Striving To Improve

Fractions, Decimals And Percentages

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

Ready-Ed
Publications

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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 the 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.

Skills With Decimals

The activities in this section allow students to revise many of the core Number properties and ideas that are involved when working with decimal numbers. Before introducing lower ability students to new work and applications involving decimals and percentages, these activities will encourage students to consolidate concepts from previous years.

The concepts covered include:

Place Value

Students have the opportunity to explore what they know about place value for integers and extend this understanding to decimal place value. These activities are particularly useful before moving on to calculations and applications.

Rounding

As a concept with which many students experience difficulty, it is important to allow for a thorough consolidation of rounding decimals to specified place values. This is important work to include prior to work on scientific notation and significant figures.

Estimation

To assist students with building their appreciation and understanding of working with numbers, estimation is a core skill. These activities will encourage students to reflect on whether their calculations are providing reasonable solutions.

Addition, Subtraction, Multiplication And Division

These activities are designed to develop the mental and written learning processes of students. It may be useful to encourage students to check their answers with a calculator or appropriate technology. Full engagement with these core skills is also useful to prepare students for NAPLAN requirements.

✸ 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.

Example	Hundreds	Tens	Ones	/tenth	/hundredth	1/thousandth	
	4		**5**			**7**	405.307

✳ TASK B) **Write the number represented in the table below.**

	Hundreds	Tens	Ones	/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?

✱ Decimal Place Value 2

✱ TASK A Write the following numbers in expanded form.

234.35 = ... *e.g. (2 x 100) + (3 x 10) + (4 x 1) + (3 x $^1/_{10}$) + (5 x $^1/_{100}$)* ....

13.356 = ...

57.108 = ...

29.998 = ...

✱ TASK B What is the *face value* of the underlined digits below?

56.7<u>5</u>8 =   35.<u>4</u>24   3.22<u>2</u>   13.<u>4</u>1

✱ TASK C Write these numbers in words.

289.78 = two hundred and eighty-nine point seven eight

301.203 = ...

1345.2 = ...

1.298 = ...

✱ TASK D Order each set of numbers starting from the least.

1.9   1.234   10.13   2.013   21.13   1.23   1234.12   2.13

....

2345   2.345   234.5   23.45   2.543   2543.1   234.05   234.005

....

✱ TASK E Use < or > to complete these.

1.9 ☐ 1.99	4.23 ☐ 4.023	5.155 ☐ 1.5	3.00 ☐ 13.1
18.2 ☐ 182	49.5 ☐ 49.7	64.8 ☐ 64.09	75.6 ☐ 7.56
3001 ☐ 3001.9	203.4 ☐ 204.3	46.003 ☐ 46.03	21.003 ☐ 21.333

✱ Rounding Decimals 1

0 0.5 1 1.5 2 2.5 3 3.5 4 4.5 5 5.5 6 6.5 7 7.5 8 8.5 9 9.5 10
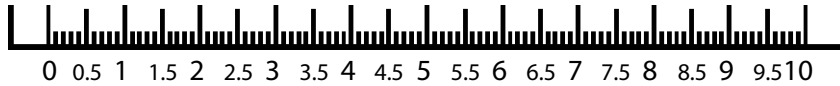
✱ TASK A Round these decimals to the nearest whole number.

3.6 ≈ 4   2.8 ≈................. 9.1 ≈ .... 5.6 ≈................. 2.3 ≈ .... 7.8 ≈ ....

3.1 ≈................. 4.7 ≈................. 9.8 ≈ .... 6.4 ≈................. 1.7 ≈ .... 2.9 ≈ ....

Remember if the decimal ends in 5 (such as 2.5), it is rounded to the nearest even whole number. Complete these following the rule.

3.5 ≈................. 1.5 ≈................. 6.5 ≈ .... 5.5 ≈................. 7.5 ≈ .... 9.5 ≈ ....

✱ TASK B Complete the following.

Round these decimals to the nearest whole number.

25.7 ≈ .... 89.5 ≈ .... 24.4 ≈.............. 27.6 ≈.......... 38.7 ≈............ 12.3 ≈ ....

These decimals have two decimal places. Round them to the nearest whole number.

26.78 ≈ 27   36.35 ≈............. 9.18 ≈............. 87.94 ≈ .... 84.32 ≈ ....

63.11 ≈................. 28.97 ≈............. 24.75 ≈ .... 55.34 ≈ .... 72.43 ≈ ....

Round these decimals to the nearest whole number.

56.789 ≈ 57   13.8 ≈............. 24.865 ≈............. 2.367 ≈ .... 25.895 ≈ ....

4.111 ≈................. 5.555 ≈............. 53.455 ≈............ 7.001 ≈ .... 2.457 ≈ ....

✱ TASK C Estimate the sum of these decimals by rounding each decimal to the nearest whole number.

3.42 ≈ **3**	3.56 ≈ __	2.56 ≈ __	2.79 ≈ __
4.67 ≈ **5**	8.98 ≈ __	8.74 ≈ __	6.54 ≈ __
2.69 ≈ **3**	7.43 ≈ __	2.53 ≈ __	3.53 ≈ __
+ 5.54 ≈ **6**	+ 2.41 ≈ __	+ 5.32 ≈ __	+ 2.42 ≈ __
≈ **17**			

Sample

✹ Decimal Addition 2

● Adding decimals is like regular adding. You regroup the same way. Just remember to keep the decimal point in the same place.

Examples

```
     3. 45
  +  5. 2
  ─────────
     8. 65
```
No regrouping

```
      1
     5. 79
  +  4. 3
  ─────────
    10. 09
```
Regrouping one column

✳ TASK A   Try these sums. Hint: Put 0 in the gaps to help~~

↓

```
     1. 4**0**
  +  4. 12
  ─────────
```

↓

```
     5. 6
  +  4. 14
  ─────────
```

↓

```
     3. ?
  +  ?. 59
  ─────────
```

```
     3. 47
  +  5. 8
  ─────────
```

```
     4. ?
  +  5. ?5
  ─────────
```

```
     1. 9
  +  5. 89
  ─────────
```

● When you write the decimals for a sum, make sure the decimal point is lined up. Look at the sum 2.45 + 3.6 + 0.78 + 5 below. Putting 0 into the gaps helps neat setting out!

Example

Wrong:
```
     2.45
     3.6
     0.78
  +     5
```

Right:
```
     2. 45
     3. 60
     0. 78
  +  5. 00
```

✳ TASK B   Try lining the sum up in the space.

5.37 + .4 + 23.55 + 7

		.		
		.		
		.		
+		.		
=		.		

✷ Adding And Subtracting Decimals 3

(✷ TASK A) Add the following decimals by setting them out correctly.

24.567 + 23.45 + 3.46 =
```
   24.567
   23.45
+   3.46
_____
_____
```

4.56 + 46.78 + 356.7   =
```
+
_____
_____
```

1.009 + 456.7 + 4.302 =
```
+
_____
_____
```

23.01 + 345.6 + 45.643 =
```
+
_____
_____
```

2 .456 + 456.7 + 4.302 =
```
+
_____
_____
```

24. 56 + ~~5.3 + 24~~.63 =
```
+
_____
_____
```

(✷ TASK B) Subtract the following ~~amounts~~

4578.7 - 32.3   =
```
  4578.7
    2.3
_____
_____
```

24.567 - 12.324   =
```
–
_____
_____
```

35.687 - 2.5~~~   =
```
_____
_____
```

97.85 - 3.79   =
```
–
_____
_____
```

567.9 - 29.8   =
```
–
_____
_____
```

116.34 - 35.76   =
```
–
_____
_____
```

✷ TASK C: CHALLENGE

Emily picked three crates of apples and packed them into six boxes. The boxes had a total weight of 14.75 kg. Three of the boxes, weighing a total of 6.5 kg, were sold at the markets. What is the weight of the remaining boxes?

✳ Dividing Decimals

● When we divide money we are dividing with decimals. In the working out, the decimal place in the answer must go directly over the decimal places within the division bracket.

Example $7\overline{)6.3}$ answer 0.9 **and** $3\overline{)12.6}$ answer 4.2

✳ TASK A Complete the following divisions of decimals.
Remember to place the decimal point in the correct place.

$9\overline{)8.1}$ $\qquad$ $4\overline{)3.2}$ $\qquad$ $6\overline{)3.6}$ $\qquad$ $8\overline{)6.4}$ $\qquad$ $3\overline{)2.7}$ $\qquad$ $5\overline{)4.5}$

$3\overline{)9.6}$ $\qquad$ $5\overline{)7.5}$ $\qquad$ $4\overline{)7.2}$ $\qquad$ $2\overline{)9.8}$ $\qquad$ $7\overline{)5.6}$ $\qquad$ $4\overline{)9.2}$

● It is best to make an estimate of the answer by rounding the decimals so that you know roughly what the answer should be.

Example $32.4 \div 4 \approx 32 \div 4 = 8$ $\qquad$ divisor → $4\overline{)32.4}$ answer 8.1 ← *dividend*

Instead of rounding the *dividend* to the nearest whole number, round it to the nearest multiple of the *divisor*.

✳ TASK B Show how you would estimate the answers to these, then complete the original problem to see how close your estimate was.

SET 1 $5\overline{)45.5} \approx 5\overline{)45}$ $\qquad$ $6\overline{)6} \approx$ $\qquad$ $8\overline{)64.8} \approx$ $\qquad$ $7\overline{)49.7} \approx$

SET 2 $3\overline{)24} \approx$ $\qquad$ $\overline{)36.} \approx$ $\qquad$ $3\overline{)26.7} \approx$ $\qquad$ $4\overline{)63.2} \approx$

SET 3 $7\overline{)4} \approx$ $\qquad$ $6\overline{)29.4} \approx$ $\qquad$ $7\overline{)40.6} \approx$ $\qquad$ $3\overline{)46.8} \approx$

SET 4 $2\overline{)24.8} \approx$ $\qquad$ $7\overline{)14.7} \approx$ $\qquad$ $5\overline{)35.5} \approx$ $\qquad$ $8\overline{)72.8} \approx$

SET 5 $4\overline{)12.8} \approx$ $\qquad$ $6\overline{)66.6} \approx$ $\qquad$ $8\overline{)32.8} \approx$ $\qquad$ $4\overline{)37.6} \approx$

✳ TASK C Complete the following by first making an estimate.
For example $78.96 \div 4 \approx 80 \div 4 = 20$. $\quad 4\overline{)78.96}$ answer 19.74

SET 1 $4\overline{)22.48}$ $\qquad$ $6\overline{)274.8}$ $\qquad$ $7\overline{)298.2}$ $\qquad$ $8\overline{)27.68}$ $\qquad$ $9\overline{)511.2}$

SET 2 $4\overline{)315.2}$ $\qquad$ $6\overline{)577.2}$ $\qquad$ $3\overline{)78.6}$ $\qquad$ $9\overline{)86.22}$ $\qquad$ $5\overline{)38.5}$

Fractions, Decimals And Percentages

The activities in this section allow students to revise basic ideas involving fractions and percentages and to further extend their understanding of the relationships between the three numerical representations.

The concepts covered include:

Visual Representation

Students begin by examining percentages as visual fractional quantities, enabling them to draw parallels between percentages as being fractions out of one hundred.

Conversions

The emphasis on this section is students being able to convert between fractions, decimals and percentages using various mental and written strategies. A few different options are presented and explained and teacher discretion can be used to determine which strategies will be most useful for students.

Percentage Applications

A few of the core applications of percentages are given in this section which align closely with the topics in the Australian Curriculum for this age group. These are presented with mental and written strategies for understanding and engaging with the real-life applications.

Mixed Applications

The final activities in this section will be useful in determining the fluency of students with relation to their ability to work easily with fractions, decimals and percentages and with their ability to work with short applications.