Fractions, Decimals And Percentages

For students aged 11 - 15 years who are underachieving at their year level.

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Contents

Teachers' Notes

This resource is focused on the Number and Algebra Strand of the Australian Curriculum for lower ability students and those who need further opportunity to consolidate these core areas in Mathematics.

Each section provides students with the opportunity to consolidate written and mental methods of calculation, with an emphasis on process and understanding.

The section entitled *Skills With Decimals* enables students to re-encounter ideas in decimal place value, calculations with decimals, comparing decimal quantities and rounding decimal amounts. These activities are a useful way to scaffold a new unit of Mathematics and will help build confidence for lower ability students to attempt more challenging problems at their year level.

The section entitled *Fractions, Decimals And Percentages* walks students through conversions between fractions, decimals and percentages. The activities are designed to guide student learning with minimal input from the teacher and there is a strong emphasis on process and understanding. Students explore mental and written methods for performing conversion calculations. Attention is also given to real world applications and use of these different representations, with an emphasis on understanding and using percentages.

The activities can be used for individual students needing further consolidation in a mainstream classroom or as instructional worksheets for a whole class of lower ability students. The activities are tied to Curriculum Links in the Australian Curriculum ranging from grade levels of Year 5 through to Year 7 and are appropriate for students requiring extra support in Years 7, 8 and 9.

It is hoped that *Fractions, Decimals And Percentages* will be used to help teachers provide appropriate resources and support to those students in greatest need. The book as a whole can be used as a programme of work for those students on a Modified Course or Independent Learning Programme. Activities are sufficiently guided so that students can work independently and at their own pace without constant supervision and guidance from the teacher.

✴ Decimal Place Value 1

✳ TASK A **Complete the following.**

67.9 = *e.g. six tens, seven ones and nine tenths.* ....

99.4 = ...

12.3 = ...

42.75 = ...

45. 98 = ...

364.68 = ...

● Where there is no number in a column a zero is used to hold the value.
Look at the example below. The table represents the number 405.307 NOT 45.37.

		Hundreds	Tens	Ones	1/tenth	1/hundredth	1/thousandth	
Fybnqm		4		5	3		7	405.307

✳ TASK B **Write the numbers represented in the table below.**

	Hundreds	Tens	Ones	.	1/tenth	1/hundredth	1/thousandth	
a.	1	2	1	.	2	1	1	
b.		4		.	3	5	9	
c.	2		1	.			3	
d.	1	4	6	.	5	2	4	
e.			3	.	4			
f.		2		.	3	7	7	
g.	4	2		.			4	

✳ TASK C: CHALLENGE

Which is the greater number – 601.01 or 601.001?

✷ Adding And Subtracting Decimals 2

● So far we have added and subtracted decimals to and from other decimals with the same amount of decimal places. In all of the problems the decimal points have been placed in a line. This is because the decimal point is *always* after the number of ones. Look at how the sum 4.567 + 12.3 is set out.

```
   4.567
+ 12.3
  16.867
```

✷ TASK A **Complete only the sums below that show the correct setting out.**

a.	b.	c.	d.	e.	f.
24.243	2.4	532.5	643.7	7457.8	45.456
+ 2.73	+ 256.3	+ 24.56	+ 32.53	+ 35.7	+ 0.57

✷ TASK B **Add these decimals.**

234	56	7.45	79.98	6.98	2.3
+ 2.3	+ 2.1	+ 1.2	+ 1.3	+ 1.22	+ 1.23

23.45	46.78	34.25	35.87	54.75	33.6
3.5	23.3	64.7	4.7	4.8	3.52
+ 12.3	+ 123.54	+ 23.44	+ 234.67	+ 364.78	+ 364.43

Add the following amounts.

4.99 m	3.75 kg	43.2 mL	56.89 km	23.12 cm	$3.56
+ 1.2 m	+ 19.5 kg	+ 3.55 mL	+ 13.5 km	+ 54.6 cm	+ 47c

SAMPLE

✷ TASK C **Complete the subtraction problems that are set out correctly.**

a.	b.	c.	d.	e.	f.
24.564	3.789	4.574	253.5	36.434	3.456
− 2.462	− 23.45	− 3.54	− 2.342	− 23.1	− 2.78

✷ TASK D: CHALLENGE

On camp the following distances were travelled by bus. Monday - 24.3 km, Tuesday - 7.65 km and Wednesday - 46.53 km. What was the total distance travelled?

✳ Recurring Decimals

● When we divide a whole number by another number we may have to add extra zeros on the end to calculate the exact answer.

[Fybnqmf] ▶

$98 shared among four people can be shown as:

$$\begin{array}{r} 24.\,50 \\ 4\,\overline{)\,\$98.200} \end{array}$$

Zeros are also added to normal whole numbers in order to calculate the answer.

[Fybnqmf] ▶

$76 \div 5 =$ $35 \div 4 =$

$$\begin{array}{r} 15.\,2 \\ 5\,\overline{)\,76.^10} \end{array} \qquad \begin{array}{r} 8.\,7\,5 \\ 4\,\overline{)\,35.\,^30^20} \end{array}$$

[Fybnqmf] ▶

If we divide certain numbers we will end up with a recurring decimal.

$$2.0 \div 3 = \begin{array}{r} 0.6666 \\ 3\,\overline{)\,2.0^20^20^20} \end{array}$$

The answer is expressed as a recurring decimal = 0.66

[Fybnqmf] ▶

$44 \div 7 =$

$$\begin{array}{r} 6.2\;8\;5\;7\;1\;4\;2\;8\;5\;7\;1\;4 \\ 7\,\overline{)\,44.^20^60^40^50^10^30^20^60^40^50^60^10^30} \end{array} \quad \text{and so on … Answer} \approx 6.28$$

In this case the answer would be rounded to two decimal places.

(✳ TASK A) **Use a calculator to find the answers to the division problems. Express your answers as recurring decimals.**

$3\,\overline{)\,8.0}$ $3\,\overline{)\,1.0}$ $6\,\overline{)\,1.0}$ $9\,\overline{)\,3.0}$

$9\,\overline{)\,6.2}$ $9\,\overline{)\,5.0}$ $9\,\overline{)\,4.0}$ $3\,\overline{)\,7.0}$

(✳ TASK B) **Calculate answers to the following. Round your answer to the second decimal place.**

$$\begin{array}{r} 3.142857 \\ 7\,\overline{)\,22.00000} \end{array} \approx \quad 3.14 \qquad\qquad 7\,\overline{)\,83} \qquad\qquad \approx$$

$7\,\overline{)\,9.3} \quad \approx$ $14\,\overline{)\,7.8} \quad \approx$

$6\,\overline{)\,7.9} \quad \approx$ $6\,\overline{)\,5.0} \quad \approx$

$7\,\overline{)\,59} \quad \approx$ $13\,\overline{)\,12} \quad \approx$

✱ Shading Decimal And Fraction Quantities 2


✱ **TASK A** **The grids below have been divided into 100 units.**
Shade the amount shown underneath.
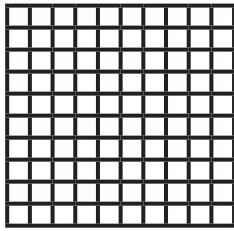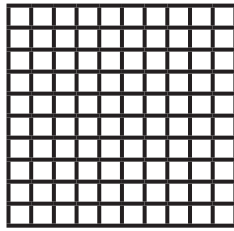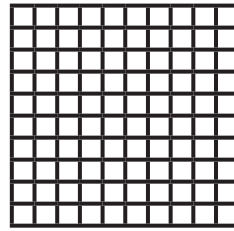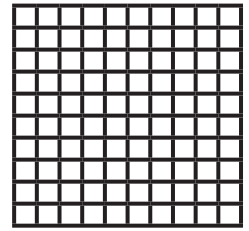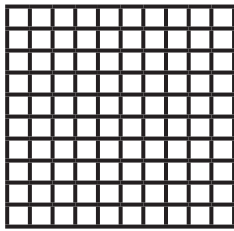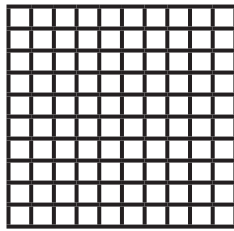
0.2	0.45	0.01	0.86
0.96	0.05	.68	0.8
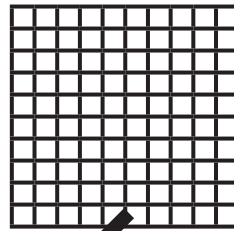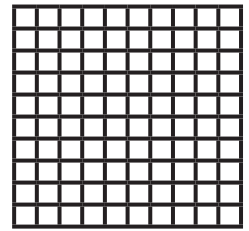
What fraction of the above grids have you shaded? Express in the simplest form.

a. $\frac{20}{100} = \frac{1}{5}$ .... b. .... c. .... d. ....

e. .... f. .... g. .... h. ....

✱ **TASK B** **Complete these using = or ≠.**

$\frac{3}{4}$ ☐ 0.75 $\frac{2}{6}$ ☐ 0.4 $\frac{8}{10}$ ☐ 0.8 $\frac{2}{3}$ ☐ 0.3

$\frac{4}{8}$ ☐ 0.6 $\frac{1}{3}$ ☐ 0.3 $\frac{4}{8}$ ☐ 0.6 $\frac{2}{5}$ ☐ 0.25

✱ **TASK C** **Use =, < or > to complete these.**

$1\frac{3}{4}$ ☐ 1.75 $2\frac{4}{8}$ ☐ 2.4

$9\frac{8}{10}$ ☐ 9.8 $6\frac{5}{100}$ ☐ 6.5

✱ **TASK D: CHALLENGE**

Bridget has painted 0.75 of the garage door.
What fraction does she still need to paint?

✸ Fractions And Decimal Conversions 2

● Fractions and decimals can be used to express the same amounts. We use fractions for some objects and decimals for others. Consider the examples and circle the way you would describe them.

[Fybnqmft] ▐▌▌▶ $\frac{1}{2}$ or 0.5 a glass of orange juice;

0.3 of a metre or $\frac{3}{10}$ of a metre;

$\frac{1}{4}$ of a sandwich or 0.25 of a sandwich;

0.75 or $\frac{3}{4}$ of a job finished.

✶ TASK A **Express the decimals below as fractions.**

0.2 = 0.5 = 0.6 = 0.23 = 0.98 = 0.47 =

✶ TASK B **Express the fractions below as decimals.**

$\frac{1}{10}$ = $\frac{7}{10}$ = $\frac{10}{100}$ = $\frac{34}{100}$ = $\frac{28}{100}$ = $\frac{567}{1000}$ =

● Fractions need to be expressed with denominations of 10, 100 or 1000 before being expressed as decimals.

[Fybnqmft] ▐▌▌▶ $\frac{3}{5} = \frac{6}{10} = 0.6$
$\frac{1}{2} = \frac{5}{10} = 0.5$

✶ TASK C **Express the fractions below as decimals.**

$\frac{2}{5}$ = ... $\frac{4}{10}$ = ... $\frac{1}{5}$ = ... $\frac{8}{20}$ = ... $\frac{6}{20}$ = ... $\frac{10}{50}$ = ...

$\frac{10}{20}$ = ... $\frac{20}{50}$ = ... $\frac{2}{5}$ = ... $\frac{3}{4}$ = ... $\frac{1}{4}$ = ... $\frac{15}{20}$ = ...

$\frac{40}{200}$ = ... $\frac{300}{600}$ = ... $\frac{20}{2000}$ = ... $\frac{150}{200}$ = ... $\frac{200}{200}$ = ... $\frac{20}{40}$ = ...

✶ TASK D **Use =, < or > to make the following true.**

0.5 ☐ $\frac{4}{10}$ $\frac{6}{10}$ ☐ 6.0 $\frac{8}{100}$ ☐ 0.08

$\frac{4}{5}$ ☐ 0.45 $\frac{90}{100}$ ☐ 0.9 $\frac{8}{1000}$ ☐ 0.08

✶ TASK C: CHALLENGE

Miles has collected 36 sports cards this year. If there are 200 in the set, what fraction has he collected so far? Express this fraction as a decimal.

SAMPLE

✳ Percentages 4

● In order to convert these fractions to percentages, we need to find an equivalent fraction with a denominator of 10, 100 or 1000.


✳ TASK A **Look at these examples and then convert each fraction to a percentage.**

$\frac{40}{200} = \frac{20}{100} = 20\%$ $\frac{20}{200} =$ .... $\frac{1}{4} =$ .... $\frac{460}{2000} =$ ....

$\frac{30}{50} =$ .... $\frac{2}{20} =$ .... $\frac{40}{800} =$ .... $\frac{15}{20} =$ ....

$\frac{40}{60} =$ .... $\frac{30}{40} =$ .... $\frac{300}{400} =$ .... $\frac{600}{800} =$ ....

$\frac{300}{3000} =$ .... $\frac{25}{50} =$ .... $\frac{5}{25} =$ .... $\frac{9}{20} =$ ....

✳ TASK B **Match the percentage on the left with the correct fraction and decimal. There may be more than two answers.**

a) 25%	(0.25)	2.5	$\frac{2}{5}$	$\left(\frac{25}{100}\right)$	$\left(\frac{1}{4}\right)$	0.14
b) 55%	5.5	0.55	$\frac{5}{10}$	$\frac{55}{100}$	$\frac{1}{5}$	0.5
c) 32%	3.2	$\frac{32}{10}$	0.23	0.32	$\frac{32}{100}$	$\frac{16}{50}$
d) 80%	$\frac{4}{5}$	0.08	8.0	0.45	0.8	$\frac{8}{1000}$
e) 15%	1.5	0.15	$\frac{1}{5}$	0.015	5.1	$\frac{15}{100}$

SAMPLE

✳ TASK C: WORD PROBLEMS

1. Sophie spent 10% of her pocket money on a new pencil. What percentage of her pocket money does she have left? ....

2. Taylor spent $\frac{4}{5}$ of his spare time reading. What percentage of time is this?
....

3. Marcelle collected snails in the garden. She found 50% of them near the rose bushes, 15% of them near the hose and 25% around the clothes line.
What percentage were found elsewhere? ....

4. Katie and Greg have 100 chocolates in a jar. If 37 of them have hard centres and the rest are soft centred, what percentage have soft centres?................................

5. Lilly had 10 000 Frequent Flyer points. She received a 10% bonus for reaching the 10 000 mark. How many points does she now have? ....

✷ Fractions, Decimals And Percentages 1

● Decimals and fractions can also be expressed as percentages. Percentages are another way of representing a part of a whole. Percentages are expressed as a fraction with a denominator of 100, as *per cent* means 'for each hundred'.

(✶ TASK A) **Complete the following.**

1. Convert the percentages below to fractions.

$35\% = {}^{35}/_{100}$ $56\% = ...$ $98\% = ...$ $87\% = ...$ $50\% = ...$

$100\% = ...$ $105\% = ...$ $765\% = ...$ $0\% = ...$ $12\% = ...$

2. Change these decimals to percentages.

$0.23 = 23\%$ $0.56 = ...$ $0.99 = ...$ $0.27 = ...$ $0.5 = ...$

$0.7 = ...$ $0.25 = ...$ $0.3 = ...$ $0.55 = ...$ $0.2 = ...$

3. Change these fractions to percentages.

${}^{20}/_{100} = 20\%.........$ ${}^{67}/_{100} = ...$ ${}^{52}/_{100} = ...$ ${}^{254}/_{100} = ...$ ${}^{1}/_{100} = ...$

4. If a fraction has a denominator which is not equal to 100, an equivalent fraction with a denominator of 100 must be found. Look at the examples below and complete.

$^{1}/_{10} = {}^{10}/_{100} = 10\,\%$ $^{4}/_{10} = ...$ $^{7}/_{10} = ...$ ${}^{500}/_{1000} = ...$

$^{1}/_{20} = {}^{5}/_{100} = 5\%$ $^{5}/_{20} = ...$ $^{1}/_{25} = ...$ $^{9}/_{20} = ...$

$^{10}/_{50} = {}^{20}/_{100} = 20\%$ $^{4}/_{50} = ...$ $^{16}/_{50} = ...$ $^{35}/_{50} = ...$

$^{1}/_{5} = {}^{20}/_{100} = 20\%$ $^{3}/_{5} = ...$ $^{4}/_{5} = ...$ $^{5}/_{5} = ...$

SAMPLE

● Another way to convert a fraction to a percentage is to multiply the fraction by 100.

[Fybnqif]|||▶

$^{3}/_{4}$ x 100 = $^{1}/_{2}$ x 100 =

$= \underline{\quad 300 \quad}$ $= \underline{\quad 100 \quad}$

      4   2

$= \quad 4\overline{)300}$ $= \quad 50 = 50\%$

$= \quad 75 = 75\%$

(✶ TASK B)   **Change these fractions into percentages.**

$^{1}/_{4} = ...$ $^{2}/_{5} = ...$ $^{3}/_{20} = ...$ $^{7}/_{10} = ...$

$^{5}/_{20} = ...$ $^{3}/_{50} = ...$ $^{26}/_{50} = ...$ $^{154}/_{200} = ...$

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