

Mathletics

Fractions, Decimals & Percentages Worksheets



Teacher Solutions

Year 6

Decimal fractions – tenths, hundredths and thousandths

Common fractions and decimal fractions are related as they both show parts of a whole. In common fractions, we divide a whole into parts such as halves or sixths.

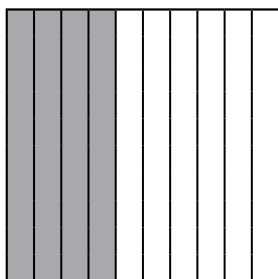
In decimal fractions, the whole is partitioned using the base 10 system – into tenths, then hundredths, then thousandths and so on.

We use a decimal point after the unit to indicate the end of whole numbers: 6.42

If the number has no whole numbers, we use a zero to make sure we don't miss the decimal point: 0.42

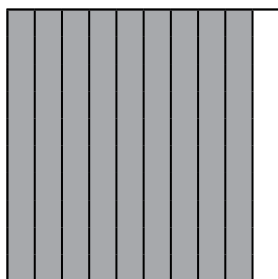
1 Divide these wholes into tenths and shade the specified amounts. Write each as a decimal fraction:

a



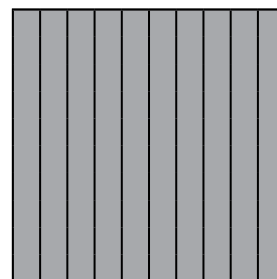
$$\frac{4}{10} \quad 0 \cdot 4$$

b



$$\frac{9}{10} \quad 0 \cdot 9$$

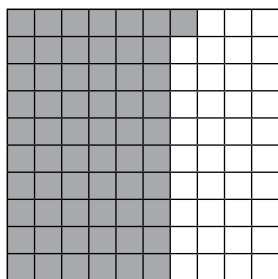
c



$$\frac{10}{10} \quad 1 \cdot 0$$

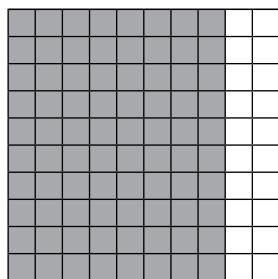
2 Now divide these wholes into hundredths and shade the specified amounts. Write each as a decimal fraction:

a



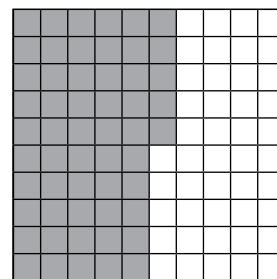
$$\frac{61}{100} \quad 0 \cdot 6 \quad 1$$

b



$$\frac{80}{100} \quad 0 \cdot 8 \quad 0$$

c



$$\frac{55}{100} \quad 0 \cdot 5 \quad 5$$

3 Express these as decimal fractions:

a 6 tenths, 7 hundredths, 4 thousandths

$$0 \cdot 6 \quad 7 \quad 4$$

b $\frac{432}{1000}$ $0 \cdot 4 \quad 3 \quad 2$

c 4 tenths, 9 hundredths, 3 thousandths

$$0 \cdot 4 \quad 9 \quad 3$$

d $\frac{589}{1000}$ $0 \cdot 5 \quad 8 \quad 9$

e 0 tenths, 2 hundredths, 9 thousandths

$$0 \cdot 0 \quad 2 \quad 9$$

f $\frac{7}{1000}$ $0 \cdot 0 \quad 0 \quad 7$

g 4 thousandths

$$0 \cdot 0 \quad 0 \quad 4$$

h $\frac{1000}{1000}$ $1 \cdot 0 \quad 0 \quad 0$

Decimal fractions – reading and writing decimals

When we write decimals we follow this place order:

Thousands	Hundreds	Tens	Units	Tenths	Hundredths	Thousandths
			2	2	5	6

Numbers **before** the decimal point are whole numbers.

Numbers **after** the decimal point are parts of a whole number.

The further the digit is to the left in the number, the greater its value. The further it is to the right, the smaller its value.

- 1 What is the value of the digit in bold? Tick the correct column:

	Thousands	Hundreds	Tens	Units	Tenths	Hundredths	Thousandths
a 5.892					•	✓	
b 13.05					•	✓	
c 763.22		✓			•		
d 89.021				✓	•		
e 100.001					•		✓
f 560.45					•	✓	
g 312.956			✓		•		

- 2 Read each number and write it as a decimal:

- a four units, one hundred and twenty two thousandths 4.122
- b one hundred and eleven, and sixty five hundredths 111.65
- c three hundred, and forty two thousandths 300.042
- d four thousand, and twelve hundredths 4000.12
- e twelve, and 13 thousandths 12.013
- f two hundred and thirteen, and forty-three hundredths 213.43

Watch out for the commas!
They indicate the end of whole numbers.



CHECK

- 3 These answers are all close but incorrect. Write the correct answers:

- | | | |
|-------------------------------------------------|------------------------------|------------------|
| a twenty seven tenths is written as 0.27 | No it's not, it's written as | <div>2.7</div> |
| b forty eight hundredths is written as 0.048 | No it's not, it's written as | <div>0.48</div> |
| c 9000 thousandths is written as 0.009 | No it's not, it's written as | <div>9.0</div> |
| d eleven and 12 hundredths is written as 11.012 | No it's not, it's written as | <div>11.12</div> |
| e 167 hundredths is written as 16.7 | No it's not, it's written as | <div>1.67</div> |

Decimal fractions – comparing and ordering decimals

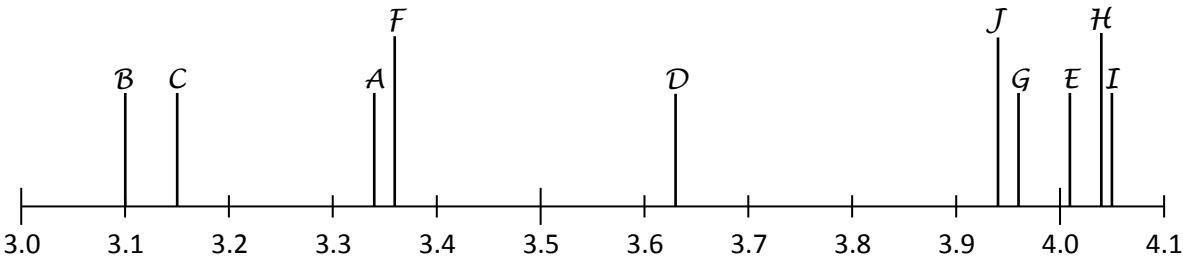
We need to carefully consider the place value of digits when ordering and comparing decimals.



	Name	Distance
A	Spitter Macgee	3.34 m
B	Did You See That One Big-noter	3.1 m
C	Secret-ingredient Spitski	3.15 m
D	Dead-eye Jones	3.63 m
E	The Long Distance Shooter	4.01 m
F	Sally Straw	3.36 m
G	Technique Tezza	3.96 m
H	Lone Shooter	4.04 m
I	Double Or Nothing Danielle	4.05 m
J	Shoot Dog	3.94 m

- 1 6A has a very cool teacher who decides to harness, not ban, the class’ current obsession with pea shooting. After a week of intense training, a shoot-off occurs. The results for the top ten shooters are tabled on the right.

Place the students on the number line. The first one has been done for you.



- 2 Use the above information to answer the following questions:

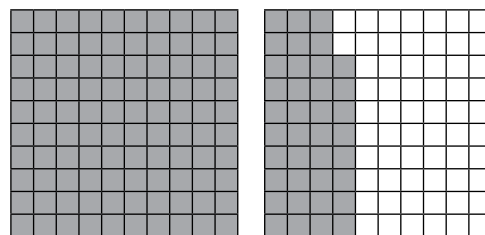
- a Who shot the furthest on the day? Double Or Nothing Danielle
- b Whose shot was the shortest? Did You See That One Big-noter
- c Which students’ shots were 1 hundredth of a metre apart?
Lone Shooter and Double Or Nothing Danielle
- d What was the difference between the shots of Shoot Dog and Spitter Macgee? 0.6 m
- e Do you think you could beat this? Something to try at home perhaps? Even 6A’s teacher eventually had enough of the pea shooting.

Answers will vary.

Decimal fractions – renaming decimals

We can express the same decimal fraction in different ways.
This shows 138 hundredths.

We can also express this as 1 unit, 3 tenths and 8 hundredths
or 13 tenths and 8 hundredths **or** 1 unit and 38 hundredths.



1 Rename these fractions:

- a 37 hundredths is also tenths + hundredths
- b 53 hundredths is also tenths + hundredths
- c 99 hundredths is also tenths + hundredths
- d 6 tenths and 3 hundredths is also hundredths
- e 4 tenths and 9 hundredths is also hundredths
- f 4 tenths, 9 hundredths and 8 thousandths is also thousandths
- g 0 tenths, 5 hundredths and 8 thousandths is also thousandths

It may help to write these numbers in their decimal forms.

2 Now try these. Fill in the missing information:

- a 4 units = 40 tenths = 400 hundredths = 4 000 thousandths
- b 7 units = 70 tenths = 700 hundredths = 7 000 thousandths
- c 2.5 units = 25 tenths = 250 hundredths = 2 500 thousandths
- d 9 units = 90 tenths = 900 hundredths = 9 000 thousandths



THINK

3 Rename these numbers as many ways as you can. Use the abbreviation: H for hundredths, T for tenths and U for units:

5.67	2.52	9.81
<u>5 U 67 H</u>	<u>2 U 52 H</u>	<u>9 U 81 H</u>
<u>5 U 6 T 7 H</u>	<u>2 U 5 T 2 H</u>	<u>9 U 8 T 1 H</u>
<u>56 T 7 H</u>	<u>25 T 2 H</u>	<u>98 T 1 H</u>
<u>567 H</u>	<u>252 H</u>	<u>981 H</u>

Decimal fractions – rounding

We often round decimals to a particular place value. We do this to make the numbers easier to work with.

Look at 2.685. We can round this to the nearest whole number, tenth or hundredth.

Let's round it to the nearest tenth. To do this, we look at the number in the hundredths place.

This is 8, which is closer to 10 than 1, so we round the tenth up. The rounded number is now 2.7

1 Round these numbers to the nearest tenth:

a 67.23 67.2

b 48.07 48.1

c 124.78 124.8

d 90.14 90.1

e 54.53 54.5

f 7.06 7.1

If the rounding number is a 1 to 4, it rounds down.
If it is 5 to 9, it rounds up.

2 Now round these numbers to the nearest hundredth:

a 58.127 58.13

b 70.345 70.35

c 45.007 45.01

d 78.134 78.13

e 89.036 89.04

f 36.231 36.23



REMEMBER

3 Use a calculator to perform the following operations. Round the answers to the nearest tenth:

a $132.4 \div 5 =$ 26.5

b $178 \div 8 =$ 22.3

c $125.3 \div 4 =$ 31.3

d $223 \div 4 =$ 55.8

e $12 \div 7 =$ 1.7

f $123.52 \div 4 =$ 30.9

4 Look at the following meal options.

a Round each price to the nearest dollar and total the estimated cost of each option below:

Choice 1		
Hamburger	\$4.95	\$5
Can of drink	\$2.25	\$2
Large chips	\$1.15	\$1
Total		\$8

Choice 2		
Noodles with prawns	\$7.95	\$8
Green tea	\$0.95	\$1
3 Crab cakes	\$2.98	\$3
Total		\$12

Choice 3		
Salad roll	\$5.15	\$5
Juice	\$2.25	\$2
Cookie	\$1.95	\$2
Total		\$9

b You have \$10. Circle the choices you can afford.

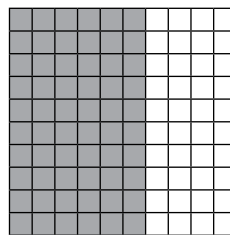
Decimal fractions – percentages

Percent comes from the Latin 'per centum' and means parts per hundred. It is expressed using the symbol %.

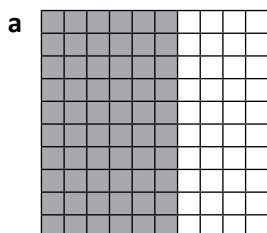
Here, 60% has been shaded. This is the same as 60 hundredths.

$$\frac{60}{100} = 0.60 = 60\%$$

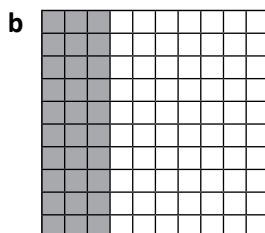
We commonly use percentages in sales – *25% off everything TODAY ONLY*;
on tests – *I got 85%*; and when we are gathering and reporting on data
– *78% of people surveyed love chocolate*.



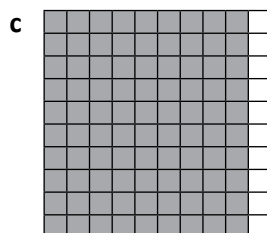
1 Fill in the missing values:



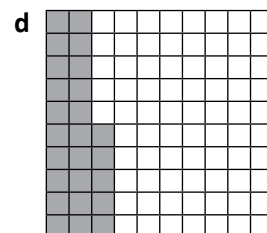
$\frac{60}{100}$	0.6	60%
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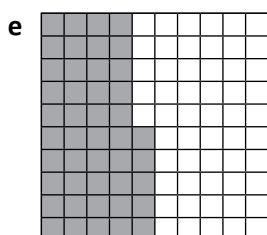
$\frac{30}{100}$	0.3	30%
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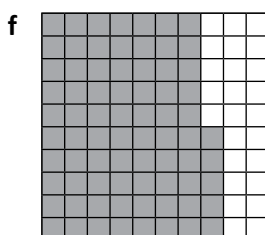
$\frac{90}{100}$	0.9	90%
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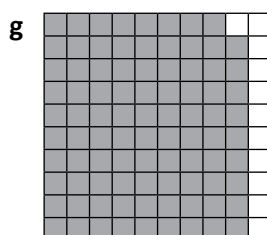
$\frac{25}{100}$	0.25	25%
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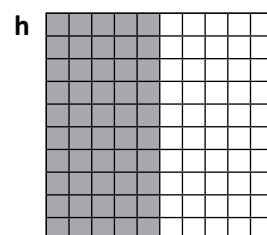
$\frac{45}{100}$	0.45	45%
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$\frac{75}{100}$	0.75	75%
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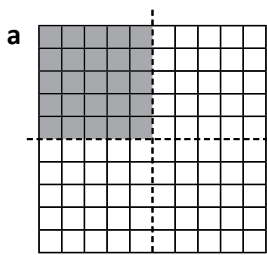
$\frac{89}{100}$	0.89	89%
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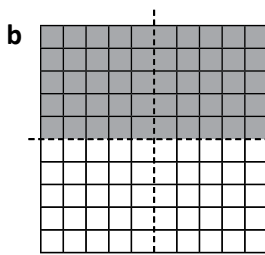
$\frac{50}{100}$	0.5	50%
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It is useful to know some common percentages such as 25%, 50%, 75% or 100%.

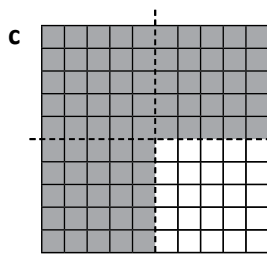
2 Shade the grids to show the following percentages:



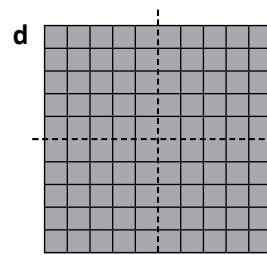
$\frac{1}{4}$	0.25	25%
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$\frac{1}{2}$	0.5	50%
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$\frac{3}{4}$	0.75	75%
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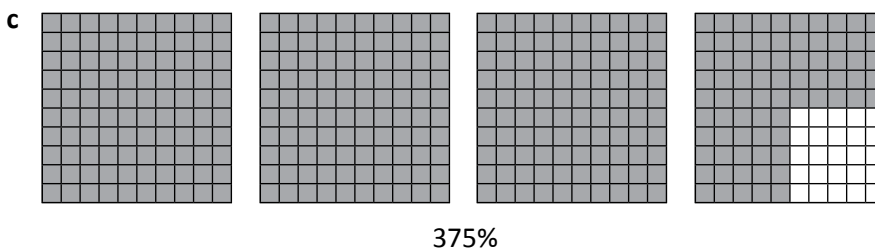
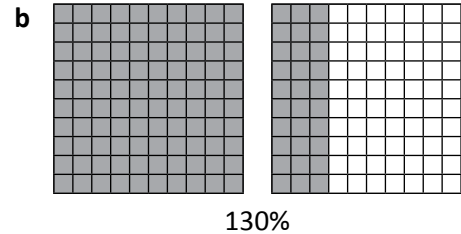
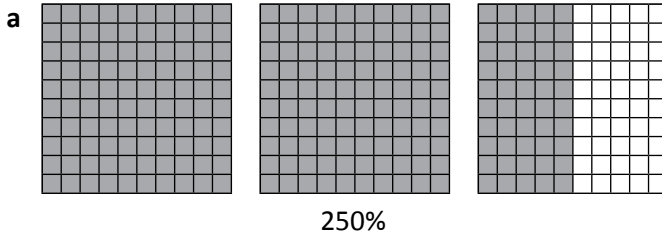


$\frac{4}{4}$	1.0	100%
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Decimal fractions – percentages

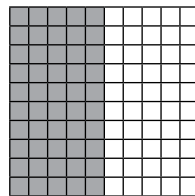
Not all percentage values are whole numbers between 1 and 100. We can have such things as 300% growth or percentages that contain decimals such as 3.5%.

3 Shade the grids to show the following percentages:

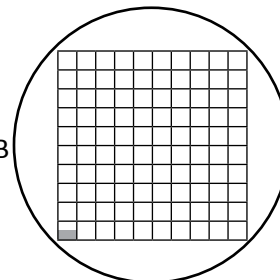


4 How would you show half a percent? Circle the option you think is correct. Discuss your choice with a partner. Do they agree?

Option A

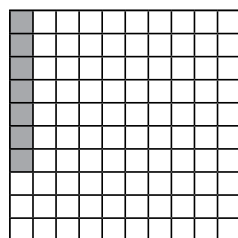


Option B

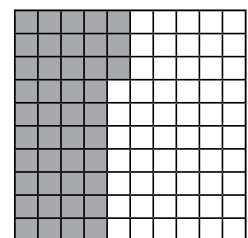


5 100 people were surveyed. They were asked to nominate their preferred way of eating vegetables. Shade the grids to show the survey results:

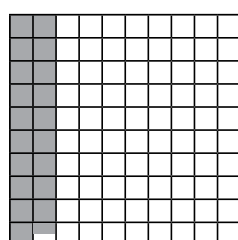
a 7% preferred their veggies boiled till they were all soggy and watery.



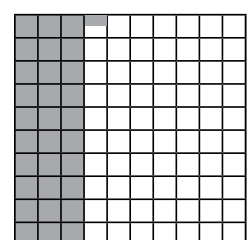
b 43% preferred their veggies stir fried.



c 19.5% preferred their veggies raw.



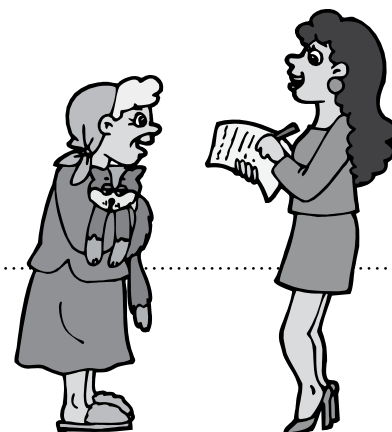
d 30.5% did not care how they were prepared because they weren't going to eat them anyway.



**Getting ready**

In this activity you are going to design a survey and then ask 100 people your questions. You will then find a way to communicate your results.

Work in a small group.

**What to do**

As a group, think about what information you are going to gather. Some things to consider might be:

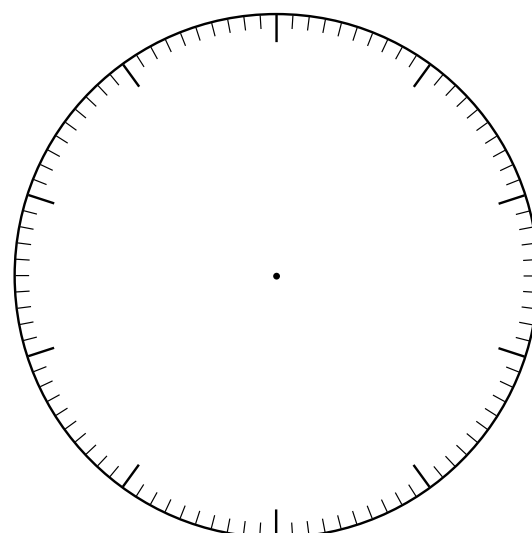
- What kind of answers are you after?
- Will you provide options? How many? What if someone gives an answer you haven't included in your list? What if you get 100 different answers?
- Who is your target audience and when will you ask them? If you are surveying kids about their favourite ice cream flavours, asking at lunch times would be a good time. If you want adult responses, when is the best time to be able to talk to 100 adults?
- How will you record the answers?

Plan your survey and run it by your teacher. If it all looks good, conduct it.

**What to do next**

Use a pie graph to represent your information. You may use this model below or create your own using a spreadsheet program.

Answers will vary

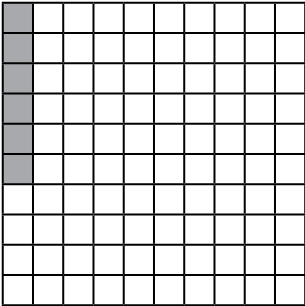




We have been using 100 grids to represent percentage, with each square representing 1%.



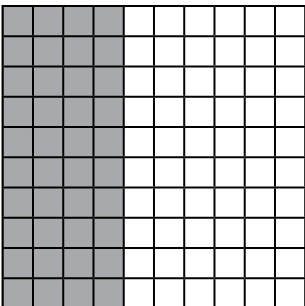
These grids are set up a little differently. Work with a partner to figure out what each square represents and then answer the questions.



Problem 1

These 6 squares have a value of 36.

- What is the value of 1 square? 6
- What is the value of the entire grid? 600
- If 50% of the grid is shaded, what value is shaded? 300

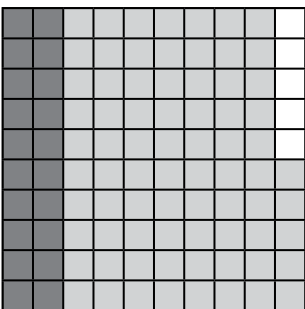


Problem 2

There are 140 convenience stores in Smallville.

- 40% of these stock your favourite Slurpee flavour. Use the grid to represent this information.
- How many stores sell your favourite flavour? 56

300 people



Problem 3

- If this grid represents 300 people, what does each square represent? 3 people
- How many people are represented by ten squares? 30
- 60 of the 300 people like watching sports. Represent this on the grid in red.
- 225 people prefer playing sport to watching it. Represent this in green.

Mathletics

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