

Year 9 Term 1 Homework

Student Name: _____	Grade: _____
Date: _____	Score: _____

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2 Year 9 Term 1 Week 2 Homework

2.1 Rational Number

2.1.1 Recurring decimals

Exercise 2.1.1 Convert each of these recurring decimals to a fraction or mixed numeral, in simplest form:

1. $0.1\dot{5} =$

2. $0.7\dot{5} =$

3. $7.8\dot{3} =$

4. $1.2\dot{3}\dot{3}$

Exercise 2.1.2

1. Write down the recurring decimal for $\frac{1}{9}$. _____

2. Hence, write down recurring decimals for:

(a) $\frac{2}{9} =$ _____

(b) $\frac{5}{9} =$ _____

(c) $\frac{8}{9} =$ _____

3. What meaning should be given to $0.\dot{9}$. Why?

2.1.2 Calculator**Exercise 2.1.3 Evaluate each of these, correct to 4 significant figures using the square key x^2 .**

1. $7.6^2 =$ _____

2. $(-12.8)^2 =$ _____

3. $(3\frac{3}{8})^2 =$ _____

Exercise 2.1.4 Evaluate each of these, correct to the nearest tenth using the square root key $\sqrt{\quad}$ and cube root key $\sqrt[3]{\quad}$.

1. $\sqrt{26} =$ _____

2. $\sqrt[3]{124.6} \div 2.4 =$ _____

3. $\sqrt[3]{2.57} + \sqrt{152.8} =$ _____

Exercise 2.1.5 Evaluate each of these, correct to the nearest hundredth using the reciprocal key x^{-1} .

1. $\frac{1}{0.235} =$ _____

2. $\frac{1}{0.024^2} =$ _____

3. $\frac{1}{\sqrt[3]{4.56}} =$ _____

Exercise 2.1.6 Evaluate each of the following, correct to 3 significant figures using the grouping symbols keys $($ and $)$ where necessary.

1. $\frac{2.35+3.14}{1.4} =$ _____

2. $\frac{12.3 \times 34.6}{2.4 + 12.8} =$ _____

3. $\frac{6.8^2 + \pi}{\sqrt{32.4} \times 2.35^3} =$ _____

2.1.3 Rates**Exercise 2.1.7**

1. Covert each of the following:

(a) $8 \text{ mm/min} = \text{_____} \text{ mm/h}$

(b) $65 \text{ km/h} = \text{_____} \text{ km/day}$

(c) $40 \text{ m/min} = \text{_____} \text{ km/h}$

(d) $280 \text{ mL/h} = \text{_____} \text{ L/day}$

(e) $5 \text{ m/s} = \text{_____} \text{ km/h}$

2. A car uses 18 L of petrol to travel 150 km. How much petrol would be needed to travel 480 km?

3. A farmer spreads 15 kg of fertiliser over an 2000 m^2 . How much fertiliser would be needed to cover an area of 1.8 ha?

Exercise 2.1.8 The petrol consumption (C) of a car is measured in litres (L) used per 100 km (K) travelled.

1. Write down a formula connection C, L and K. _____

2. Calculate the petrol consumption of a car that travels 905 km in 2 weeks and used 85 L of petrol, correct to 1 decimal place.

3. Michael is planning a tour of the Australian outback and expects to travel 12,000 km. His vehicle's petrol consumption is expected to average 12L /100 km. If the average price of petrol in the outback is \$1.29 per litre, find the expected cost of petrol for his trip.

2.1.4 Solving Problem with rates**Exercise 2.1.9**

1. A motorist covered $\frac{3}{5}$ of a journey in 5 hours at an average speed of 90 km/h. He completed the whole journey at an average speed of 75 km/h.

(a) Find the total distance of the whole journey.

(b) What was the average speed of the last $\frac{2}{5}$ of the journey?

2. Kevin normally works four-hour shifts. He is paid \$18.50 per hour normal time and \$22.50 per hour for any time he works over four hours. He works a shift from 9:15 am to 3:15 pm. What is his total pay?

3. Keith took 14 hours to travel from Town A to Town B. His average speed for the last $\frac{2}{7}$ of his journey was $\frac{3}{4}$ of the average speed for the whole journey. The average for the whole journey was 80 km/h.

(a) What is the distance between Town A and Town B?

(b) How long did he take to complete the last $\frac{2}{7}$ of his journey?

2.2 Algebra

2.2.1 Describing simple patterns

To find the rule that links the variables x and y in a linear relationship:

- write the standard rule in the form $y = \Delta x + \square$
- find the Δ , the finite difference between the bottom number in the table

x	1	2	3	4
y	13	16	19	22

$\underbrace{\hspace{1.5cm}}_{+3}$
 $\underbrace{\hspace{1.5cm}}_{+3}$
 $\underbrace{\hspace{1.5cm}}_{+3}$

- find \square by substituting into the rule a pair of values from the table

Example 2.2.1 Find the rule that describes the relationship between x and y in this table of values.

x	0	1	2	3
y	7	12	17	22

$\underbrace{\hspace{1.5cm}}_{+5}$
 $\underbrace{\hspace{1.5cm}}_{+5}$
 $\underbrace{\hspace{1.5cm}}_{+5}$

Solution: Let the rule be $y = \Delta x + \square$, where Δ is the difference between each pair of consecutive y -value.

Now, the y -values are increasing by 5, $\therefore \Delta = 5$

If $y = (5 \times 1) + \square$ where $y = 12$, $\therefore \square = 7$

\therefore The rule is $y = 5x + 7$.

Exercise 2.2.1

1. Complete each table using the given rules.

$y = x + 3$

a

x	1	2	3	4
y				

$y = 2x + 5$

b

x	0	1	2	3
y				

2. For each table of values in the question above, compare the difference between the y -values and the co-efficient of x in the rule. What do you notice?

Exercise 2.2.2

1. Use the method of finite differences to find the rule for each of values.

(a) rule: _____

x	4	5	6	7
y	11	13	15	17

(b) rule: _____

s	5	6	7	8
t	17	22	27	32

2. For the figure given below:



(a) Complete the following table of values:

Number of pentagons (p)	1	2	3
Number of triangles (t)			

(b) Write down an algebraic rule that links the number of triangles (t) to the number of pentagons (p).

(c) How many triangles would there be in a figure with 9 pentagons?

2.2.2 Substitution**Exercise 2.2.3 Evaluate each of the following given that $a = -3$, $b = 5$ and $c = -8$.**

1. $(a + b)(b - c)$

2. $\frac{a}{b \times c}$

3. $\frac{c-3a}{c+4}$

2.2.3 Adding and subtracting algebraic expressions**Exercise 2.2.4 Simplify these expressions by collecting the like terms.**

1. $z^2 - 2z + 5z^2 - 6z$

2. $4mn + 5m - 3mn - 9n$

3. $8a - 4b^2 - b^2 - 4a - 8$

Exercise 2.2.5 Further applications

1. Subtract $3x^2 - 4x + 10$ from $9x^2 - 2x + 4$

2. By how much does $4y^2 + 2y + 6$ exceed $y^2 - 2y + 12$

3. Take the sum of $x^2 - x + 2$ and $2x^2 + 12x + 8$ from $6x^2 - 8x + 18$

2.2.4 Multiplying and dividing algebraic expressions**Exercise 2.2.6 Simplify these products:**

1. $mn \times mp \times np =$ _____

2. $12x \times 6xy \times \frac{1}{4}z =$ _____

3. $\frac{1}{3}p \times 24pq \times 2q =$ _____

Exercise 2.2.7 Simplify these quotients:

1. $24m^2 \div 3m =$ _____

2. $72x^2 \div 8x \div 3x =$ _____

3. $15xy^2 \div 5y =$ _____

Exercise 2.2.8 Further applications

1. $9pq \times 7q \div 3p =$ _____

2. $15x^2 \times (-3y) \div 9x =$ _____

3. $-96a^2b \div 8ab \times 2c =$ _____

4. $81p^2 \div 9p \div 3p =$ _____

5. $-12ab \div 4a \times (-2b) =$ _____

6. $18xy \div 27y^2 =$ _____

7. $36abc \div 4abcd =$ _____

8. $35xy^2 \div 50xyz =$ _____

2.2.5 The order of operations**Exercise 2.2.9 Simplify each expression using the order of operations:**

1. $24x \div 8 + 4x \times 3 =$ _____

2. $8a \times 4b + 2a^2b \div a =$ _____

3. $[8x + (5 \times 12x)] + 6x =$ _____

4. $32a - [12a + (45a^2 \div 9a)] =$ _____

5. $\frac{19w+9w}{13w-6w} =$ _____