Year 9 Term 1 Homework

Student Name:	Grade:
Date:	Score:

Table of contents

1	Year	r 9 Tern	n 1 Week 1 Homework	1
	1.1	Ration	al Number	
		1.1.1	Significant figures	1
		1.1.2	Estimation	3
		1.1.3	Recurring decimals	4
		1.1.4	Rates	6
		1.1.5	Solving problem with rates	8
	1.2	Miscel	laneous Exercises	9

This edition was printed on March 15, 2022 with Worked Solutions.

Camera ready copy was prepared with the LATEX2e typesetting system.

Copyright © 2000 - 2022 Yimin Math Centre (www.yiminmathcentre.com)

1 Year 9 Term 1 Week 1 Homework

1.1 Rational Number

A rational number is a number that can be written in the form $\frac{a}{b}$, where a and b are integers and $b \neq 0$.

1.1.1 Significant figures

A significant figure is a number that is correct within some stated degree of accuracy. The rule for significant figures are:

- All non-zero digits are significant.
- Zeros between non-zero digits are significant.
- Zeros at the end of a decimal are significant.
- Zeros before the first non-zero digit in a decimal are not significant.
- Zeros after the last non-zero digit in a whole number may or may not be significant.

Example 1.1.1 State the number of significant figures in each of these numbers:

1. 2.008

Solution: In 2.008, the two non-zero digits are significant and two zeros between these digits are also significant. \therefore the number has four significant figures.

2. 102.50

Solution: In 102.50, the three non-zero digits are significant and both the zero in between and at the end of the decimal are significant. : The number has five significant figures.

3. 0.00125

Solution: In 0.00125, the three non-zero digits are significant; however, the three zeros at the beginning of the decimal are not significant. \therefore the number has only three significant figures.

4. 9000

Solution: In 9000, the non-zero digit is significant. Either some, all or none of the final zeros could possibly be significant. If we knew that the number had been rounded off correct to:

- (a) 1 significant figure, then only the 9 would be significant.
- (b) 2 significant figures, then only the 9 and the first zero would be significant.
- (c) 3 significant figures, then only the 9 and the first two zeros would be significant.
- (d) 4 significant figures, then all the digits would be significant.

Exercise 1.1.1 Round off 34.535 correct to: 1. 1 significant figure _____ 2. 2 significant figures 3. 3 significant figures _____ 4. 4 significant figures _____ **Exercise 1.1.2 State the number of significant figures in each of the following:** 1. 5002 2. 0.48 _____ 3. 3.40 4. 12.0050 _____ 5. 0.012003400 Exercise 1.1.3 Round off each of the following correct to 1 significant figure: 1. 325 2. 280 3. 2180 _____ 4. 12.56 _____ 5. 99.45 Exercise 1.1.4 Round off each of the following correct to 2 significant figures: 1. 8580 2. 123003 3. 8028 4. 0.25349 5. 194.95

Copyright © 2000 - 2022 Yimin Math Centre (www.yiminmathcentre.com)

1.1.2 Estimation

- An estimate is an approximate answer that is worked out logically.
- It needs to be of the same order of magnitude.

Exercise 1.1.5 Estimate the answer, as an integer to each of these:

<i>1</i> . 9.6 + 19.3 + 12.2	
2. 95.5 - 27.3 + 15.048	
3. $12.2 \times 3.75 \times 5.4$	
<i>4.</i> 126.6 ÷ 9.81	
5. $53.5 \div 6.12 \times 8.045$	

Exercise 1.1.6 Further applications

- 1. Evaluate $\sqrt{4}$ and $\sqrt{9}$, find estimates for the following, correct to 1 decimal place.
 - (a) $\sqrt{5}$ ______ (b) $\sqrt{8}$ ______

2. Evaluate $\sqrt{121}$ and $\sqrt{144}$. Hence, find estimates for the following, correct to 1 decimal place.

- (a) $\sqrt{125}$ _____
- (b) $\sqrt{145}$ _____
- 3. John decided to re-carpet his lounge room using carpet squares of side length 40 cm. The lounge room is rectangular in shape and measure 4.8 m by 5.6 m.
 - (a) Estimate the area of the room in square metres.
 - (b) How many carpet squares are needed to cover an area of $2 m^2$.
 - (c) Estimate the number of carpet squares that are needed to cover the entire lounge room floor.
 - (d) If the carpet squares are sold in packs of 50 at \$280 per pack, estimate the total cost of the re-carpeting.

1.1.3 Recurring decimals

- A recurring decimal has an infinite number of decimal places, with one or more of the digits repeating themselves indefinitely.
- Recurring decimals are written with a dot above the first and the last digits in the repeating sequence.
- Every recurring decimal can be expressed as a fraction, so recurring decimals are rational numbers.

Example 1.1.2

- 1. $0.333333... = 0.\dot{3}$
- 2. $0.1666666... = 0.1\dot{6}$
- 3. $0.616161... = 0.\dot{6}\dot{1}$
- 4. $1.329329... = 1.\dot{3}2\dot{9}$
- To convert a fraction to a recurring decimal divide the numerator by the denominator.
- To convert a recurring decimal to a fraction:
 - let the decimal be x
 - multiply both sides by the smallest power of 10 so that the recurring part of the decimal becomes a whole number
 - subtract the first equation from the second and solve the resulting equation.

Example 1.1.3 Convert each of these recurring decimals to a fraction in its simplest form:

- 1. 0.6 Solution: let x = 0.6 (1) ∴ 10x = 6.6 (2) subtract (1) from (2) we have 9x = 6. ∴ $x = \frac{6}{9} = \frac{2}{3}$
- **2**. 0.125

Solution: let $x = 0.\dot{1}2\dot{5}$ (1) $\therefore 1000x = 125.\dot{1}2\dot{5}$ (2) subtract (1) from (2) we have 999x = 125 $\therefore x = \frac{125}{999}$

Exercise 1.1.7 Write each of these as a recurring decimal:

1. 0.6444	
2. 0.31818	
3. 0.3555	
4. 0.919191	<u> </u>
5. 0.484848	
6. 0.030303	
7. 0.029029	
8. 13.95555	

Exercise 1.1.8 Convert each of these recurring decimals to a fraction or a mixed numeral, in simplest form:

1.	0.35
2.	0.48
3.	0.146
4.	$3.41\dot{6}$

Copyright © 2000 - 2022 Yimin Math Centre (www.yiminmathcentre.com)

1.1.4 Rates

- A rate is a comparison of two unlike quantities.
- A rate is a measure of how one quantity is changing with respect to another.
- To be in simplest form, a rate must be expressed as a quantity per one unit of another quantity.

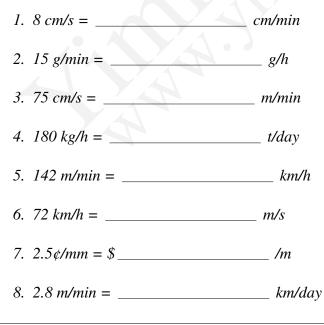
Example 1.1.4 Express each of the following statements as a rate in simplest form.

- 1. 210 km in 3 hours = 70 km/h.
- 2. 36 L in 9 min = 4 L/min.
- 3. \$180 in 4 hours = \$45/h.

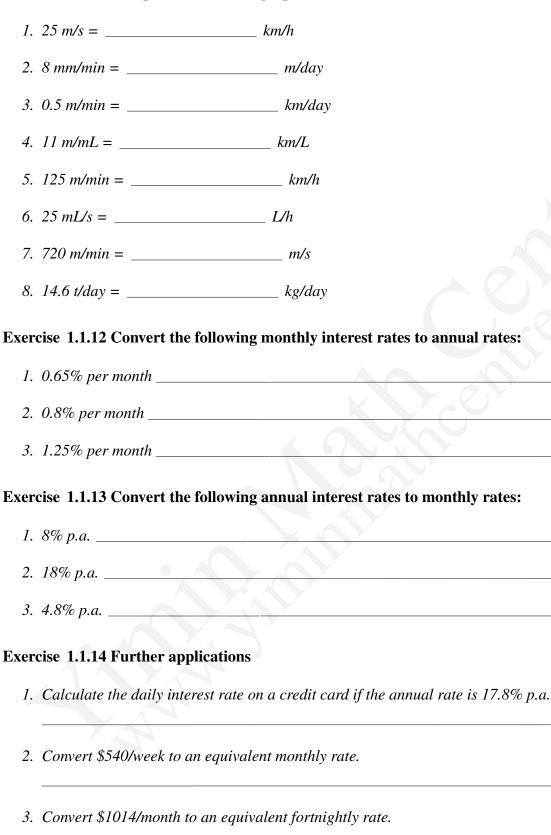
Exercise 1.1.9 Express each of the the following statements as a rate in simplest form:



Exercise 1.1.10 Complete the following equivalent rates:



Exercise 1.1.11 Complete the following equivalent rates:



4. Convert \$461.50/quarter to an equivalent weekly rate.

1.1.5 Solving problem with rates Exercise 1.1.15

- 1. George drove 15 km in 10 minutes. At the same speed, how far does he drive in 2 hours?
- 2. If it takes 3 hours to remove 72 t of sugar from a silo, how long it would take to remove 30 t?
- 3. A long distance runner completes a marathon of 42.2 kilometres in 2 hours 15 minutes. Calculate his average speed in km/h and m/s, correct to 2 decimal places.
- 4. The following currency conversions show the value of 1 Australian dollar (A\$1) in US\$, euro and NZ\$.

A\$1 = US\$0.6925 A\$1 = 0.5226 euro A\$1 = NZ\$1.2171

Use these currency conversions to convert:

- (a) A\$30 into US\$ _____
- (b) A\$50 in euro _____
- (c) A\$500 into NZ\$ _____
- 5. Use the unitary method to answer the following questions:
 - (a) David paid \$4.95 for 3 kg of apples. How much would he paid for 8 kg?
 - (b) In a walking race, Peter took 20 minutes to walk 4 km. How long would it take him to walk 15 km?
 - (c) If chicken is being sold for \$6.80 per kilogram, find the cost of purchasing 450 grams of chicken.

1.2 Miscellaneous Exercises

Exercise 1.2.1 Round off the following correct to 3 significant figures:



Exercise 1.2.2 Convert each of these recurring decimals to a fraction or mixed numeral, in simplest form:

1.	0.73	
2.	1.ĠŎ	

Exercise 1.2.3 Complete the following equivalent rates:

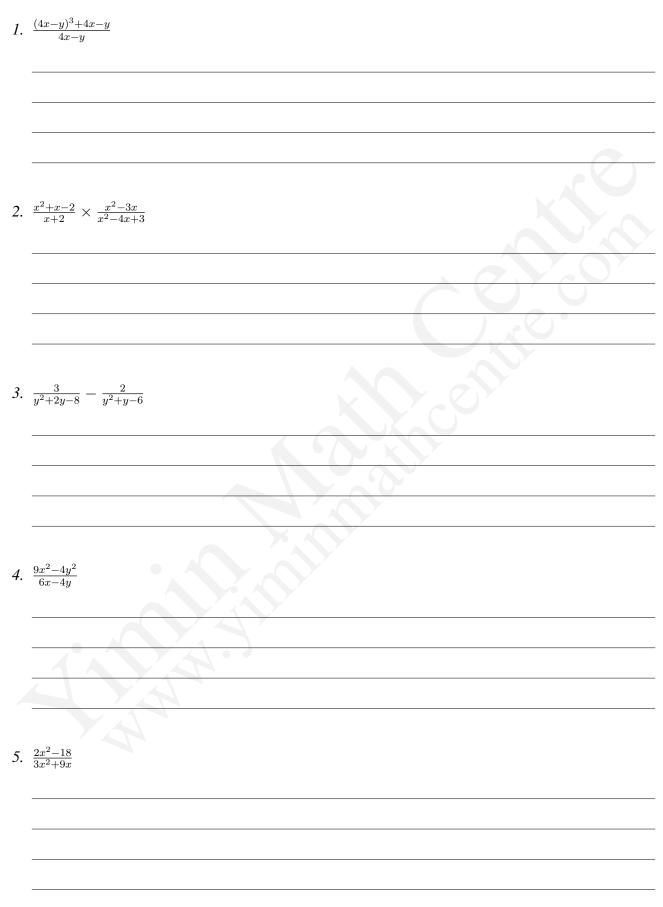
 1. 25 $\phi/cm^2 = \$$ _____ /m²
 3. 1.5 $g/cm^3 =$ _____ t/m³

 2. 160 mL/m² = _____ L/km²
 4. \$120/L = _____ ϕ/cm^3

Exercise 1.2.4 Further applications

- 1. At the 1896 Olympic Games, Australia's Edwin Flack won a gold medal in the 800 m in a time of 2 minutes 11 seconds.
 - (a) Find the average speed in m/s, correct to 1 decimal place.
 - (b) Express this speed in km/h.
- 2. On a property sold for \$600,000, a real estate agent receives a commission of \$12,000. At what rate is the commission calculated?

Exercise 1.2.5 Simplify the following:



Exercise 1.2.6 Factorise the following:

1.	$\frac{3x^2 - x - 4}{2}$
2.	$y^4 - 256$
3.	$x^2 - y^2 - x + y$
4.	$3x - 6y + x^2 - 2xy$
5.	$\frac{2x+y^2+2y+xy}{}$
6.	$6y^2 - 13y - 5$