Department of
Education

AUSTRALIAN CURRICULUM

MATHEMATICS
YEAR 7

Decimals

MATHEMATICS
YEAR 7

Decimals

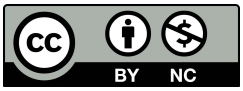
Student's name: _____

Teacher's name: _____

First published 2012

ISBN 9780730744375
SCIS 1564075

© Department of Education WA 2012 (Revised 2020)



https://creativecommons.org/licenses/by-nc/4.0/

Requests and enquiries concerning copyright should be addressed to:

Manager Intellectual Property and Copyright
Department of Education
151 Royal Street
EAST PERTH WA 6004

Email: copyright@education.wa.edu.au

Department of
Education

This resource contains extracts from The Australian Curriculum Version 3.0 © Australian Curriculum, Assessment and Reporting Authority 2012.
ACARA neither endorses nor verifies the accuracy of the information provided and accepts no responsibility for incomplete or inaccurate information. In particular, ACARA does not endorse or verify that:

- the content descriptions are solely for a particular year and subject
- all the content descriptions for that year and subject have been used
- the author's material aligns with the Australian Curriculum content descriptions for the relevant year and subject.

You can find the unaltered and most up to date version of this material at www.australiancurriculum.edu.au. This material is reproduced with the permission of ACARA.

creativecommons.org/licenses/by-nc-sa/3.0/au/

Graphics used in this resource are sourced from http://openclipart.org under the creative commons license http://creativecommons.org/publicdomain/zero/1.0

This product will be registered through the National Copyright Unit for use in all Australian schools without remuneration.

Contents

© Department of Education WA 2012 – MATHSAC017

Signposts

Each symbol is a sign to help you.

Here is what each one means:

The recommended time you should take to complete this section.

An explanation of key terms, concepts or processes.

A written response.
Write your answer or response in your journal.

Correct this task using the answers at the end of the resource.

Calculators may not be used here.

Make notes describing how you attempted to solve the problem. Keep these notes to refer to when completing the Self-evaluation task. Your teacher may wish you to forward these notes.

© Department of Education WA 2012 – MATHSACO17

Introduction

This resource should take you approximately two weeks to complete. It comprises seven learning sections, a summary section and a review task section.

The learning sections have the following headings:

- **Key words**
  These are the main words that you need to understand and use fluently to explain your thinking.

- **Warm-up**
  Warm-up tasks should take you no longer than 10 minutes to complete. These are skills from previous work you are expected to recall from memory, or mental calculations that you are expected to perform quickly and accurately. If you have any difficulties in answering these questions, please discuss them with your teacher.

- **Review**
  Some sections have reviews immediately after the warm-up. The skills in these reviews are from previous work and are essential for that section. You will use these to develop new skills in mathematics. Please speak to your teacher immediately if you are having any trouble in completing these activities.

- **Focus problem**
  Focus problems are designed to introduce new concepts. They provide examples of the types of problems you will be able to solve by learning the new concepts in this resource. Do not spend too long on these but do check and read the solutions thoroughly.

- **Skills development**
  These help you consolidate new work and concepts. Most sections include skills development activities which provide opportunities for you to become skilled at using new procedures, apply your learning to solve problems and justify your ideas. Please mark your work after completing each part.

Correcting your work

Please mark and correct your work as you go. Worked solutions are provided to show how you should set out your work. If you are having any difficulty in understanding them, or are getting the majority of the questions wrong, please speak to your teacher immediately.

Journal

Please keep an exercise book to record your notes and to summarise your learning. At the end of each section, write definitions for the key words that were introduced for that section.

© Department of Education WA 2012 – MATHSAC017

Curriculum details

Content Descriptions

This resource provides learning and teaching to deliver the Australian Curriculum: Mathematics for the following Year 7 Content Descriptions.

Multiply and divide fractions and decimals using efficient written strategies and digital technologies (ACMNA154)
Round decimals to a specified number of decimal places (ACMNA156)
Connect fractions, decimals and percentages and carry out simple conversions (ACMNA157)

Content Descriptions	1	2	3	4	5	6	7	R
ACMNA154								
ACMNA156								
ACMNA157								

Indicates the content description is explicitly covered in that section of the resource.

Note that multiplying and dividing fractions are covered in the resource on fractions and percentage connections in the resource on percentages.

Previous relevant Content Descriptions

The following Content Descriptions should be considered as prior learning for students using this resource.

At Year 6 level

Add and subtract decimals, with and without digital technologies, and use estimation and rounding to check the reasonableness of answers (ACMNA128)
Multiply decimals by whole numbers and perform divisions by non-zero whole numbers where the results are terminating decimals, with and without digital technologies (ACMNA129)
Multiply and divide decimals by powers of 10 (ACMNA130)
Make connections between equivalent fractions, decimals and percentages (ACMNA131)

At Year 5 level

Recognise that the place value system can be extended beyond hundredths (ACMNA104)
Compare, order and represent decimals (ACMNA105)

© Department of Education WA 2012 – MATHSACO17

Proficiency strand statements at Year 7 level

At this year level:

Understanding includes describing patterns in uses of indices with whole numbers, recognising equivalences between fractions, decimals, percentages and ratios, plotting points on the Cartesian plane, identifying angles formed by a transversal crossing a pair of lines, and connecting the laws and properties of numbers to algebraic terms and expressions

Fluency includes calculating accurately with integers, representing fractions and decimals in various ways, investigating best buys, finding measures of central tendency and calculating areas of shapes and volumes of prisms

Problem Solving includes formulating and solving authentic problems using numbers and measurements,working with transformations and identifying symmetry, calculating angles and interpreting sets of data collected through chance experiments

Reasoning includes applying the number laws to calculations, applying known geometric facts to draw conclusions about shapes, applying an understanding of ratio and interpreting data displays

General capabilities

General capabilities	1	2	3	4	5	6	7	R
Literacy								
Numeracy								
Information and communication technology (ICT) capability								
Critical and creative thinking								
Personal and social capability								
Ethical behaviour								
Intercultural understanding								

Indicates general capabilities are explicitly covered in that section of the resource.

© Department of Education WA 2012 – MATHSAC017

Cross-curriculum priorities

Cross-curriculum priorities	1	2	3	4	5	6	7	R
Aboriginal and Torres Strait Islander histories and cultures								
Asia and Australia's engagement with Asia								
Sustainability								

Indicates cross-curriculum priorities are explicitly covered in that section of the resource.

This resource contains extracts from The Australian Curriculum Version 3.0 © Australian Curriculum, Assessment and Reporting Authority 2012.
ACARA neither endorses nor verifies the accuracy of the information provided and accepts no responsibility for incomplete or inaccurate information. In particular, ACARA does not endorse or verify that:

- the content descriptions are solely for a particular year and subject
- all the content descriptions for that year and subject have been used
- the author's material aligns with the Australian Curriculum content descriptions for the relevant year and subject.

You can find the unaltered and most up to date version of this material at www.australiancurriculum.edu.au. This material is reproduced with the permission of ACARA.

creativecommons.org/licenses/by-nc-sa/3.0/au/

© Department of Education WA 2012 – MATHSACO17

1. Review of prior knowledge

When you complete this section you should be able to:

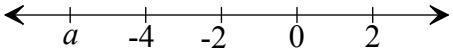
- use decimal representation
- complete questions relating to previous knowledge of decimals.

Key words

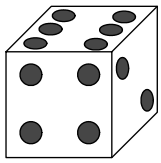
- decimal notation

Warm-up 1

1. Is 2 a factor of 7? _____
2. $9 + 6 =$ _____
3. What is the missing number?



$a =$ _____

4. Circle the greater fraction. $\frac{1}{3}$ or $\frac{1}{2}$
5. What is a half of 16? _____
6. $3.7 + 4.1 =$ _____
7. $8.1 \times 5 =$ _____
8. Write 0.25 as a fraction. _____
9. Find the next number. 3, 7, 11, _____
10. 

A six-sided die is rolled.

Express, as a fraction, the probability that it lands on a 1 or 2.

_____

© Department of Education WA 2012 – MATHSAC017

Review 1

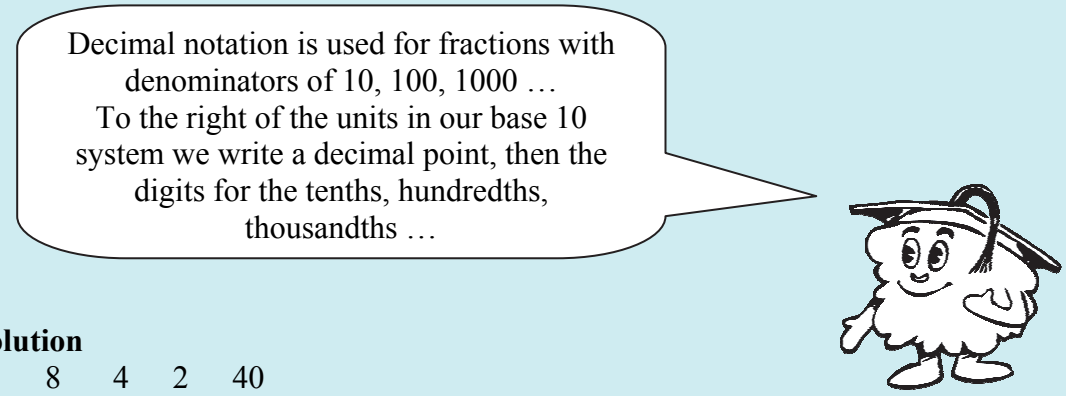
Example

1. Complete the equivalent fractions. $\frac{8}{20} = \frac{\quad}{10} = \frac{\quad}{5} = \frac{\quad}{100}$

2. Find the value of the following.

   (a) $\frac{37}{100} + \frac{24}{100}$ (b) $\frac{37}{100} - \frac{4}{100}$ (c) $\frac{1}{2}$ of $\frac{23}{50}$

3. Use **decimal notation** to write the question and answer to 2 (b).



Solution

1. $\frac{8}{20} = \frac{4}{10} = \frac{2}{5} = \frac{40}{100}$

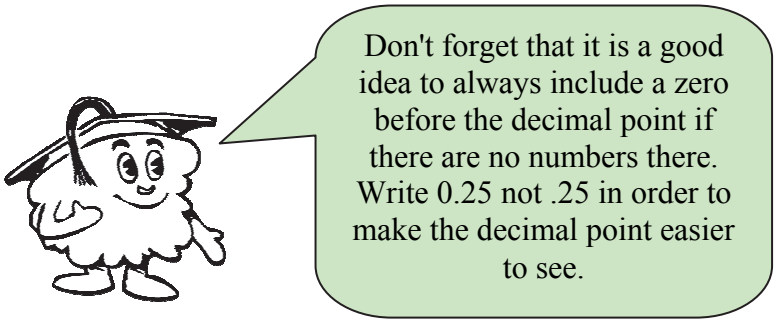
2. (a) $\frac{37}{100} + \frac{24}{100} = \frac{61}{100}$ (b) $\frac{37}{100} - \frac{4}{100} = \frac{33}{100}$ (c) $\frac{1}{2}$ of $\frac{23}{50} = \frac{1}{2} \times \frac{23}{50} = \frac{23}{100}$

3. $0.37 - 0.04 = 0.33$

1. Complete the equivalent fractions.

   $\frac{18}{20} = \frac{\quad}{10} = \frac{\quad}{100}$

2. Write the calculation $\frac{37}{100} + \frac{24}{100} = \frac{61}{100}$ using decimal notation.



© Department of Education WA 2012 – MATHSACO17

3. Complete the table to show the position of the following numbers as decimals. Parts of the first one have been done for you.

(a) 2 450.193 (b) 87.03 (c) 0.475 (d) $12\frac{71}{100}$ (e) $\frac{53}{1000}$

Thousands	Hundreds	Tens	Units	•	Tenths	Hundredths	Thousandths
2	4			•		9	
				•			
				•			
				•			
				•			

4. How do you add two decimals together without the use of a calculator? Show your method by using an example.

5. Without using a calculator find the answers to the following calculations.

(a) $1.7 + 3.2$ (b) $2.37 + 4.8$

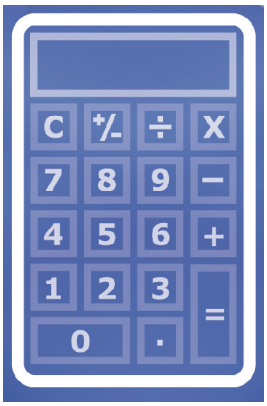
(c) $7.84 - 6.17$ (d) $19.6 - 12.29$

© Department of Education WA 2012 – MATHSAC017

Focus problem 1

Farah has just arrived in a year 7 class. She had her schooling, until now, in a refugee camp in Kenya. She knows what a decimal is and how to calculate with decimals. She has never had access to a calculator to do any calculations.

Explain to Farah how to add two decimals together using a calculator.



Now that she knows how to add, explain to Farah how to subtract one decimal from another using a calculator.

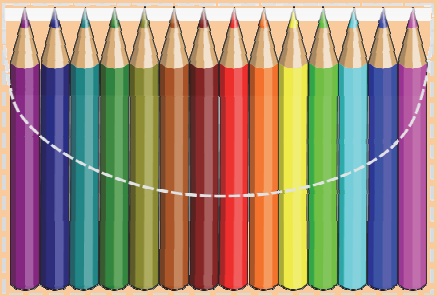
Check your work before continuing.

© Department of Education WA 2012 – MATHSACO17

Most schools in African countries are in constant and desperate need of school supplies so that their students can have a proper education.

This includes not only calculators but also simple equipment such as pens, paper, pencils and backpacks.

There are a number of agencies, which can be found using an internet search, that help with sending donations to needy schools.



© Department of Education WA 2012 – MATHSAC017

Skills development 1

Example

Set out the following calculations correctly, using symbols, then complete the answers using a calculator.

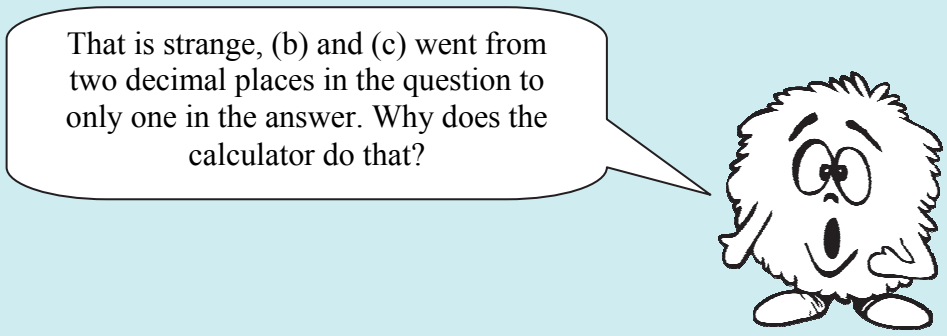
(a) Add 3.5 to 4.05. (b) Add 1.72 and 6.08 together.

(c) Take 19.6 away from 28.3. (d) From 15.43 subtract 9.83.

Solution

(a) $3.5 + 4.05 = 7.55$ (b) $1.72 + 6.08 = 7.8$

(c) $28.3 - 19.6 = 8.7$ (d) $15.43 - 9.83 = 5.6$



1. Explain why the answers to (b) and (c) in the example can be written with just one decimal place when the original numbers have two decimal places.

2. Do these calculations without a calculator. Show your setting out.

(a) $9.67 + 5.04$ (b) $0.572 + 0.677$

© Department of Education WA 2012 – MATHSACO17

(c) 2.107 – 1.934

(d) 19 – 8.7

3. Use a calculator to find the answers to the following problems.

(a) Add 954.7 to 308.2.

(b) Add 2.88 and 5.32 together.

(c) Take 9.6 away from 10.45.

(d) From 25.07 subtract 6.076.

4. (a) Which is bigger: 5.16 or 0.678?

(b) Is this statement true (T) or false (F): 0.75 > 0.643?

(c) Write these decimals in order of size, from the smallest to the largest.

1.807, 18.07, 0.1807, 180.7, 0.2224

Check your work before continuing.

© Department of Education WA 2012 – MATHSAC017

© Department of Education WA 2012 – MATHSACO17

2. Rounding conventions and use

When you complete this section you should be able to:

- round a decimal to a specified number of decimal places
- use rounded values for estimations of results.

Key words

- round
- estimate
- approximate

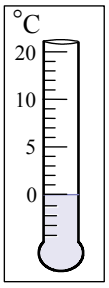
Warm-up 2

1. Is 2 a common factor of 14 and 21? _____

2. $16 - 8 =$ _____

3. The temperature was 0 degrees but it dropped 5 degrees.

   What is the new temperature? _____



4. Insert <, > or = to make the following sentence true. $\frac{1}{2} \square \frac{1}{4}$

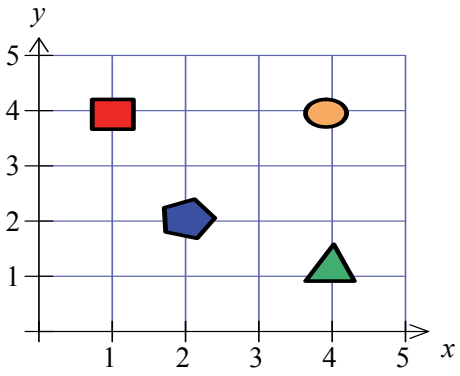
5. $\frac{1}{2} \times 14 =$ _____

6. Round 8.1 to a whole number. _____

7. $3\overline{)6.3}$ _____

8. Write 100% as a decimal. _____

9. Find the next number. 0.6, 0.9, 1.2, 1.5, _____

10. 

    Which shape is at (4, 1)?

    _____

© Department of Education WA 2012 – MATHSAC017

Review 2

Example

102, 97, 28, 15, 2.3, 0.11, 0.096, 230, 5.2, 4.7, 0.6

Which number from the list above is closest to the following numbers?

(a) 100 (b) 10 (c) 1 (d) 0.1

Solution

(a) 102 and 97 are both close to 100 but $102 - 100 = 2$ and $100 - 97 = 3$, so 102 is closest to 100.

(b) 15 and 5.2 are closest on either side of 10. However, 5.2 is closer because it is only 4.8 from 10.

(c) 2.3 and 0.6 are closest on either side of 1. However, 0.6 is the closer number.

(d) 0.11 and 0.096 are closest on either side of 0.1. However, 0.96 is the closer number.

1. 113, 95, 108, 115, 86, 106, 94, 107

   Which number(s) from the list above is closest to the following numbers?

   (a) 100 (b) 90 (c) 110

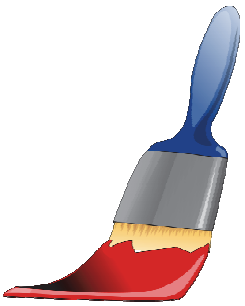
2. Find the answers then state the nearest whole number to your answer.

   (a) $2.6 + 5.7$ (b) $9.6 - 5.4$

   (c) $97.45 + 18.11$ (d) $5.6 + 4$

© Department of Education WA 2012 – MATHSACO17

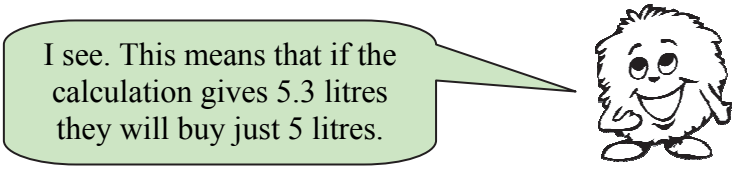
Focus problem 2



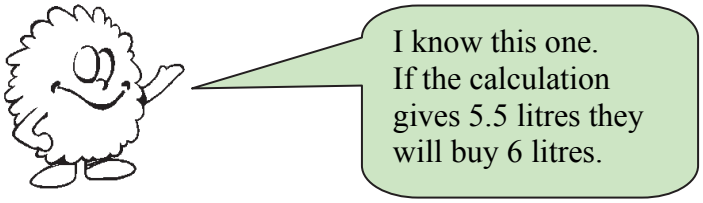
Kleo and Harry have volunteered to help paint several rooms in a new drop-in centre for teenagers. To make it more interesting each room is going to be painted a different colour. The funds are available for the paint but they have to decide how much to buy for each room.

The paint they want to buy comes in 1 litre, 2 litre, 5 litre and 10 litre cans.

If the amount of paint needed is less than half a litre over a full litre they will make do with the smaller amount.



If the amount of paint needed is half a litre or more over a full litre they will buy the next full litre amount.



1. (a) Explain why they would need to buy 6 litres of each colour of paint if the calculations for the first three rooms were as follows.

   (i) 6.4 litres

   (ii) 5.9 litres

   (iii) 5.5 litres

© Department of Education WA 2012 – MATHSAC017

(b) To buy the 6 litres of paint they could buy three 2 litre cans. Is this the only option? Find another combination of cans that would give 6 litres of paint.

2. The amount of paint needed for 5 more rooms is shown below. How many litres of paint will they need to buy for each room?

   (a) 5.3 litres

   (b) 7.6 litres

   (c) 11.5 litres

   (d) 9.49 litres

   (e) 3.51 litres

3. What combination of cans of paint will they need to buy for each room in question 2?

   (a)

   (b)

   (c)

   (d)

   (e)

4. For a much larger room they each calculated the amount of paint needed for a section and came up with the answers 7.2 litres and 8.9 litres.

   Approximate each value to the nearest whole number, and use them to **estimate** how much paint they will need for this room.

Check your work before continuing.

© Department of Education WA 2012 – MATHSACO17

1 and 2 cent coins were taken out of circulation in Australia in 1994. Today your total at the cash register is expressed to the nearest 5 cents.

There is now a push to eliminate the 5 cent piece as well and have all values rounded to the nearest 10 cents.

© Department of Education WA 2012 – MATHSAC017

Skills development 2

Rounding to a number of decimal places is achieved by considering the next digit to the right of the last place you need.

- If that digit is below 5 the number before it is not changed.
  For example, in 3.142 if you wanted two decimal places you would look at the 2.
  3.142 correct to two decimal places is 3.14
- If the digit is above 5 the number before it is increased by one.
  For example, in 2.567 if you wanted one decimal place you would look at the 6.
  2.567 correct to one decimal place is 2.6.
- If the digit is exactly 5 with no further digits the commonly accepted rounding convention is that the number before it is increased by one.
  For example, in 1.495 written to two decimal places the 9 would need to be rounded up to 10 so the 49 will be rounded to 50. 1.495 = 1.50 (2dp)

  Rounding means you don't need to use all of the number.

Example

Round the number 5.87526 correct to:

(a) the nearest whole number (b) one decimal place

(c) two decimal places (d) three decimal places

(e) four decimal places.

Solution

(a) 5.8 is closer to 6 than it is to 5 so the answer is 6.

(b) For one decimal place look at 5.87. The 7 is above 5 so the number in the first decimal place is increased by one. 8 is changed to 9.

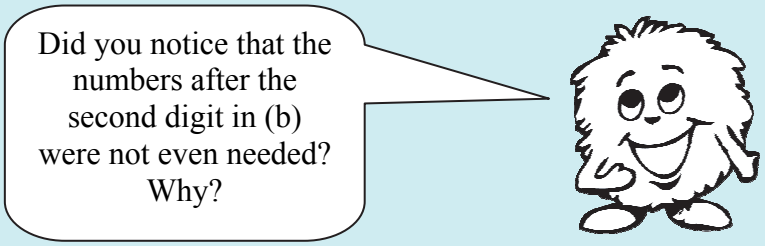
5.87 correct to one decimal place is 5.8.

(c) For two decimal places look at 5.875. The 5 has further digits after it so the number before it, 7, is changed to 8 giving 5.88.

(d) For three decimal places look at 5.8752. The 2 is below 5 so the number before it, the 5, stays the same. Correct to three decimal places the answer is 5.875.

(e) Correct to four decimal places the number 5.87526 is 5.8753.

5.87526 = 5.8753 (4dp)



© Department of Education WA 2012 – MATHSACO17

1. **Round** these decimals to the nearest whole number.

   (a) 17.21 _____ (b) 3.509 _____

   (c) 0.8752 _____ (d) 0.499 _____

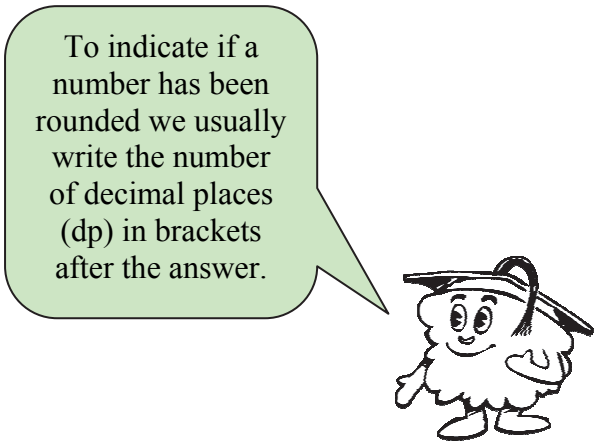
2. Round these decimals correct to two decimal places.

   (a) 56.871 _____

   (b) 0.069 _____

   (c) 1.802 _____

   (d) 5.996 _____



3. Round the following decimals to the number of places given in brackets after each one.

   (a) 6.767 (1dp) _____

   (b) 0.325 (2dp) _____

   (c) 18.9361421 (3dp) _____

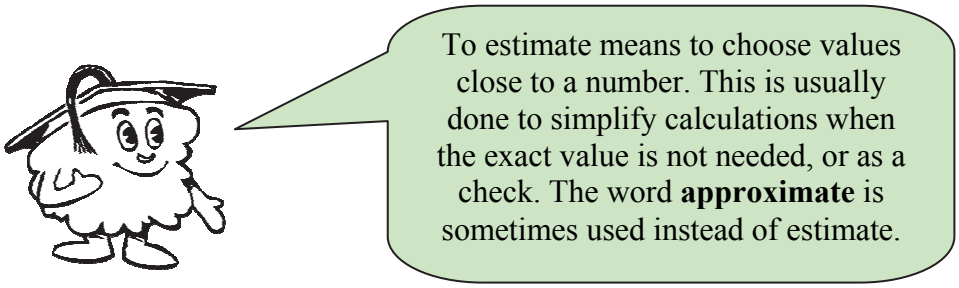
4. **Estimate** the answer to each of the following by rounding each value to the nearest whole number first.

   (a) 1.9 + 2.05 _____

   (b) 17.2 – 4.8 _____

   (c) 5.77 × 2.108 _____

   (d) 99.7 ÷ 20.2 _____



© Department of Education WA 2012 – MATHSAC017

5. (a) A class was given some calculations to do. Kelvin gave the answer to 68.6×102.7 as 704.522. His friend Nathan, who didn't have a calculator, said that the answer must be wrong. He **estimated** the answer to be about 7000.

(i) Is Nathan correct? _____

(ii) What method would Nathan have used to find the estimate of the answer?

(iii) Using Kelvin's answer and Nathan's estimation what do you think the correct answer should be? Write your reasoning.

(b) You went to the shop and bought items costing \$2.95, \$5.95, \$12.05, \$7.95, and \$0.95.

(i) What would your **approximate** total cost be? Show the estimates you used to find the approximate cost.

(ii) Without finding the actual total decide if this estimate was more or less than the actual value.

Always round to a value that makes the calculation easy to do. This may be to the nearest unit, ten or hundred in most cases. Usually you want to be able to do the calculation using the estimate in your head.

Check your work before continuing.

© Department of Education WA 2012 – MATHSACO17

3. Decimal and fraction equivalents

When you complete this section you should be able to:

- write the equivalent fraction to a decimal
- write the equivalent decimal to a fraction.

Key words

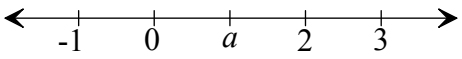
- decimal fraction
- terminating decimal
- repeating decimal
- recurring decimal

Warm-up 3

1. Circle the prime number. 2, 4, 6, 8

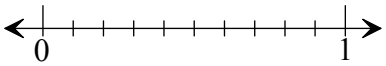
2. $6 \times 3 =$ _____

3. What is the missing number?



$a =$ _____

4. Locate $\frac{3}{10}$ on the number line.



5. What is one third of 18? _____

6. Estimate the sum by first rounding to whole numbers. $4.9 + 5.3 \approx$ _____

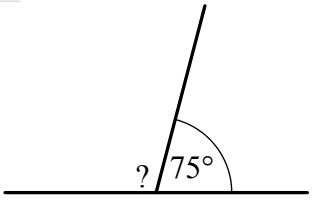
7.
$$\begin{array}{r} 0.5 \\ \times \quad 3 \\ \hline \end{array}$$

_____

8. Write $\frac{42}{100}$ as a percentage. _____

9. Write the next value. $\frac{1}{9}, \frac{3}{9}, \frac{5}{9},$ _____

10. Determine the size of the missing angle.



_____

© Department of Education WA 2012 – MATHSAC017

Review 3

Decimals are often referred to as **decimal fractions**. This is because they are just a special way of writing fractions that have denominators that are 10, 100, 1000 etc.

Example

Write these decimals as normal fractions without simplifying.

(a) 0.3 (b) 0.06 (c) 0.008 (d) 0.367

Solution

(a) $\frac{3}{10}$ (b) $\frac{6}{100}$ (c) $\frac{8}{1000}$ (d) $\frac{367}{1000}$

The number of zeros in the denominator is the same as the number of decimal places in the decimal.

1. Use addition of normal fractions to show that 0.3 + 0.06 = 0.36.

2. Write these decimal fractions as normal fractions without simplifying.

   (a) 0.7 _____ (b) 0.58 _____

   (c) 0.155 _____ (d) 0.045 _____

3. Write these decimals as mixed numbers.

   (a) 2.3 _____ (b) 4.35 _____

   (c) 15.001 _____ (d) 100.01 _____

© Department of Education WA 2012 – MATHSACO17

Focus problem 3

When you write the fraction $\frac{1}{5}$ it means that one whole has been divided into five equal parts.

In other words the fraction $\frac{1}{5} = 1 \div 5$.

Using this way of writing a fraction you can easily find the decimal equivalent to a fraction using a calculator.

1. (a) Use your calculator to check that $\frac{1}{5} = 0.2$ by dividing 1 by 5.

   (b) Complete the following statement. $\frac{1}{4} = \_\_\_ \div \_\_\_ = 0.\_\_\_\_$

   (c) Write similar statements to (b), then use your calculator to calculate the decimal equivalent of each of the following fractions.

   (i) $\frac{1}{8}$

   (ii) $\frac{3}{5}$

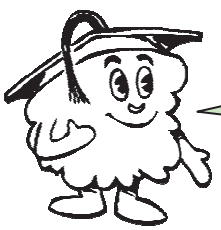
   (iii) $\frac{7}{40}$

   (iv) $\frac{9}{25}$

   (d) All the decimals you have calculated above are called **terminating decimals**. Explain why you think they are called terminating decimals.

2. (a) Now use your calculator to find the decimal equivalent to $\frac{1}{3}$.

   (b) Now use your calculator to find the decimal equivalent to $\frac{2}{3}$.



The calculator only shows the number of decimal places that fits on the display. Depending on your calculator, you may get the last decimal place on your screen as a rounded up value.

© Department of Education WA 2012 – MATHSAC017

(c) What is different in the way these decimals appear compared to those in 1?

(d) How do you write that type of decimal?

(e) What would be wrong with writing the decimal for $\frac{1}{3}$ simply as 0.3, the decimal correct to one decimal place?

(f) The decimals you have for $\frac{1}{3}$ and $\frac{2}{3}$ are called **repeating decimals** or **recurring decimals**. Why do they have that name?

3. (a) $\frac{13}{99} = 0.13131313...$ What do the three dots (…) at the end of the number indicate?

(b) Find the decimal equivalent to the following.

(i) $\frac{7}{9}$

(ii) $\frac{7}{99}$

© Department of Education WA 2012 – MATHSACO17

(iii) $\frac{17}{99}$ _____

(c) Look at the pattern in the answers to 3(b). Write what you think is the decimal equivalent to each of the following.

(i) $\frac{1}{9}$ _____

(ii) $\frac{1}{99}$ _____

Check your work before continuing.

Other number systems

We use a decimal system of numbers with a value given by the place of the digit. The base of our system is 10.

There are systems of numbers with other bases that are used, especially in electronics. The most widely used is the binary system, based on the number 2.

In the binary system the only digits are 0 and 1.

For example to represent our number 5 in the binary system it would be 101. This means that there is one unit, no lots of 2 and one lot of 4 (2 × 2).

1100 in the base 2 system would be 8 + 4 = 12 in our system.

The table below shows you more of the base 2 numerals and their base 10 equivalents.

Base 10 numeral	2 × 2× 2	2 × 2	2	1
1				1
2			1	0
3			1	1
4		1	0	0
5		1	0	1
6		1	1	0
7		1	1	1
8	1	0	0	0

© Department of Education WA 2012 – MATHSAC017

Skills development 3

Writing **terminating decimals** as fractions means that they have to first be represented with a denominator of 10, 100, 1000 or whatever is appropriate for the number of decimal places. Then the fraction is simplified as far as possible.

Writing **repeating decimals** as fractions is much harder but the simple ones can be done by looking at patterns you have seen before.

Example

(a) Write the following fractions as decimals.

(i) $\frac{4}{5}$ (ii) $\frac{8}{9}$ (iii) $\frac{23}{25}$

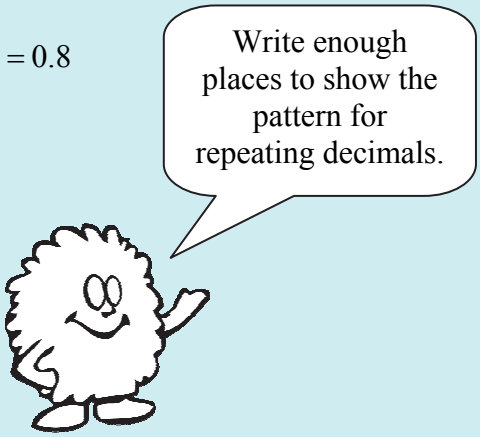
(b) Write the following decimals as fractions in their simplest form.

(i) 0.7 (ii) 0.625 (iii) 0.2222…

Solution

(a) (i) $\frac{4}{5} = 4 \div 5 = 0.8$ or $\frac{4}{5} = \frac{8}{10} = 0.8$

(ii) $\frac{8}{9} = 8 \div 9 = 0.88888...$



(iii) $\frac{23}{25} = \frac{23 \times 4}{25 \times 4} = \frac{92}{100} = 0.92$ or using the calculator $23 \div 25 = 0.92$.

(b) (i) $0.7 = \frac{7}{10}$

(ii) $0.625 = \frac{625}{1000}$ Three decimal places so three zeros in the denominator

$= \frac{125}{200}$ By dividing through by a common factor of 5

$= \frac{25}{40}$ By dividing through by a common factor of 5

$= \frac{5}{8}$ By dividing through by a common factor of 5

(iii) $0.2222\ldots = \frac{2}{9}$ By looking at the pattern of previous answers

© Department of Education WA 2012 – MATHSACO17

1. Write these fractions as decimals.

   (a) $\frac{3}{8}$ _____ (b) $\frac{1}{12}$ _____ (c) $\frac{17}{20}$ _____

2. Write these decimals as unsimplified fractions.

   (a) 0.12 _____ (b) 0.175 _____ (c) 0.6666666… _____

3. Write the answers to part 2 as simplified fractions.

4. (a) Use your calculator to find $\frac{5}{99}$ as a decimal. _____

   (b) Use the pattern that appears in (a) for decimal equivalents of fractions with a denominator of 99 to quickly write these as decimals.

   (i) $\frac{4}{99}$ _____ (ii) $\frac{25}{99}$ _____

   (iii) $\frac{59}{99}$ _____ (iv) $\frac{98}{99}$ _____

Check your work before continuing.

© Department of Education WA 2012 – MATHSAC017

© Department of Education WA 2012 – MATHSACO17

4. Multiplication and division by integers

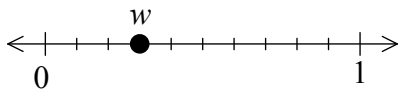
When you complete this section you should be able to:

- multiply and divide decimals by an integer.

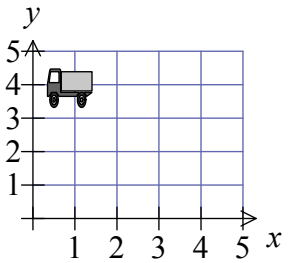
Warm-up 4

1. Complete the pattern by writing the next number. 100, 81, 64, 49, _____
2. $54 \div 9 =$ _____
3. The temperature was minus 1 degrees but it went up 5 degrees.

   What is the new temperature? _____
4. Express the value of w as a fraction.



   _____
5. $\frac{1}{4} \times 20 =$ _____
6. $0.6 \times 100 =$ _____
7. $2.16 \div 3 =$ _____
8. Write 10% as fraction. _____
9. Find the next value. 59, 54, 49, 44, _____
10. At what point is the truck?



_____

© Department of Education WA 2012 – MATHSAC017

Review 4

Example

(a) Find the value of each of the following as an unsimplified fraction.

(i) $\frac{3}{10}\times 4$ (ii) $\frac{7}{100}\times 5$ (iii) $\frac{81}{100}\times 3$

(b) Write each of the answers from (a) as a decimal.

Solution

(a) (i) $\frac{3}{10}\times\frac{4}{1}=\frac{12}{10}$ (ii) $\frac{7}{100}\times\frac{5}{1}=\frac{35}{100}$ (iii) $\frac{80}{100}\times\frac{3}{1}=\frac{240}{100}$

(b) (i) 1.2 (ii) 0.35 (iii) $2.40 = 2.4$

1. Find the answer to each of the following as an unsimplified fraction and then give the answer as a decimal.

   (a) $\frac{21}{100}\times 2$ _____

   (b) $3\times\frac{8}{10}$ _____

   (c) $\frac{111}{1000}\times 4$ _____

2. (a) Write the answer to each of the following.

   (i) $0.2+0.2+0.2 =$ _____

   (ii) $1.3+1.3+1.3+1.3 =$ _____

   (b) Rewrite the calculations in part (a) as multiplication calculations.

   (i) _____

   (ii) _____

© Department of Education WA 2012 – MATHSACO17

Focus problem 4

1. Use your calculator to find the following as decimals.

   (a) 0.2×4 _____ (b) 0.3×4 _____ (c) 0.5×4 _____

2. The first two answers in part 1 should indicate that the answer has the same number of decimal places as the question. Why doesn't the answer to (c) appear to follow that pattern?

3. Without doing any calculations explain why each of the following statements is false.

   (a) $0.4 \times 4 = 0.16$

   (b) $0.22 \times 5 = 0.011$

   (c) $1.2 \times 4 = 48$

   (d) When you multiply a decimal by a whole number bigger than one the answer is not always bigger than the original decimal. Give an example.

© Department of Education WA 2012 – MATHSAC017

4. Use your calculator to find the following as decimals.

   (a) $0.2 \div 4$ _____

   (b) $0.3 \div 4$ _____

   (c) $0.8 \div 4$ _____

5. (a) Are answers in part 4 bigger or smaller than the original decimal?

   (b) Why is it true to say that $0.2 \div 4 = 2 \div 40$?

6. $0.3 \div 4$ can also be written as a division like this $4\overline{)0.3} = 4\overline{)0.300}^{\,0.075}$ if you don't have access to a calculator. The extra zeros are needed until you have found a terminating decimal or a pattern for a repeating decimal.

   Without using a calculator, use a similar division to find the answer, as a decimal, to each of the following.

   a) $1.32 \div 3$ _____

   (b) $0.23 \div 5$ _____

Check your work before continuing.

© Department of Education WA 2012 – MATHSACO17

Skills development 4

If you are not using a calculator to multiply a decimal by a whole number the setting out of answers is important.

Look carefully at the examples below.

Example

Find the value of the following.

(a) 0.7×6 (b) 1.4×5 (c) 0.9×40.

Solution

(a)
$$\begin{array}{r} {}^{4}0.7 \\ \times 6 \\ \hline 4.2 \end{array}$$

(b)
$$\begin{array}{r} {}^{2}1.4 \\ \times 5 \\ \hline 7.0 \end{array}$$

(c)
$$\begin{aligned} 0.9 \times 40 &= 9.0 \times 4 && \text{By multiplying by the 10 first since } 40 = 4 \times 10 \\ &= 36.0 && \text{One decimal place in the question so one in the answer} \\ &= 36 && \text{The decimal place is not needed because it is a zero.} \end{aligned}$$

1. Find the answer to each of the following problems, without using a calculator. Show all the setting out.

(a) 0.5×9

(b) 2.12×5

(c) 0.22×7

(d) 1.05×20

© Department of Education WA 2012 – MATHSAC017

2. Find the answer to each of the following problems, without using a calculator. Show all the setting out.

(a) $0.5 \div 4$

(b) $2.12 \div 5$

(c) $0.22 \div 5$

(d) $1.05 \div 2$

3. Use a calculator to find the decimal answers to each of the following calculations. Round the answer to the number of decimal places indicated in the brackets.

(a) 0.521×9 (2dp)

(b) 2.073×15 (2dp)

(c) $4.35 \div 13$ (3dp)

(d) $1.06 \div 3$ (2dp)

Check your work before continuing.

© Department of Education WA 2012 – MATHSACO17

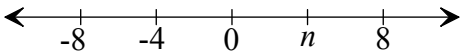
5. Multiplying decimals

When you complete this section you should be able to:

- multiply two decimals using written strategies and using technology.

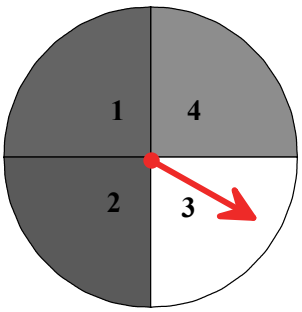
Warm-up 5

1. Circle the square number. 6, 9, 12, 15
2. $315 + 7 =$ _____
3. What is the missing number?



_____

4. $\frac{1}{2} + \frac{1}{2} =$ _____
5. What is a fifth of 20? _____
6. 3.7 cm = _____ m
7. $6 + 8 \div 2 =$ _____
8. Write $\frac{1}{5}$ as decimal. _____
9. Write the next number. 2.8, 2.6, 2.4, 2.2, _____
10.



Determine the probability the spinner will land on a 3.

Express your answer as a percentage.

_____

© Department of Education WA 2012 – MATHSAC017

Review 5

Example

(a) Estimate the answer to each of the following calculations. Indicate the estimation you have used. (i) 1.2×0.9 (ii) $59.6 + 8.45$

(b) Find the difference between the estimate and the correct answer.

(c) Determine if the estimate was a good or bad one. If it was a bad one, suggest a better estimate.

Solution

(a) (i) $1.2 \times 0.9 \approx 1 \times 1$ so $1.2 \times 0.9 \approx 1$.

(ii) $59.6 + 8.45 \approx 60 + 10$ so $59.6 + 8.45 \approx 70$

(b) (i) $1.2 \times 0.9 = 1.08$ and the difference is $1.08 - 1 = 0.08$.

(ii) $59.6 + 8.45 = 68.05$ and the difference is $70 - 68.05 = 1.95$.

(c) (i) The answer is a good estimate because 0.08 is quite a small difference.

(ii) The estimate is quite good but a better estimate may be using 60 + 8 or 68. The difference then would be only 0.05.

1. (a) Estimate the answer to each of the following calculations. Indicate the estimation you have used.

(i) $1.9 \div 0.9$ _____

(ii) $208.6 - 191.84$ _____

(b) Find the difference between the estimate and the correct answer.

(i) _____

(ii) _____

(c) Determine if the estimate was a good or bad one. If it was a bad one, suggest a better estimate.

(i) _____

(ii) _____

2. John estimates his electricity bill for the year by rounding each bill to the nearest $100.

(a) What is his yearly estimate if the bills are $203.95, $317.56, $191.00, $274.54, $83.96 and $419.31?

_____

_____

© Department of Education WA 2012 – MATHSACO17

(b) What is the difference between John's estimate and the actual yearly total?

(c) Was John' estimate a good one? Give a better estimate if you think there is one.

Check your work before continuing.

© Department of Education WA 2012 – MATHSAC017

Focus problem 5

1. Find an approximate answer to 2.1×1.9 by rounding both numbers to whole numbers.

2. (a) Find an approximate answer to 0.1×0.9 by using the same method as in question 1.

   (b) Does the answer this time seem wrong? Why?

   (c) Complete this calculation of the same multiplication using fractions.

$$0.1 \times 0.9 = \frac{1}{10} \times \text{—}$$
$$= \frac{9}{\text{——}}$$
$$= 0.\text{____}$$

   (d) What is the total number of decimal places in the question? _____

   (e) What is the total number of decimal places in the answer? _____

   (f) Why does the approximate answer in (a) fit the answer to (c).

3. (a) (i) Complete this calculation.

$$0.02 \times 0.7 = \frac{2}{100} \times \text{—}$$
$$= \text{——}$$
$$= 0.\text{____}$$

   (ii) What is the total number of decimal places in the question? _____

   (iii) What is the total number of decimal places in the answer? _____

© Department of Education WA 2012 – MATHSACO17

(b) (i) Complete this calculation.

$$4.1 \times 0.03 = \frac{41}{10} \times \text{——}$$

$$= \text{———}$$

$$= 0.\text{____}$$

(ii) What is the total number of decimal places in the question? _____

(iii) What is the total number of decimal places in the answer? _____

4. How many decimal places should be in the answer to each of the following multiplications?

(a) 1.3×7 _____

(b) 1.3×0.7 _____

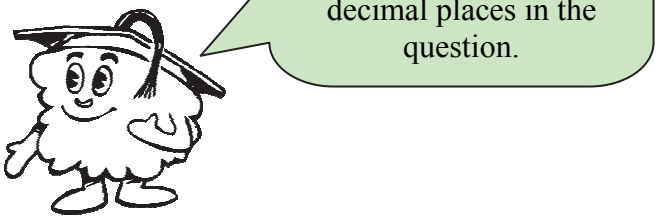
(c) 0.13×0.07 _____

5. Use the fact that $23 \times 5 = 115$ to write the answers to the following.

(a) 0.23×5 _____

(b) 2.3×0.5 _____

(c) 0.023×0.5 _____



Check your work before continuing.

© Department of Education WA 2012 – MATHSAC017

Skills development 5

Example

(a) How many decimal places should be in the answer to each of the following multiplications?

(i) 0.3×1.7 (ii) 1.45×0.002

(b) Use the fact that $14 \times 15 = 210$ to write the answers to the following.

(i) 0.14×15 (ii) 1.4×0.15 (iii) 0.014×0.15

Solution

(a) (i) Two places because there is one decimal place in each number

(ii) Five places because there are 2 in the first decimal and 3 in the second

(b) (i) Two decimal places are needed so the answer is 2.10 which can be shortened to 2.1.

(ii) Three decimal places are needed so the answer is 0.210 which can be shortened to 0.21.

(iii) Five decimal places are needed so the answer is 0.00210 which can be shortened to 0.0021.

1. Use your calculator to find the answers to the following.

   (a) 2.7×0.4 _____

   (b) 0.5×0.6 _____

   (c) 0.2×8.39 _____

2. How many decimal places should be in the answer to each of the following calculations.

   (a) 0.56×0.1 _____ (b) 55.5×7 _____

   (c) 0.335×0.16 _____ (d) $0.5 \times 0.6 \times 0.3$ _____

3. Use the fact that $56 \times 14 = 784$ to write the answers to the following.

   (a) 56×0.14 _____

   (b) 0.56×0.14 _____

   (c) 5.6×1.4 _____

© Department of Education WA 2012 – MATHSACO17

4. (a) Find an approximation to the answer to each of the following multiplications by first rounding to the nearest whole number.

   (i) 6.2×8.8 _____

   (ii) 0.7×1.4 _____

   (iii) 28.5×3.4 _____

   (b) Use your calculator to find the accurate answers to the questions in (a) then round them to the nearest whole number.

   (i) _____

   (ii) _____

   (iii) _____

   (c) Comment on whether the answers from (a) and (b) are approximately the same.

   (i) _____

   (ii) _____

   (iii) _____

   (d) Try to explain why one of the answers is not close using the whole number approximation.

_____

_____

_____

_____

Check your work before continuing.

© Department of Education WA 2012 – MATHSAC017

© Department of Education WA 2012 – MATHSACO17

6. Dividing decimals

When you complete this section you should be able to:

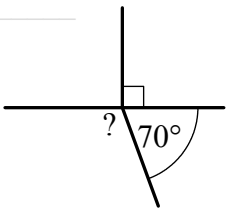
- divide a decimal by another decimal.

Keywords

- divisor
- reciprocal

Warm-up 6

1. $0.9 \times 10 =$ _____
2. $24 - 7 =$ _____
3. The temperature is minus 7 degrees. How much will it need to increase to get to zero degrees? _____
4. $\frac{1}{2} - \frac{1}{2} =$ _____
5. $\frac{1}{10} \times 40 =$ _____
6. 8.6 kg = _____ g
7. $3 \times 4 \div 6 =$ _____
8. Write 0.4 as a percentage. _____
9. Determine the next value. $\frac{9}{4}, \frac{7}{4}, \frac{5}{4}, \frac{3}{4},$ _____
10. Determine the size of the missing angle.



_____

© Department of Education WA 2012 – MATHSAC017

Review 6

Here is a reminder about division by a fraction:

Change the division to a multiplication by multiplying by the **divisor** turned upside down. That means you multiply by the **reciprocal**.

Example

Find the answers to the following.

(a) $\frac{2}{3} \div \frac{1}{6}$ (b) $\frac{7}{10} \div \frac{8}{10}$ (c) $\frac{27}{100} \div \frac{9}{10}$

The divisor is the number you are dividing by.
The reciprocal is the fraction turned upside down.

Solution

(a) $\frac{2}{3} \div \frac{1}{6} = \frac{2}{3} \times \frac{6}{1}$ The reciprocal of $\frac{1}{6}$ is $\frac{6}{1}$.

$= \frac{12}{3}$

$= 4$

(b) $\frac{7}{10} \div \frac{8}{10} = \frac{7}{10} \times \frac{10}{8}$ The reciprocal of $\frac{8}{10}$ is $\frac{10}{8}$.

$= \frac{70}{80}$

$= \frac{7}{8}$

(c) $\frac{27}{100} \div \frac{9}{10} = \frac{{}^{3}\cancel{27}}{{}_{10}\cancel{100}} \times \frac{\cancel{10}^{1}}{\cancel{9}_{1}}$

$= \frac{3 \times 1}{10 \times 1}$

$= \frac{3}{10}$

Check the simplification here. 9 is one common factor and 10 is another common factor of the numerator and denominator.

© Department of Education WA 2012 – MATHSACO17

1. Find the answers to the following.

(a) $\frac{6}{10} \div \frac{2}{10}$ (b) $\frac{15}{100} \div \frac{9}{10}$ (c) $\frac{6}{10} \div \frac{23}{100}$

2. (a) Explain why $\frac{27}{100} \div \frac{9}{10}$ can be written as $\frac{27}{100} \div \frac{90}{100} = \frac{27}{90}$.

(b) Write the answer to (a) in simplest form.

Check your work before continuing.

© Department of Education WA 2012 – MATHSAC017

Focus problem 6

1. (a) Use fraction notation, that is, change the decimals to fractions first, to complete the answer to the division $0.8 \div 0.2$.

(b) Why is the question in (a) the same as $8 \div 2$?

(c) What would be a simpler calculation that would give you the same result as $0.6 \div 0.3$?

(d) What would be a simpler calculation that would give you the same result as $0.25 \div 0.05$?

(e) Did you find it easier to divide by a whole number than by a decimal when a calculator is not available?

To complete a division by a decimal without a calculator, change both decimals to the same number of decimal places until you are dividing by a whole number.

For example: $0.72 \div 0.8 = 7.2 \div 8 = 0.9$

© Department of Education WA 2012 – MATHSACO17

2. (a) How many places will the decimal point need to move to the right in each of the following cases so the number you are dividing by is a whole number?

   (i) $0.24 \div 0.3$ _____

   (ii) $1.08 \div 0.04$ _____

   (iii) $5.04 \div 0.004$ _____

   (b) Rewrite the questions in (a) with the decimal point moved to make the division by a whole number.

   (i) _____

   (ii) _____

   (iii) _____

   (c) Without the use of a calculator find the answers to the new divisions you have in (b).

   (i) _____

   (ii) _____

   (iii) _____

   (d) Use a calculator to find the answers to the divisions in (a). Compare them to your answers to (c). Are they the same?

   (i) _____

   (ii) _____

   (iii) _____

Check your work before continuing.

© Department of Education WA 2012 – MATHSAC017

Skills development 6

Remember that to complete a division by a decimal without a calculator, change both decimals by the same number of decimal places until you are dividing by a whole number.

Example

Rewrite each question so that you are dividing by a whole number and hence find the answer without the use of a calculator.

(a) $0.24 \div 0.08$ (b) $0.45 \div 0.5$ (c) $3.6 \div 0.012$

Solution

(a) $0.24 \div 0.08 = 24 \div 8$ The decimal point has to move two places to the right.
$= 3$

(b) $0.45 \div 0.5 = 4.5 \div 5$ The decimal place moves one place to the right.
$= 0.9$

(c) $3.6 \div 0.012 = 3600 \div 12$ The decimal place moves three places to the right.
$= 300$

1. Rewrite each question so that you are dividing by a whole number and hence find the answer without the use of a calculator.

(a) $0.25 \div 0.05$

(b) $2.48 \div 0.4$

(c) $0.6 \div 0.005$

© Department of Education WA 2012 – MATHSACO17

2. (a) An estimate of the calculation of $9.1 \div 0.32$ has been completed below. It can be used as a check for the correct answer. Write down what has been done on each line of the working.

$9.1 \div 0.32 \approx 9 \div 0.3$

$9 \div 0.3 = 90 \div 3$

$= 30$

$9.1 \div 0.32 \approx 30$

(b) Why was it useful in this case to round the 0.32 to 0.3?

3. Estimate the answer to each of the following divisions. Show your working.

(a) $4.8 \div 0.5$

(b) $36.2 \div 0.043$

4. Use your calculator to find the answers to the following.

(a) $4.8 \div 0.5$

(b) $36.2 \div 0.043$ (correct to one decimal place)

(c) Find the number of apples that were bought if each apple cost \$0.35 and the total bill was \$5.95.

Check your work before continuing.

© Department of Education WA 2012 – MATHSAC017

© Department of Education WA 2012 – MATHSACO17

7. Problem solving with decimals

When you complete this section you should be able to:

- solve problems that involve the mathematical operations with decimals.

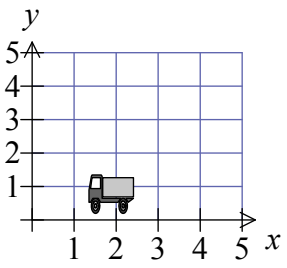
Warm-up 7

1. $3.8 \div 10 =$ _____
2. $248 \div 2 =$ _____
3. The temperature is 6 degrees. How much will it need to decrease to get to minus 1 degree? _____
4. $\frac{3}{10} + \frac{1}{5} =$ _____
5. $\frac{1}{5} \times 45 =$ _____
6. 2.3 kL = _____ L
7. $20 \div (6 - 2) =$ _____
8. Find 25% of $20. _____
9. Describe the rule for the following pattern.

   1, 4, 7, 10, 13, …

   _____

10. The truck is shown at (2, 1). If the truck moves 2 units up, where will it then be?



_____

© Department of Education WA 2012 – MATHSAC017

Review 7

1. Write each of the following as decimals.

   (a) $1\frac{9}{100}$ _____ (b) $\frac{14}{33}$ _____

2. Write as simplified fractions.

   (a) 0.75 _____ (b) 0.025 _____

3. Round the decimal to the number of places given in brackets.

   (a) 1.875304 (3dp) _____ (b) 1.875304 (2dp) _____

4. Find the answer without using your calculator. Show any necessary working.

   (a) 1.7×0.2 (b) $1.7 \div 0.2$

5. Use your calculator to find the answer to each of the following.

   (a) 1.7×0.24 _____ (b) $1.7 \div 0.24$ _____

Check your work before continuing.

© Department of Education WA 2012 – MATHSACO17

Skills development 7

When solving word problems it is essential that the working is set out clearly. It needs to show which calculations have been done to reach the answer. Everything that is written must also be mathematically correct.

Example

To earn pocket money Shoena has offered to pick the fruit from the apple trees in the orchard. She picked five buckets of them for each of the first two days then four buckets of them the next day. The apples in the buckets weigh, on average, 6.5 kg.

(a) What weight of apples did she pick in the three days?

The buckets of apples are to go into a big bin that holds 160 kg of apples.

(b) How many more buckets of apples will Shoena need to pick to fill the bin?

Solution

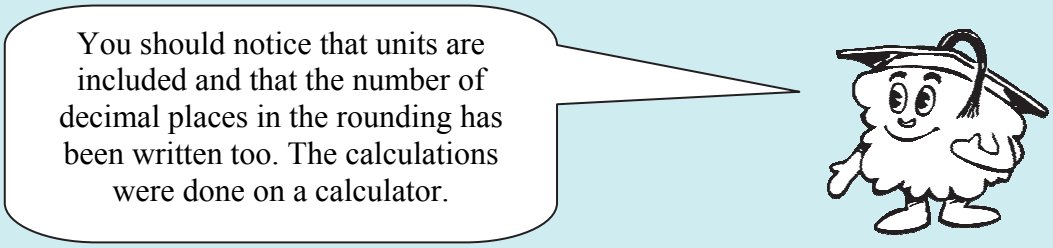
(a) Number of buckets of apples in three days = 5 + 5 + 4 = 14.

Weight of apples picked = 14 × 6.5 kg = 91 kg.

(b) Weight of apples still needed = 160 kg – 91 kg = 69 kg.

Number of buckets of apples needed = 69 kg ÷ 6.5 = 10.62 (2dp).

Shoena will need to pick almost another 11 buckets of apples.



1. Jane has to buy 7.4 metres of curtain material to complete a room makeover. The material costs $37.60 per metre and the other accessories she needs to hang them costs $85.20. How much will it cost altogether to buy and hang the curtains?

© Department of Education WA 2012 – MATHSAC017

2. Pat's school backpack was heavy. He decided to work out exactly how much it weighed. The books weighed 0.85 kg, 1.2 kg, 1.04 kg, 1.87 kg and 0.9 kg. His calculator, writing equipment, lunch and the weight of the backpack itself added another 2.1 kg to the overall weight.

   (a) What was the total weight of the backpack and its contents?

Pat had read that school pupils shouldn't be carrying more than 0.1 of their own weight on their backs.

   (b) Calculate the maximum weight Pat should be carrying if he weighs 49.6 kg.

   (c) How much over this weight is Pat's backpack?

3. Find the missing number represented by n in each of the following.

   (a) $8.7 + n = 17.6$

   (b) $15.4 \times n = 4.62$

   (c) $n \div 0.54 = 1.2$

© Department of Education WA 2012 – MATHSACO17

4. Adrien bought 15 cartons of chocolate flavoured milk for his birthday party. The cost came to a total of $38.25. How much did each carton of milk cost?

5. A builder has to build a brick wall 26.45 metres long and 2.8 metres high. He is going to use some specially made bricks that are 0.23 metres long and 0.07 metres high. Answer the following questions showing all your working.

   (a) How many bricks will he need in one row to complete the length?

   (b) How many bricks will be needed for the height he requires?

   (c) How many bricks will he need altogether?

   (d) He gets paid $275.60 for every thousand bricks he lays. What will be his pay for completing the wall?

Check your work before continuing.

© Department of Education WA 2012 – MATHSAC017

© Department of Education WA 2012 – MATHSACO17

8. Summary

- Decimals are usually written with a zero to the left of the decimal point if there are no other values there.
- When adding and subtracting decimals the decimal points must be lined up. The answer will have the same number of decimal places as the number with the most places.
- Estimation can be used to check the size of the answer to a problem.
- When rounding to a given number of decimal places first consider the digit to the right of the last place you need.
  - If the digit is below 5 leave the last place digit as it is.
  - If the digit is above 5 increase the last place digit by one.
  - If the digit is 5, and other digits follow the 5, increase the last place digit by one.
  - If it is exactly 5 with no further digits the commonly accepted rounding convention is that the digit before it is increased by one.
  - Indicate the accuracy of the answer by writing the number of decimal places it has been rounded to.
  - If the last digit is 0 it is left in to show the accuracy.
- To change a fraction to a decimal:
  - Write the equivalent fraction with the denominator of 10, 100, 1000 etc as required then write using decimal notation.
  - If using a calculator divide the numerator by the denominator.
- To change a decimal to a fraction:
  - Write the decimal with the appropriate denominator of 10, 100, 1000 etc if it is a terminating decimal. The denominator should have the same number of zeros as there are decimal places.
  - Simplify the fraction if possible.
  - If the decimal is a repeating decimal look for a pattern that you have seen before.
- To multiply two decimals you multiply the numbers as usual then the answer will have the same number of decimal places as in total in the question.
- To divide by a decimal first move the decimal point in both numbers to the right until you are dividing by a whole number, then complete the division.
- When completing problems involving decimals use words and sentences to make the working and answers clear. Units should be used where appropriate.

© Department of Education WA 2012 – MATHSAC017

© Department of Education WA 2012 – MATHSACO17

9. Review tasks

The following tasks will assist you to consolidate your learning and understanding of the concepts introduced in this resource, and assist you to prepare for assessments.

Task A

Name: _____ Suggested time: 50 minutes

Actual time taken: _____

Instructions

Complete this work on your own.

You may use a calculator, but show how you got your answer.

Attempt every question. Take as long as you need and record the time in the space provided above after you have finished.

1. Write these fractions using decimal notation.

   (a) $\frac{23}{100}$ _____ (b) $\frac{7}{1000}$ _____

   (c) $\frac{3}{40}$ _____ (d) $\frac{4}{33}$ _____

2. Write as simplified fractions or mixed numbers.

   (a) 0.25 _____

   (b) 1.12 _____

   (c) 0.036 _____

3. Write each of the following decimals correct to two decimal places.

   (a) 0.367 _____ (b) 5.0229 _____ (c) 104.2983 _____

4. Complete the following statements.

   (a) When multiplying two decimals the answer has the same _____

   _____

   (b) When dividing by a decimal move the decimal point _____

   _____

   _____

© Department of Education WA 2012 – MATHSAC017

5. Without the use of a calculator find the answers to the following calculations. Show your working clearly.

   (a) 0.6×0.02

   (b) $1.46 \div 0.4$

6. Use a calculator to do the following calculations.

   (a) Divide 35.94 by 1.2.

   (b) Multiply 0.075 by 9.4.

   (c) $18.5 \times 6.3 \div 4.2$

7. Decide if each of the following calculations are reasonable approximations. If not, give a better estimate.

   (a) $210 \times 8.1 \approx 200 \times 8$ $\quad 200 \times 8 = 1600$ so $210 \times 8.1 \approx 1600$.

   (b) $802 + 199 \approx 1000 + 200$ $\quad 1000 + 200 = 1200$ so $802 + 199 \approx 1200$.

   (c) $172 - 67 \approx 200 - 50$ (to the nearest 50) $\quad 200 - 50 = 150$ so $172 - 67 \approx 150$.

© Department of Education WA 2012 – MATHSACO17

(d) $1.52 \div 0.93 \approx 1.5 \div 1 \quad 1.5 \div 1 = 1.5$ so $1.52 \div 0.93 \approx 1.5$.

8. Estimate the answer to each of the following calculations by first rounding to the nearest whole number.

   (a) 8.91 + 2.03

   (b) 97.4 – 6.8

   (c) 15.45 × 2.2

   (d) 49.5 ÷ 5.2

9. A car averages 8.7 litres of petrol per 100 km. How many litres of petrol will be needed for a trip of 420 km?

10. Ebony went to the supermarket and bought some cans of dog food and some cans of cat food. When she got home her mother wanted to know how much each can cost. Ebony had lost the receipt but she knew a few details to help get the answer. She knew that the total was $34.83 before it was rounded to $34.85. She also remembered that the cans of dog food cost $1.16 each and that she had bought 12 of them.

    (a) How much did she pay for all the cans of cat food? Show your working.

    (b) They then realised they had 17 cans of cat food. What was the cost of each can of cat food?

© Department of Education WA 2012 – MATHSAC017

Task B

Name: _____ Suggested time: 40 minutes

Actual time taken: _____

Instructions

Complete this work on your own.

You may use a calculator, but show how you got your answer.

Attempt every question. Take as long as you need and record the time in the space provided above after you have finished.

Finding patterns in repeating decimals makes it easier to write fractional equivalents.

1. Use your calculator to find the decimal equivalent for the following.

   (a) (i) $\frac{1}{11}$ _____

   (ii) $\frac{2}{11}$ _____

   (ii) $\frac{3}{11}$ _____

   (b) What pattern can you see in the decimals in (a)?

   _____

   _____

   _____

   _____

   (c) Use the pattern to write the simple fractions for the following.

   (i) 0.36363636… _____

   (ii) 0.54545454… _____

   (iii) 0.909090… _____

© Department of Education WA 2012 – MATHSACO17

2. Investigate the decimal equivalents of fractions with a denominator of 33 in a similar way to those in part 1.

3. Some fractions are much harder to find a pattern in the digits when changing to a decimal.

   For example, fractions with a denominator of 7 are much harder to find a pattern.

   (a) Use your calculator to write down the decimal equivalent for $\frac{1}{7}$ to as many decimal places as possible. You need at least 8 decimal places.

   (b) Look at the decimal and try to find where the pattern starts to repeat itself. How many decimals places is it before it repeats?

© Department of Education WA 2012 – MATHSAC017

(c) Now find $\frac{2}{7}$ and $\frac{3}{7}$ as decimals and compare the patterns in the numerals.

(d) Continue looking for patterns for the decimal equivalents of fractions with a denominator of 7.

Describe the pattern and include more examples.

© Department of Education WA 2012 – MATHSACO17

Self-evaluation task

Please complete the following.

How well did you manage your own learning using this resource?

	Always	Usually	Rarely	Not sure
Each section took approximately 45 minutes to complete.	☐	☐	☐	☐
I needed extra help.	☐	☐	☐	☐
I marked and corrected my work at the end of each section.	☐	☐	☐	☐
I made the journal entries and summaries when asked.	☐	☐	☐	☐
I have kept to my work schedule.	☐	☐	☐	☐

How much mathematics have you learnt using this resource?

	Always	Usually	Rarely	Not sure
Understanding				
I understand how to change a fraction to a decimal.	☐	☐	☐	☐
I understand how to change a decimal to a fraction.	☐	☐	☐	☐
I understand how to find an estimate of an answer.	☐	☐	☐	☐
Fluency				
I can accurately round to a given number of decimal. places	☐	☐	☐	☐
I can change a decimal to a fraction.	☐	☐	☐	☐
I can change a fraction to a decimal.	☐	☐	☐	☐
I can multiply and divide decimals.	☐	☐	☐	☐
Problem Solving				
I can use decimals to solve problems.	☐	☐	☐	☐

© Department of Education WA 2012 – MATHSAC017

Reasoning

I can use estimation to decide if an answer is reasonable.	☐	☐	☐	☐
I can find patterns in repeating decimals to write fraction equivalents.	☐	☐	☐	☐

Write a list of topics for which you need additional assistance. Discuss these with your teacher.

© Department of Education WA 2012 – MATHSACO17

Solutions

1. Review of prior knowledge

Solutions to Warm-up 1

1. No, 2 is not a factor of 7.
2. 15
3. $a = (-6)$
4. $\frac{1}{2}$ should be circled.
5. 8
6. 7.8
7. 40.5
8. $\frac{1}{4}$
9. 15
10. $\frac{2}{6} = \frac{1}{3}$

Solutions to Review 1

1. $\frac{18}{20} = \frac{9}{10} = \frac{90}{100}$
2. $0.37 + 0.24 = 0.61$
3. (a) 2 450.193 (b) 87.03 (c) 0.475 (d) $12\frac{71}{100}$ (e) $\frac{53}{1000}$

Thousands	Hundreds	Tens	Units	•	Tenths	Hundredths	Thousandths
2	4	5	0	•	1	9	3
		8	7	•	0	3	
			0	•	4	7	5
		1	2	•	7	1	
			0	•	0	5	3

4. To add two decimals together you have to line up the numbers so that the decimal points are under each other. Add the numbers normally then put the decimal point in the same position in the answer as in the question.
5. (a) $\begin{array}{r} 1.7 \\ +3.2 \\ \hline 4.9 \end{array}$ (b) $\begin{array}{r} 2.37 \\ +4.8 \\ \hline 7.17 \end{array}$ (c) $\begin{array}{r} 7.84 \\ -6.17 \\ \hline 1.67 \end{array}$ (d) $\begin{array}{r} 19.60 \\ -12.29 \\ \hline 7.31 \end{array}$

© Department of Education WA 2012 – MATHSAC017

Solution to Focus problem 1

Instructions will vary but will be similar to those below.

'Farah, first you use the 'on' key to turn the calculator on. To add two decimals you use the number keys and the decimal point to enter the first number. It will be on the display. Hit the + key then enter the second number. Check the display to see that you have it correct. Next use the = key and the answer comes up on the display. Depending on the calculator the = key may say 'enter' or 'exe' rather than =.'

To subtract two decimals do the same as you did for adding but use the – key instead of the + key.

Solutions to Skills development 1

1. The answer to (b) was 7.80 which is two decimal places but the zero at the end doesn't have to be written in this case. In (c) the answer was really 5.60 but again the zero at the end is not needed.

2. (a)
$$\begin{array}{r} 9.^{1}67 \\ +5.\ 04 \\ \hline 14.\ 7\ 1 \end{array}$$
(b)
$$\begin{array}{r} {}^{1}0.{}^{1}572 \\ +0.\ 677 \\ \hline 1.\ 249 \end{array}$$
(c)
$$\begin{array}{r} {}^{1}\cancel{2}.{}^{10}\cancel{1}{}^{1}0\ 7 \\ -1.\ \ 9\ 3\ 4 \\ \hline 0.\ \ 1\ 7\ 3 \end{array}$$
(d)
$$\begin{array}{r} 1{}^{8}\cancel{9}.{}^{1}0 \\ -\ \ 8.7 \\ \hline 10.3 \end{array}$$

3. (a) 1262.9
   (b) 8.2
   (c) 0.85
   (d) 18.994

4. (a) 5.16 is bigger
   (b) T (true)
   (c) 0.1807, 0.2224, 1.807, 18.07, 180.7

© Department of Education WA 2012 – MATHSACO17

2. Rounding conventions and use

Solutions to Warm-up 2

1. No, 2 is not a common factor.
2. 8
3. (-5) degrees
4. $\frac{1}{2} > \frac{1}{4}$
5. 7
6. 8
7. 2.1
8. 1.0
9. 1.8
10. Triangle

Solutions to Review 2

1. (a) Both 95 and 106 are close to 100, but 95 is closest.
   (b) Both 86 and 94 are the closest to 90.
   (c) Both 113 and 108 are close to 110, but 108 is the closest.
2. (a) 2.6 + 5.7 = 8.3 The nearest whole number is 8.
   (b) 9.6 – 5.4 = 4.2 The nearest whole number is 4.
   (c) 97.45 + 18.11 = 115.56 The nearest whole number is 116.
   (d) 5.6 + 4 = 9.6 The nearest whole number is 10.

Solution to Focus problem 2

1. (a) (i) 6.4 litres is less than half a litre over the full litre so they will only buy 6 litres.
   (ii) 5.9 litres is less than six litres but it is over five and a half litres so they will need to buy 6 litres.
   (iii) 5.5 litres is exactly half a litre less than six litres and according to their rules they will need to buy 6 litres.
   (b) They could buy six of the one litre cans, or some other combinations, but one of the five litre cans and one of the one litre cans would be the best. It is the smallest number of cans.
2. (a) 5 litres
   (b) 8 litres
   (c) 12 litres
   (d) 9 litres
   (e) 4 litres

© Department of Education WA 2012 – MATHSAC017

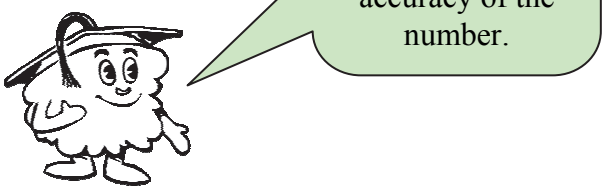
3. The answers given below are the most efficient because they give the least number of cans.
   (a) One 5 litre
   (b) One each of 1 litre, 2 litre, 5 litre
   (c) One each of 10 litre and 2 litre
   (d) One 5 litre and two 2 litre
   (e) Two 2 litre

4. $7.2 \approx 7$ and $8.9 \approx 9$. They will need approximately 16 litres of paint.

Solutions to Skills development 2

1. (a) 17
   (b) 4
   (c) 1
   (d) 0

2. (a) 56.87 (2dp)
   (b) 0.07 (2dp)
   (c) 1.80 (2dp)
   (d) 6.00 (2dp)



3. (a) 6.8 (1dp)
   (b) 0.33 (2dp)
   (c) 18.936 (3dp)

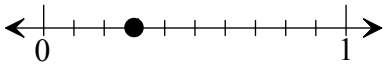
4. (a) Approximately equal to $2 + 2 = 4$
   (b) Approximately equal to $17 - 5 = 12$
   (c) Approximately equal to $6 \times 2 = 12$
   (d) Approximately equal to $100 \div 20 = 5$

5. (a) (i) Yes, Nathan is correct.
   (ii) $68.6 \approx 70$ and $102.7 \approx 100$ $70 \times 100 = 7000$, So $68.6 \times 102.7 \approx 7000$.
   (iii) The correct answer would probably be 7045.22 since Nathan said approximately 7000 and Kelvin wrote the number with the decimal point in the wrong place.
   (b) (i) Approximate cost = $\$(3 + 6 + 12 + 8 + 1) = \$30$
   (ii) It will be more. All the values were close to a whole dollar and only one was rounded down.

© Department of Education WA 2012 – MATHSACO17

3. Decimal and fraction equivalents

Solutions to Warm-up 3

1. 2 should be circled
2. 18
3. $a = 1$
4. 

5. 6
6. 10
7. 1.5
8. 42%
9. $\frac{7}{9}$
10. 105°

Solutions to Review 3

1. $$\begin{aligned} 0.3 + 0.06 &= \frac{3}{10} + \frac{6}{100} \\ &= \frac{30}{100} + \frac{6}{100} \\ &= \frac{36}{100} \\ &= 0.36 \end{aligned}$$

2. (a) $\frac{7}{10}$ (b) $\frac{58}{100}$ (c) $\frac{155}{1000}$ (d) $\frac{45}{1000}$

3. (a) $2\frac{3}{10}$ (b) $4\frac{35}{100}$ (c) $15\frac{1}{1000}$ (d) $100\frac{1}{100}$

Solution to Focus problem 3

1. (a) Check using a calculator.

   (b) $\frac{1}{4} = 1 \div 4 = 0.25$

   (c) (i) $\frac{1}{8} = 1 \div 8 = 0.125$ (ii) $\frac{3}{5} = 3 \div 5 = 0.6$

   (iii) $\frac{7}{40} = 7 \div 40 = 0.175$ (iv) $\frac{9}{25} = 9 \div 25 = 0.36$

© Department of Education WA 2012 – MATHSAC017

(d) They are called terminating decimals because they have an exact ending number.

2. (a) $\frac{1}{3} = 0.333333...$ 3 fills all the decimal places.

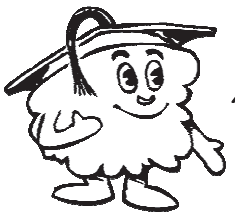
(b) $\frac{2}{3} = 0.66666...$ 6 fills all the decimal places, except the last one on the display may be rounded to a 7.

(c) These decimals have all the same number repeated. They appear to go on forever this way.

(d) The decimals are usually written with some numbers after the decimal point to show the pattern. Dots, …, are then included to show they continue forever.

(e) 0.3 is $\frac{3}{10}$ which is not the same as $\frac{1}{3}$. Also $\frac{3}{10} = \frac{30}{100}$ and $0.33333... = \frac{33.3333...}{100}$.

(f) There is a pattern that repeats itself or recurs so it goes on forever.



You might sometimes see a repeating decimal written with a dot or a line above the part that repeats. For example,

$0.3333.... = 0.\dot{3}$ and $0.363636... = 0.\overline{36}$.

3. (a) The dots mean that the pattern of 1313 continues on.

(b) (i) $\frac{7}{9} = 0.7777...$ (ii) $\frac{7}{99} = 0.070707...$ (iii) $\frac{17}{99} = 0.171717...$

(c) (i) $\frac{1}{9} = 0.1111...$ (ii) $\frac{1}{99} = 0.010101...$

Solutions to Skills development 3

1. (a) $\frac{3}{8} = 0.375$

(b) $\frac{1}{12} = 0.08333...$

(c) $\frac{17}{20} = 0.85$

2. (a) $0.12 = \frac{12}{100}$

(b) $0.175 = \frac{175}{1000}$

© Department of Education WA 2012 – MATHSACO17

(c) $0.666... = \frac{2}{3}$

3. (a) $\frac{12}{100} = \frac{4 \times 3}{4 \times 25} = \frac{3}{25}$

(b) $\frac{175}{1000} = \frac{25 \times 7}{25 \times 40} = \frac{7}{40}$

(c) $\frac{2}{3}$

4. (a) $\frac{5}{99} = 0.050505...$

(b) (i) $0.040404\ldots$

(ii) $0.252525\ldots$

(iii) $0.595959\ldots$

(iv) $0.989898\ldots$

4. Multiplication and division by integers

Solutions to Warm-up 4

1. 36
2. 6
3. 4 degrees
4. $\frac{3}{10}$
5. 5
6. 60
7. 0.72
8. $\frac{10}{100} = \frac{1}{10}$
9. 39
10. (1, 4)

Solutions to Review 4

1. (a) $\frac{21}{100} \times 2 = \frac{42}{100} = 0.42$

(b) $3 \times \frac{8}{10} = \frac{24}{10} = 2.4$

(c) $\frac{111}{1000} \times 4 = \frac{444}{1000} = 0.444$

© Department of Education WA 2012 – MATHSAC017

2. (a) (i) 0.6

   (ii) 5.2

   (b) (i) $0.2 \times 3 = 0.6$

   (ii) $1.3 \times 4 = 5.2$

Solution to Focus problem 4

1. (a) 0.8

   (b) 1.2

   (c) 2

2. Part (c) should be 2.0 but in this case the zero was not needed.

3. (a) False, because there should be only one decimal place

   (b) False, because there should be only two decimal places

   (c) False, because there should be one decimal place

   (d) False, because if you multiply by a number bigger than one the answer is always bigger than the number you started with

4. (a) $0.2 \div 4 = 0.05$ (b) $0.3 \div 4 = 0.075$ (c) $0.8 \div 4 = 0.2$

5. (a) The answers are smaller because you are dividing by a number bigger than one.

   (b) $$0.2 \div 4 = \frac{2}{10} \div \frac{4}{1}$$
   $$= \frac{2}{10} \times \frac{1}{4}$$
   $$= \frac{2}{40}$$
   $$= 2 \div 40$$

6. (a) $3\overline{)1.3^{1}2}$ $0.4\ 4$

   (b) $5\overline{)0.230}$ 0.046

© Department of Education WA 2012 – MATHSACO17

Solutions to Skills development 4

1. (a) $\begin{array}{r} {}^{4}0.5 \\ \times\ 9 \\ \hline 4.5 \end{array}$

   (b) $\begin{array}{r} 2.^{1}12 \\ \times\ \ \ 5 \\ \hline 10.6\ 0 \end{array}$

   (c) 1.54

   (d) $1.05 \times 20 = 10.5 \times 2 = 21$

2. (a) $4\overline{)0.5^{1}0^{2}0}$ $\quad 0.125$

   (b) 0.424

   (c) 0.044

   (d) 0.525

3. (a) $4.689 = 4.69$ (2dp)

   (b) $31.095 = 31.10$ (2dp)

   (c) 0.335 (3dp)

   (d) $0.353333\ldots = 0.35$ (2dp)

5. Multiplying decimals

Solutions to Warm-up 5

1. 9 should be circled
2. 322
3. $n = 4$
4. 1
5. 4
6. 0.037
7. 10
8. 0.2
9. 2
10. $\frac{1}{4} = 25\%$

© Department of Education WA 2012 – MATHSAC017

Solutions to Review 5

1. (a) (i) Approximately equal to $2 \div 1 = 2$

   (ii) Approximately equal to $210 - 190 = 20$

   (b) (i) $1.9 \div 0.9 = 2.1111...$ The difference is $0.1111\ldots$

   (ii) $208.6 - 191.84 = 16.76$ The difference is 3.24.

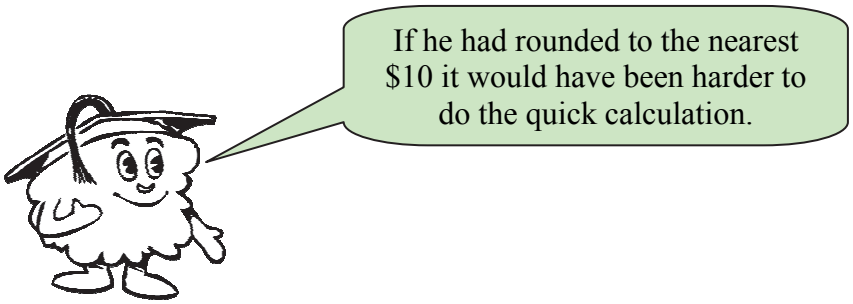
   (c) (i) The estimate was good because the difference was small and it was an easy calculation.

   (ii) The estimate was good but a better one could be found by rounding to the nearest whole number. 209 – 192 = 17. The calculation is not too difficult.

2. (a) \$(200 + 300 + 200 + 300 + 100 + 400) = \$1500

   (b) The actual value is \$1490.32. The difference between the actual value and the estimate is \$9.68.

   (c) In this case it was a good estimate. Less than \$10 difference in \$1500 is quite small.



Solution to Focus problem 5

1. $2.1 \times 1.9 \approx 2 \times 2$ so $2.1 \times 1.9 \approx 4$.

2. (a) $0.1 \times 0.9 \approx 0 \times 1$ so $0.1 \times 0.9 \approx 0$.

   (b) It is strange to get a zero answer when you multiply two non-zero numbers together.

   (c) $$0.1 \times 0.9 = \frac{1}{10} \times \frac{9}{10}$$
   $$= \frac{9}{100}$$
   $$= 0.09$$

   (d) There are two decimal places in total in the question.

   (e) There are two decimal places in the answer.

   (f) The answer to (c) when rounded to the nearest whole number is zero, the same as the answer to the approximation in (a).

© Department of Education WA 2012 – MATHSACO17

3. (a) (i) $0.02 \times 0.7 = \frac{2}{100} \times \frac{7}{10}$
$= \frac{14}{1000}$
$= 0.014$

(ii) There are three decimal places in total in the question.

(iii) There are three decimal places in the answer.

(b) (i) $4.1 \times 0.03 = \frac{41}{10} \times \frac{3}{100}$
$= \frac{123}{1000}$
$= 0.123$

(ii) There are three decimal places in total in the question.

(iii) There are three decimal places in the answer.

4. (a) One decimal place
(b) Two decimal places
(c) Four decimal places

5. (a) $0.23 \times 5 = 1.15$
(b) $2.3 \times 0.5 = 1.15$
(c) $0.023 \times 0.5 = 0.0115$

Solutions to Skills development 5

1. (a) 1.08
(b) 0.3
(c) 1.678

2. (a) Three decimal places
(b) One decimal place
(c) Five decimal places
(d) Three decimal places

3. (a) 7.84
(b) 0.0784
(c) 7.84

4. (a) (i) $6 \times 9 = 54$
(ii) $1 \times 1 = 1$
(iii) $29 \times 3 = 87$

(b) (i) $54.56 \approx 55$
(ii) $0.98 \approx 1$
(iii) $96.9 \approx 97$

(c) (i) Approximately the same
(ii) Approximately the same
(iii) Not close.

(d) In (iii) both numbers are further away from the whole number they are rounded to.

© Department of Education WA 2012 – MATHSAC017

6. Dividing decimals

Solutions to Warm-up 6

1. 9
2. 17
3. 7 degrees
4. 0
5. 4
6. 8600
7. 2
8. 40%
9. $\frac{1}{4}$
10. 110°

Solutions to Review 6

1. (a) $\frac{6}{10} \div \frac{2}{10} = \frac{6}{10} \times \frac{10}{2} = 3$

   (b) $\frac{\overset{5}{\cancel{15}}}{\underset{10}{\cancel{100}}} \times \frac{\overset{1}{\cancel{10}}}{\underset{3}{\cancel{9}}} = \frac{5}{30} = \frac{1}{6}$

   (c) $\frac{6}{10} \div \frac{23}{100} = \frac{6}{\underset{1}{\cancel{10}}} \times \frac{\overset{10}{\cancel{100}}}{23} = \frac{60}{23} = 2\frac{14}{23}$

2. (a) $\frac{27}{100} \div \frac{90}{100}$ is the same as $\frac{27}{100} \div \frac{9}{10}$ because $\frac{9}{10} = \frac{90}{100}$.

   Then $\frac{27}{100} \times \frac{100}{90} = \frac{27}{90}$.

   (b) $\frac{27}{90} = \frac{3}{10}$

© Department of Education WA 2012 – MATHSACO17

Solution to Focus problem 6

1. (a) $0.8 \div 0.2 = \frac{8}{10} \div \frac{2}{10}$

$= \frac{8}{10} \times \frac{10}{2}$

$= 4$

(b) $0.8 \div 0.2$ is the same as $8 \div 2$ as shown below.

$\frac{8}{10} \div \frac{2}{10} = \frac{8}{\cancel{10}_1} \times \frac{\cancel{10}^1}{2}$

$= \frac{8}{2}$

$= 4$

(c) $6 \div 3$

(d) $25 \div 5$

(e) Yes

2. (a) (i) One place (ii) Two places (iii) Three places

(b) (i) $2.4 \div 3$ (ii) $108 \div 4$ (iii) $5040 \div 4$

(c) (i) 0.8 (ii) 27 (iii) 1260

(d) (i) 0.8 (ii) 27 (iii) 1260

The answers were the same.

Solutions to Skills development 6

1. (a) $0.25 \div 0.05 = 25 \div 5 = 5$

(b) $2.48 \div 0.4 = 24.8 \div 4 = 6.2$

(c) $0.6 \div 0.005 = 600 \div 5 = 120$

2. (a) $9.1 \div 0.32 \approx 9 \div 0.3$ Each value is rounded to one less decimal place.

$9 \div 0.3 = 90 \div 3$ The decimal point is moved one place right.

$= 30$ The calculation of $90 \div 3$ is completed.

$9.1 \div 0.32 \approx 30$ The approximation for the answer is written.

(b) If it was rounded to the nearest whole number $0.32 \approx 0$ and then the calculation couldn't be done. 3 is easy to divide by once the decimal point has been moved.

3. (a) $5 \div 0.5 = 50 \div 5 = 10$ so $4.8 \div 0.5 \approx 10$.

(b) $36 \div 0.04 = 3600 \div 4 = 900$ so $36.2 \div 0.043 \approx 900$.

4. (a) 9.6

(b) 841.9 (1dp)

(c) $\$5.95 \div \$0.35 = 17$ There were 17 apples.

© Department of Education WA 2012 – MATHSAC017

7. Problem solving with decimals

Solutions to Warm-up 7

1. 0.38
2. 124
3. 7 degrees
4. $\frac{5}{10} = \frac{1}{2}$
5. 9
6. 2300 L
7. 5
8. \$5
9. Add 3 to get the next number.
10. (2, 3)

Solutions to Review 7

1. (a) 1.09
   (b) 0.424242…
2. (a) $\frac{75}{100} = \frac{3}{4}$
   (b) $\frac{25}{1000} = \frac{1}{40}$
3. (a) 1.875
   (b) 1.88
4. (a) $1.7 \times 0.2 = 0.34$ (2 decimal places were needed in the answer.)
   (b) $1.7 \div 0.2 = 17 \div 2 = 8.5$
5. (a) 0.408
   (b) 7.08333…

© Department of Education WA 2012 – MATHSACO17

Solutions to Skills development 7

1. Cost of curtains $= \$37.60 \times 7.4$
$= \$278.24$
Total cost $= \$278.24 + \$85.20$
$= \$363.44$

2. (a) Total weight = (0.85 + 1.2 + 1.04 + 1.87 + 0.9 + 2.1) kg = 7.96 kg
(b) Maximum weight allowed = (49.6 × 0.1) kg = 4.96 kg
(c) The loaded backpack is overweight by 3 kg.

3. (a) $n = 17.6 - 8.7 = 8.9$
(b) $n = \dfrac{4.62}{15.4} = 0.3$
(c) $n = 1.2 \times 0.54 = 0.648$

4. $\$38.25 \div 15 = \$2.55$ Each carton costs \$2.55.

5. (a) $26.45 \div 0.236 = 115$
(b) $2.8 \div 0.07 = 40$
(c) Total number of bricks = 115 × 40 = 4600
(d) He lays 4.6 lots of a thousand bricks. \$275.60 × 4.6 = \$1267.76

Solutions to Review tasks

Solutions to Task A

1. (a) 0.23 (b) 0.007 (c) 0.075 (d) 0.121212…

2. (a) $0.25 = \dfrac{25}{100} = \dfrac{1}{4}$
(b) $1.12 = 1\dfrac{12}{100} = 1\dfrac{3}{25}$
(c) $0.036 = \dfrac{36}{1000} = \dfrac{9}{250}$

3. (a) 0.37
(b) 5.02
(c) 104.30

© Department of Education WA 2012 – MATHSAC017

4. (a) When multiplying two decimals the answer has the same number of decimal places as in the question.

   (b) When dividing by a decimal move the decimal point in both numbers so that you are dividing by a whole number.

5. (a)
$$\begin{array}{r} 0.6 \\ \times 0.02 \\ \hline 0.012 \end{array}$$

   (b) $4\overline{)14.60}$ $\quad 3.65$ $\qquad 1.46 \div 0.4 = 14.6 \div 4$

6. (a) 29.95

   (b) 0.705

   (c) 27.75

7. (a) Reasonable but $210 \times 8 = 1680$ would be a better estimate and is still easy to calculate

   (b) 802 is not very close to 1000. A better estimate would be $800 + 200 = 1000$.

   (c) 172 to the nearest 50 is 150 not 200. A much better estimate would be to take them to the nearest ten so $170 - 70 = 100$.

   (d) The estimate is quite good.

8. (a) $9 + 2 = 11$

   (b) $97 - 7 = 90$

   (c) $15 \times 2 = 30$

   (d) $50 \div 5 = 10$

9. There are 4.2 lots of one hundred kilometres in 420 km.

   Amount of petrol needed = $4.2 \times 8.7 = 36.54$ litres.

10. (a) Dog food total cost = $\$1.16 \times 12 = \$13.92$

    Cat food total = $\$34.83 - \$13.92 = \$20.91$

    (b) Cost of one can of cat food = $\$20.91 \div 17 = \$1.23$

© Department of Education WA 2012 – MATHSACO17

Solutions to Task B

1. (a) $\frac{1}{11} = 0.09090909...$

$\frac{2}{11} = 0.18181818...$

$\frac{3}{11} = 0.27272727...$

(b) They are all repeating decimals. If you multiply the numerator by 9 you get the number that is repeated.

(c) (i) $\frac{4}{11}$

(ii) $\frac{6}{11}$

(iii) $\frac{10}{11}$

2. Working will vary but the conclusions should be the same.

For fractions with a denominator of 33 the numbers that are repeated are 3 times the numerator. For example, $\frac{24}{33} = 0.727272...$ because $3 \times 24 = 72$.

3. (a) $\frac{1}{7} = 0.1428571428...$ The part that repeats is underlined $0.\underline{1428571}428\ldots$

(b) The decimal has six places before it repeats.

(c) $\frac{2}{7} = 0.\underline{285714}2857...$

$\frac{3}{7} = 0.\underline{428571}4285...$

They both repeat after six places and the same digits are repeated but with the first digit being different in the order. The digits seem to rotate in order.

(d) All other decimal equivalents for fractions with a denominator of 7 have the same six digits repeated with the order moved around. Working will vary so check with your teacher.

© Department of Education WA 2012 – MATHSAC017

© Department of Education WA 2012 – MATHSACO17

Department of
Education

MATHSAC017
DECIMALS
ISBN: 9780730744375