1}{4}}$ of £1

b) Nijah swims the same distance each day for 7 days.

She swims 4 km in total across the week.

What fraction of a km does Nijah swim each day?

Each day Nijah swims $\boxed{\dfrac{4}{7}}$ km.

10 Put the fractions in descending order.

$\boxed{\dfrac{31}{50}}$ $\boxed{\dfrac{45}{75}}$ $\boxed{\dfrac{18}{24}}$ $\boxed{\dfrac{130}{2000}}$

Show your method.

$\dfrac{18}{24} \qquad \dfrac{31}{50} \qquad \dfrac{45}{75} \qquad \dfrac{130}{2000}$

Convert fluently between fractions, decimals and percentages

White Rose Maths

1 Draw a line between the matching fractions and decimals.

You may use a calculator to help you.
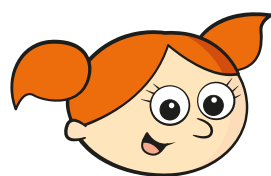
| $\frac{17}{20}$ | $\frac{33}{40}$ | $\frac{43}{50}$ | $\frac{21}{25}$ |

| 0.825 | 0.85 | 0.84 | 0.86 |
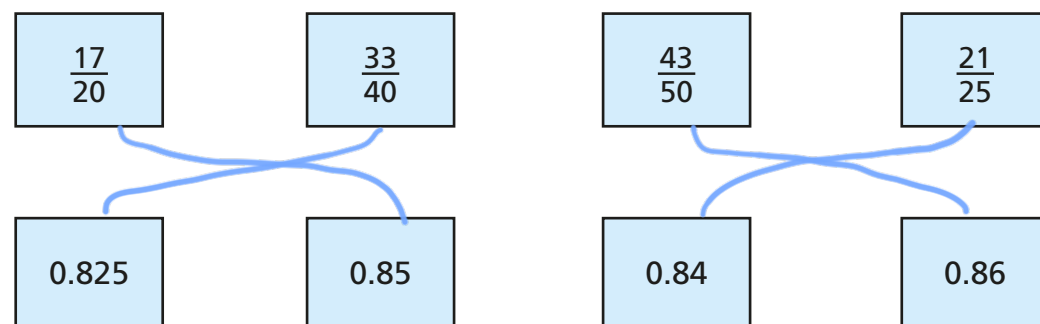
2

One-quarter is equal to 25%, so one-eighth must be the same as $12\frac{1}{2}$% or 0.125

Use Alex's fact to write the percentage and decimal equivalents.

$\frac{3}{8}$ = 3 × $12\frac{1}{2}$% = **37.5** % = **0.375**

$\frac{5}{8}$ = **5 × 12½%** = **62.5** % = **0.625**

$\frac{7}{8}$ = × **7 × 12½%** = **87.5** % = **0.875**

3 Look at the results in the table.

Percentage	Calculation	Decimal
40%	40 ÷ 100	0.4
42%	42 ÷ 100	0.42
42.7%	42.7 ÷ 100	0.427

Use a calculator or your knowledge of division and multiplication to complete this table.

Percentage	Decimal
37%	**0.37**
37.4%	**0.374**
3%	**0.03**
3.5%	**0.035**
46%	0.46
41.6%	0.416
40.6%	0.406
4.6%	0.046

4 You can convert a fraction to a decimal by dividing the numerator by the denominator.

For example, $\frac{11}{20}$ = 11 ÷ 20 = 0.55

Convert these fractions to decimals.

a) $\frac{19}{40}$ = **0.475**

b) $\frac{27}{200}$ = **0.135**

c) $\frac{51}{80}$ = **0.6375**

5 Convert these percentages to fractions, simplifying your answers if possible.

The first one has been done for you.

a) $30\% = \dfrac{30}{100} = \dfrac{3}{10}$

d) $42\% = \dfrac{21}{50}$

b) $45\% = \dfrac{45}{100} = \dfrac{9}{20}$

e) $71\% = \dfrac{71}{100}$

c) $38\% = \dfrac{38}{100} = \dfrac{19}{50}$

f) $92\% = \dfrac{23}{25}$

6 Use a calculator to convert these fractions to decimals.

a) Copy the full display from your calculator screen.

$\dfrac{1}{7} = 0.14\,2857...$

$\dfrac{2}{7} = 0.285714...$

$\dfrac{3}{7} = 0.428571...$

$\dfrac{4}{7} = 0.571428...$

$\dfrac{5}{7} = 0.714285...$

$\dfrac{6}{7} = 0.857142...$

$\dfrac{7}{7} = 1$

b) Some of the decimals in part a) are known as recurring decimals.

Which ones do you think are called this? Why?

They go on forever.

_____

c) Work with a partner to find more fractions that are recurring decimals.

7 Write the next three terms in each sequence.

Give your answers as fractions, decimals and percentages.

a) 0.1, $\dfrac{1}{5}$, 30%, ___ , ___ , ___

fractions: $\dfrac{4}{10}$ $\dfrac{5}{10}$ $\dfrac{6}{10}$

decimals: 0.4 0.5 0.6

percentages: 40% 50% 60%

b) $\dfrac{1}{5}$, 0.25, 30%, ___ , ___ , ___

fractions: $\dfrac{35}{100}$ $\dfrac{4}{10}$ $\dfrac{45}{100}$
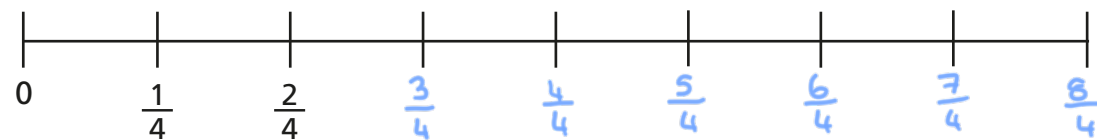
decimals: 0.35 0.4 0.45

percentages: 35% 40% 45%

1 Continue the number lines.

a)

0    $\frac{1}{4}$ $\frac{2}{4}$ $\frac{3}{4}$ $\frac{4}{4}$ $\frac{5}{4}$ $\frac{6}{4}$ $\frac{7}{4}$ $\frac{8}{4}$

b)

0   0.2   0.4   0·6   0·8   1   1·2   1·4   1·6   1·8   2

c)

70%   80%   90%   100%   110%   120%   130%   140%   150%   160%   170%

2 a) Complete the number line.

0   $\frac{1}{5}$ $\frac{2}{5}$ $\frac{3}{5}$ $\frac{4}{5}$ 1 $1\frac{1}{5}$ $1\frac{2}{5}$ $1\frac{3}{5}$ $1\frac{4}{5}$ 2

0   $\frac{1}{5}$ $\frac{2}{5}$ $\frac{3}{5}$ $\frac{4}{5}$ $\frac{5}{5}$ $\frac{6}{5}$ $\frac{7}{5}$ $\frac{8}{5}$ $\frac{9}{5}$ $\frac{10}{5}$
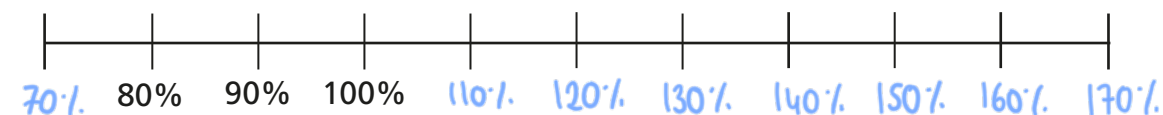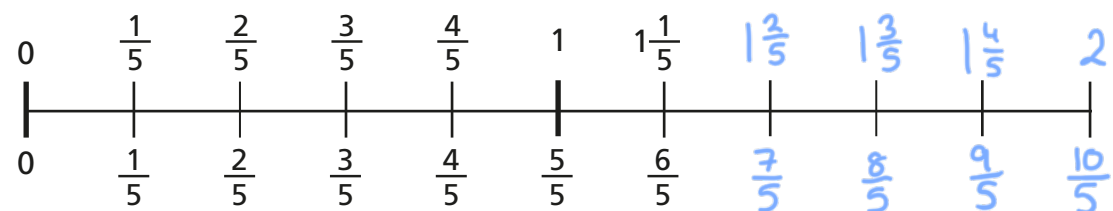
b) Use the number line to convert the following.

$1\frac{2}{5} = \frac{7}{5}$ $\frac{11}{5} = 2\frac{1}{5}$

3 This number line shows the calculation $\frac{2}{3} + \frac{2}{3} + \frac{2}{3} + \frac{2}{3}$

$\frac{2}{3}$	$\frac{2}{3}$	$\frac{2}{3}$	$\frac{2}{3}$

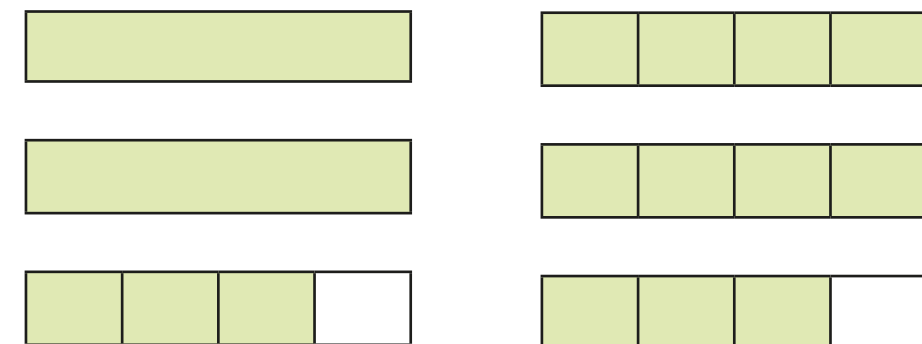0   1   2   3
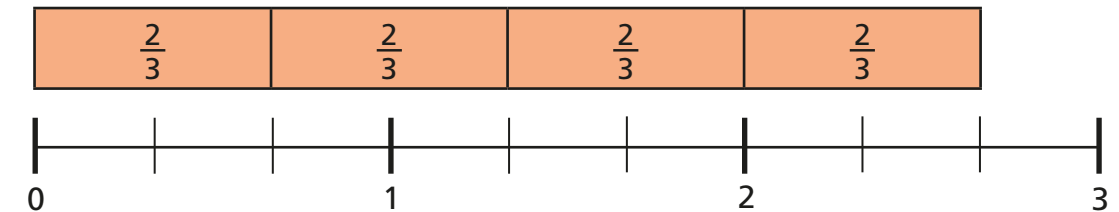
a) How many thirds are there altogether? $\frac{8}{3}$

b) Complete the calculation.

$\frac{8}{3} = 2\frac{2}{3}$

4 Kim uses bar models to convert mixed numbers into improper fractions.

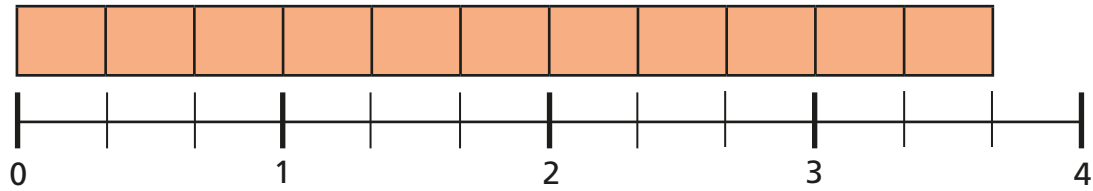These models show that $2\frac{3}{4} = \frac{11}{4}$

Use Kim's method to convert the mixed numbers to improper fractions.

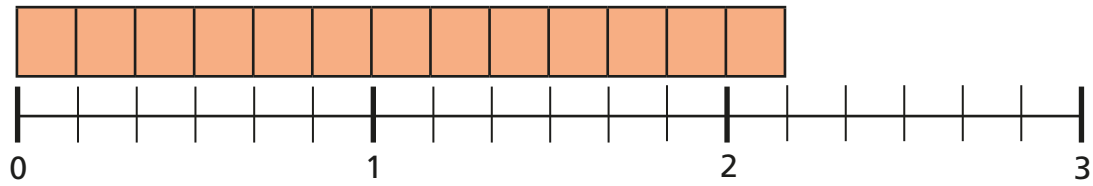**a)** $3\frac{1}{2}$ $\frac{7}{2}$ **b)** $2\frac{3}{4}$ $\frac{11}{4}$

5 Convert the improper fractions to mixed numbers.

a) $\frac{11}{3} = \boxed{3} \; \boxed{\frac{2}{3}}$

0   1   2   3   4

b) $\frac{13}{6} = \boxed{2} \; \boxed{\frac{1}{6}}$

0   1   2   3

c) $\frac{17}{4} = \boxed{4\frac{1}{4}}$ e) $\frac{39}{5} = \boxed{7\frac{4}{5}}$

d) $\frac{39}{10} = \boxed{3\frac{9}{10}}$ f) $\frac{123}{2} = \boxed{61\frac{1}{2}}$

6 Look at the pattern blocks.
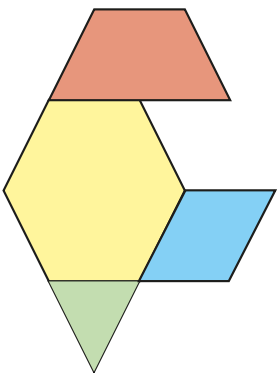
Two triangles fit exactly into one rhombus.

Three triangles fit exactly into one trapezium.

a) If the hexagon represents 1 whole, what fractions are represented by these shapes?

 $= \boxed{\frac{1}{6}}$ $= \boxed{\frac{1}{3}}$ $= \boxed{\frac{1}{2}}$

b) If the triangle represents 50%, what percentages are represented by these shapes?

 $= \boxed{100\%}$ $= \boxed{150\%}$

 $= \boxed{300\%}$

c) If the rhombus represents 0.5, what decimals are represented by these shapes?

 $= \boxed{0.25}$ $= \boxed{0.75}$

 $= \boxed{1.5}$

7 The nth term of a sequence is given by the rule $\frac{4n}{5}$

Write the first six terms of the sequence.

Give your answers as mixed numbers.

$\frac{4}{5}$ $1\frac{3}{5}$ $2\frac{2}{5}$ $3\frac{1}{5}$ 4 $4\frac{4}{5}$