

- 1 A night bus runs from 21 50 to 05 18 the next day.

Work out the number of hours and minutes that the night bus runs.

..... h min [1]

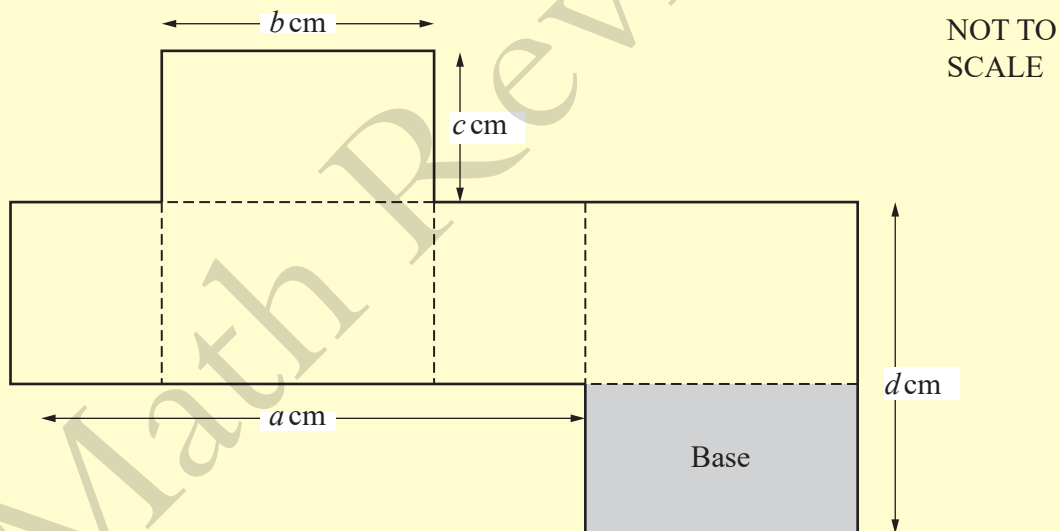
- 2 Calculate $\sqrt{5.76} + 2.8^3$.

..... [1]

- 3 Simplify $4m + 7k - m + 3k$.

..... [2]

4



The diagram shows the net of a cuboid with its base shaded.
The length of the cuboid is 10 cm, its width is 4 cm and its height is 5 cm.

Write down the values of each of a , b , c and d .

$a =$, $b =$, $c =$, $d =$ [4]

- 8 (a) The n th term of a sequence is $n^2 - 3$.

Find the first three terms of this sequence.

.....,, [2]

- (b) These are the first five terms of a different sequence.

1 3 9 27 81

Find the n th term of this sequence.

..... [2]

- 11 Without using a calculator, work out $1\frac{1}{4} - \frac{5}{6}$.

You must show all your working and give your answer as a fraction in its simplest form.

..... [3]

- 24 $x^2 - 16x + a$ can be written in the form $(x + b)^2$.

Find the value of a and the value of b .

$$a = \dots\dots\dots$$

$$b = \dots\dots\dots [2]$$

- 18 Find the highest common factor (HCF) of $28x^5$ and $98x^3$.

$$\dots\dots\dots [2]$$

- 14 A train, 1750 metres long, is travelling at 55 km/h.

Calculate how long it will take for the whole train to completely cross a bridge that is 480 metres long. Give your answer in seconds, correct to the nearest second.

$$\dots\dots\dots \text{ s } [3]$$

21 (a) $\sqrt[5]{3} = 3^h$

Write down the value of h .

$h = \dots\dots\dots$ [1]

(b) Simplify $(4x^3)^3$.

$\dots\dots\dots$ [2]

22 y is inversely proportional to the square of $(x + 3)$.
When $x = 5$, $y = 0.375$.

Find y in terms of x .

$y = \dots\dots\dots$ [2]

1 A grocer sells potatoes, mushrooms and carrots.

(a) A customer buys 3 kg of mushrooms at \$1.04 per kg and 4 kg of carrots at \$1.28 per kg.

Calculate the total cost.

\$ [2]

(b) In one week, the ratio of the masses of vegetables sold by the grocer is

potatoes : mushrooms : carrots = 11 : 8 : 6.

(i) Work out the mass of mushrooms sold as a percentage of the total mass.

..... % [2]

(ii) The total mass of potatoes, mushrooms and carrots sold is 1500 kg.

Find the mass of carrots the grocer sells this week.

..... kg [2]

(iii) The profit the grocer makes selling 1 kg of carrots is \$0.75 .

Find the total profit the grocer makes selling carrots this week.

\$ [1]

- (iv) On the last day of the week, the grocer reduces the price of 1 kg of potatoes by 8% to \$1.15 .

Calculate the original price of 1 kg of potatoes.

\$ [2]

- (c) The grocer buys 620 kg of onions, correct to the nearest 20 kg.
He packs them into bags each containing 5 kg of onions, correct to the nearest 1 kg.

Calculate the upper bound for the number of bags of onions that he packs.

..... [3]

5 (a) (i) Factorise.

$$x^2 - x - 12$$

..... [2]

(ii) Simplify.

$$\frac{x^2 - 16}{x^2 - x - 12}$$

..... [2]

(b) Simplify.

$$(2x - 3)^2 - (x + 1)^2$$

..... [3]

(c) Write as a single fraction in its simplest form.

$$\frac{2x + 4}{x + 1} - \frac{x}{x - 3}$$

..... [4]

(d) Expand and simplify.

$$(x-3)(x-5)(2x+1)$$

..... [3]

(e) Solve the simultaneous equations.
You must show all your working.

$$\begin{aligned} x - 3y &= 13 \\ 2x^2 - 9y &= 116 \end{aligned}$$

$$x = \dots\dots\dots y = \dots\dots\dots$$

$$x = \dots\dots\dots y = \dots\dots\dots [6]$$

- 9 (a) Janna and Kamal each invest \$8000.
At the end of 12 years, they each have \$12 800.

- (i) Janna invests in an account that pays simple interest at a rate of $r\%$ per year.

Calculate the value of r .

$$r = \dots\dots\dots [3]$$

- (ii) Kamal invests in an account that pays compound interest at a rate of $R\%$ per year.

Calculate the value of R .

$$R = \dots\dots\dots [3]$$

- (b) The population of a city is growing exponentially at a rate of 1.8% per year.
The population now is 260 000.

Find the number of complete years from now when the population will first be more than 300 000.

$$\dots\dots\dots \text{ years } [3]$$

- 3 The table shows some information about two sequences.

	n th term	5th term
Sequence A	$60 - 4n$	
Sequence B	$n^2 - 300$	

- (a) Complete the table.

[2]

- (b) Find the smallest **positive** number in sequence B .

..... [2]

- 4 Find the greatest **odd** number that is a factor of 140 and a factor of 210.

..... [2]

- 5 Calculate.

(a) $\sqrt[3]{343} - \sqrt{40.96}$

..... [1]

(b) $(192 + 4 \times 16)^{1.25}$

..... [1]

- 8 These are the first five terms of a sequence.

11 18 25 32 39

Find an expression for the n th term of the sequence.

..... [2]

- 9 The value of a car is \$8000.
Each year the value of the car decreases exponentially by 25%.

Calculate the value of this car after 3 years.

\$ [2]

- 10 Amir invests \$1500 in an account.
The account pays compound interest at a rate of r % per year.
At the end of 8 years the value of his investment is \$1656.73 .

Find the value of r .

$r =$ [3]

- 15 Write $0.1\dot{4}\dot{6}$ as a fraction in its simplest form.
You must show all your working.

..... [3]

- 12 Solve the simultaneous equations.
You must show all your working.

$$\begin{aligned}\frac{3x}{2} + 5y &= 5 \\ 4x - 3y &= 46\end{aligned}$$

$x =$

$y =$ [4]

19 Factorise completely.

(a) $12m^2 - 75t^2$

..... [3]

(b) $xy + 15 + 3y + 5x$

..... [2]

25 Simplify.

$$\frac{pt - p - t + 1}{1 - t^2}$$

..... [4]

- 1 The temperature at midnight is -4°C .
The temperature at noon is 25°C .

Work out the difference between these two temperatures.

..... $^{\circ}\text{C}$ [1]

- 2 A gardener charges \$6.55 for each hour he works plus a fixed charge of \$15.50 .

Calculate the total amount he charges when he works for 4 hours.

\$ [2]

- 8 Kai invests \$5000 in an account paying simple interest at a rate of $r\%$ per year.
At the end of 8 years, the value of his investment is \$5700.

Find the value of r .

$r =$ [3]

- 10 Write 174 000 in standard form.

..... [1]

- 4 Jonah has \$750.
He spends $\frac{1}{4}$ of this money on travel and some of this money on food.
He now has \$437.50 .

Work out the fraction of the \$750 he spends on food.

..... [3]

- 5 The table shows part of a tram timetable.

Newpoint	Westhill
10 30	11 17
12 18	
13 30	14 17

All the trams take the same number of minutes to complete the journey from Newpoint to Westhill.

Complete the table.

[2]

- 6 Write 0.04628 correct to 2 significant figures.

..... [1]

- 11 A company surveys 40 of its employees.
In the survey, 3 employees say they walk to work.
The company has a total of 1240 employees.

Find the expected number of employees in the company who walk to work.

..... [2]

- 19 (a) y is directly proportional to $(x-1)^2$.
When $x = 4$, $y = 3$.

Find y when $x = 7$.

$y =$ [3]

- (b) m is inversely proportional to the square root of p .

Explain what happens to the value of m when the value of p is multiplied by 9.

..... [1]

- 13 Without using a calculator, work out $2\frac{1}{4} \div 1\frac{7}{8}$.

You must show all your working and give your answer as a mixed number in its simplest form.

..... [3]

23 Simplify.

$$\frac{2}{y+1} - \frac{3}{y}$$

Give your answer as a single fraction in its simplest form.

21 Solve the simultaneous equations.
You must show all your working.

$$4y + 3x = 13$$

$$y = x^2 - 18$$

..... [3]

$$x = \dots\dots\dots y = \dots\dots\dots$$

$$\text{or } x = \dots\dots\dots y = \dots\dots\dots [5]$$

- 1 Write the number two million two thousand and two in figures.

..... [1]

- 2 Put one pair of brackets into this calculation to make it correct.

$$5 - 4 \times 3 - 9 - 2 = 0$$

[1]

- 3 Simplify.

$$7x - 8y - x - y$$

..... [2]

- 5 In a city, the probability that it will rain today is 0.15 .

Find the probability that it will not rain today in this city.

..... [1]

- 6 Factorise completely.

$$4x^2y - 5xy^2$$

..... [2]

- 7 The scale of a map is 1 : 40 000.
On the map the distance between two villages is 37 cm.

Calculate the actual distance between the two villages.
Give your answer in kilometres.

..... km [2]

- 8 **Without using a calculator**, work out $\frac{3}{7} - \frac{1}{14}$.

You must show all your working and give your answer as a fraction in its simplest form.

..... [2]

- 21 Write the recurring decimal $0.4\dot{1}$ as a fraction in its simplest form.
You must show all your working.

..... [2]

11 Solve the simultaneous equations.

$$5t - 2w = 19$$

$$3t + 2w = 5$$

$$t = \dots\dots\dots$$

$$w = \dots\dots\dots [2]$$

12 Simplify.

(a) $\frac{32g^{16}}{16g^8}$

$$\dots\dots\dots [2]$$

(b) $(625k^8)^{\frac{3}{4}}$

$$\dots\dots\dots [2]$$

16

$$A = \pi r^2 + \pi dh$$

Rearrange the formula to make h the subject.

$$h = \dots\dots\dots [2]$$

17 Work out, giving each answer in standard form.

(a) $(2.1 \times 10^{101}) \times (8 \times 10^{101})$

$$\dots\dots\dots [2]$$

(b) $(2.1 \times 10^{101}) + (2.1 \times 10^{100})$

$$\dots\dots\dots [2]$$

- 1 (a) The table shows the areas, in km^2 , of the four largest rainforests in the world.

Rainforest	Area (km^2)
Amazon	5 500 000
Congo	2 000 000
Atlantic	1 315 000
Valdivian	250 000

- (i) Find the area of the Valdivian rainforest as a percentage of the area of the Amazon rainforest.

..... % [1]

- (ii) Write, in its simplest form, the ratio of the areas of the rainforests Valdivian : Atlantic : Congo.

..... : : [2]

- (iii) The Amazon rainforest has 60% of its area in Brazil and 10% of its area in Colombia.
 $43\frac{1}{3}\%$ of the **remaining area** of the rainforest is in Peru.

Find the percentage of the Amazon rainforest that is in Brazil, Colombia and Peru.

..... % [3]

- (iv) The area of the Amazon rainforest represents $\frac{27}{50}$ of the total area of rainforest in the world.

Calculate the total area of rainforest in the world.

Give your answer correct to the nearest 100 000 km².

..... km² [3]

- (v) In the world, 60.7 hectares of rainforest are lost every minute.

Calculate the total area, in hectares, of rainforest that is lost in 365 days.

Give your answer in standard form.

..... hectares [3]

- (b) The Amazon river has a length of 6440 km, correct to the nearest 10 km.
The Congo river has a length of 4400 km, correct to the nearest 100 km.

Calculate the upper bound of the difference between the lengths of the Amazon river and the Congo river.

..... km [3]

3 (a) $C = \frac{1}{4}xy^2$

(i) Find C when $x = 5$ and $y = 8$.

$C = \dots\dots\dots$ [2]

(ii) Find the positive value of y when $C = 15$ and $x = 2.4$.

$y = \dots\dots\dots$ [2]

(b) Write as a single fraction in its simplest form.

$$\frac{4}{x-1} - \frac{3}{2x+5}$$

$\dots\dots\dots$ [3]

(c) Expand and simplify.

$$(2x+3)(4-x)^2$$

$\dots\dots\dots$ [3]

(d) Simplify.

$$\left(\frac{y^8}{16x^{16}}\right)^{-\frac{3}{4}}$$

..... [3]

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- 1 (a) A fruit drink is made using 1.5 litres of apple juice and 450 millilitres of mango juice.

Write the ratio apple juice : mango juice in its simplest form.

..... : [2]

- (b) One litre of fruit drink is shared between three cups.
The amount in the cups is in the ratio 9 : 6 : 10.

Calculate the number of millilitres in each cup.

..... ml , ml , ml [3]

- (c) A shop buys bottles of the fruit drink for \$3.20 each.
It sells them at a profit of 15%.

Calculate the selling price of each bottle of fruit drink.

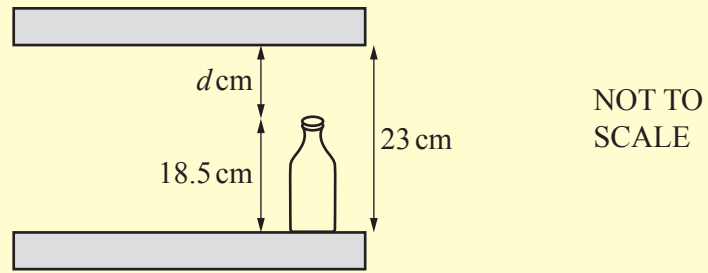
\$ [2]

- (d) The number of bottles of fruit drink sold has grown exponentially at a constant rate of 2.5% per year.
5 years ago, the shop sold 16 620 bottles.

Calculate the number of bottles sold this year.

..... [2]

(e)



The bottles of juice are 18.5 cm tall, correct to the nearest millimetre.

They are stored on shelves.

The distance between the shelves is 23 cm, correct to the nearest centimetre.

Calculate the lower bound for the distance, d cm, between the top of a bottle and the shelf above it.

..... cm [3]

5 (a) Simplify $(25x^6)^{\frac{3}{2}}$.

..... [2]

(b) These are the first five terms of a sequence.

$\frac{1}{6}$ 1 6 36 216

Find the n th term of the sequence.

..... [2]

(c) Expand and simplify.

$$(x+4)(x-3)(3x-1)$$

..... [3]

- (d) (i) Show that $(3x+5) + \frac{7}{x-2} = x$ simplifies to $2x^2 + x - 3 = 0$.

[4]

- (ii) Solve by factorisation $2x^2 + x - 3 = 0$.

$x = \dots\dots\dots$ or $x = \dots\dots\dots$ [3]

- (e) A solid cylinder has base radius x and height $3x$.
The **total** surface area of the cylinder is the same as the **total** surface area of a solid hemisphere of radius $5y$.

Show that $x^2 = \frac{75y^2}{8}$.

[The surface area, A , of a sphere with radius r is $A = 4\pi r^2$.]

[4]

7 (a) Solve $3x - 8 = 6 - 4x$.

$x =$ [2]

(b) Factorise fully $10a^2 + 5a$.

..... [2]

(c) Factorise fully $(2x - 3)^2 - 9$.

..... [2]

- 1 (a) In 2023 a football club had 50 adult members and 70 child members.
The membership fee for an adult was \$40 and the membership fee for a child was \$15.

(i) Calculate the total of the membership fees received by the club in 2023.

\$ [2]

(ii) The cost of running the club in 2023 was \$2780.

Calculate \$2780 as a percentage of the total of the membership fees received by the club.

..... % [1]

(iii) In 2023 there were 120 members.
This was a decrease by 4% of the number of members in 2022.

Calculate the number of members in 2022.

..... [2]

(iv) In 2024 the total number of members increased from the 120 members in 2023.
The number of adult members and the number of child members each increased by the same number.
The ratio number of adult members : number of child members changed to 14 : 19.

(a) Find the total number of members in 2024.

..... [2]

- (b) Calculate the percentage increase in the total number of members from 2023 to 2024.

..... % [2]

- (b) The population of a village is 2500.
The population is decreasing exponentially at a rate of 3% per year.

- (i) Calculate the population at the end of 3 years.

..... [2]

- (ii) Find the number of complete years it takes for the population to first fall below 2000.

..... years [2]

2 (a) The n th term of a sequence is $120 - n^3$.

(i) Find the 4th term of this sequence.

..... [1]

(ii) Find the value of n when the n th term is -1211 .

$n =$ [2]

(b) The n th term of a different sequence is $3 \times (0.2)^{n-1}$.

Find the 5th term of this sequence.

..... [1]

5 Convert 7.51 m^2 into cm^2 .

..... cm^2 [1]

- (c) The table shows the first four terms of sequences A , B and C .

Sequence	1st term	2nd term	3rd term	4th term	5th term		n th term
A	7	4	1	-2			
B	$\frac{1}{4}$	$\frac{2}{5}$	$\frac{3}{6}$	$\frac{4}{7}$			
C	0	2	6	12			

Complete the table for each sequence.

23 $(x-5)^2 + k = x^2 - px - 21$

Find the value of p and the value of k .

$p = \dots\dots\dots$

$k = \dots\dots\dots$ [2]

- 1 These are the first eight terms of a sequence.

c -3 -9 -15 -21 -27 -33 k

Find the value of c and the value of k .

$c = \dots\dots\dots$

$k = \dots\dots\dots$ [2]

- 7 (a) (i) A car travels 50 km at an average speed of 75 km/h.

Find the time taken.

Give your answer in minutes.

..... min [2]

- (ii) Another car travels 47 km, correct to the nearest kilometre.
The average speed of this car is 75 km/h, correct to the nearest 5 km/h.

Calculate the lower bound of the time taken.

Give your answer in minutes.

..... min [3]

- (b) A train travels a total of 240 km.
 The train travels for t **minutes** at an average speed of 100 km/h.
 It then travels for $(t + 60)$ **minutes** at an average speed of 110 km/h.

Find the average speed for the whole journey.

- 7 Factorise.
 $28x - 35$

..... [1]

- 8 Edith invests \$3000 in a savings account.
 The account pays simple interest at a rate of 2.6% per year.

Calculate the total interest earned at the end of 3 years.

\$ [2]

..... km/h [6]

- 1 A concert starts at 19 50 and finishes 2 hours 42 minutes later.

Work out the time the concert finishes.

..... [1]

- 2 Find the reciprocal of $1\frac{1}{4}$.

..... [1]

- 3 Use one of the symbols $<$, $>$ or $=$ to make each statement true.

$$\begin{array}{l} \frac{2}{7} \dots\dots\dots 0.2861 \\ \frac{99}{900} \dots\dots\dots 11\% \\ 1^3 \dots\dots\dots 4^0 \end{array}$$

[2]

- 4 Safia has a piece of fabric of length 5.6 m.
She cuts the fabric into two parts, with lengths in the ratio 3 : 4.

Calculate the length of the longer part.

..... m [2]

17 Solve.

$$3x^2 - 7x - 16 = 0$$

You must show all your working and give your answers correct to 2 decimal places.

$$x = \dots\dots\dots \text{ or } x = \dots\dots\dots [4]$$

11 **Without using a calculator**, work out $5\frac{1}{3} - 3\frac{4}{7}$.

You must show all your working and give your answer as a mixed number in its simplest form.

$$\dots\dots\dots [3]$$

- 12 Solve the simultaneous equations.
You must show all your working.

$$\begin{aligned} 5x + 6y &= 9 \\ 3x - 2y &= -17 \end{aligned}$$

$$\begin{aligned} x &= \dots\dots\dots \\ y &= \dots\dots\dots \end{aligned} \quad [3]$$

- 13 (a) A sequence has n th term $3n^2 - 1$.

Find the second term in this sequence.

..... [1]

- (b) The table shows the first five terms of sequences A and B .

	1st term	2nd term	3rd term	4th term	5th term	n th term
Sequence A	-6	-2	2	6	10	
Sequence B	3	17	55	129	251	

Complete the table to show the n th term of each sequence.

[4]

- 7 Without using a calculator, work out $\frac{2}{7} \div \frac{6}{11}$.

You must show all your working and give your answer as a fraction in its simplest form.

..... [2]

- 15 At the start of an experiment there are 40 000 bacteria.
The number of bacteria increases at a rate of 15% per hour.

Calculate the number of bacteria after 3 hours.

..... [2]

- 10 Calculate $\sqrt[3]{1 + 10.9 \times 0.4^2}$.

..... [1]

11 Factorise fully.

(a) $24x^2 - 9xy$

..... [2]

(b) $63x^2 - 28y^2$

..... [3]

12 y is directly proportional to the square root of $x + 1$.
 $y = 10.5$ when $x = 8$.

Find y when $x = 1.56$.

$y =$ [3]

- 20 Find an expression for the n th term of this sequence.

$$\frac{1}{7}, \quad 1, \quad 7, \quad 49, \quad 343, \quad 2401, \quad \dots$$

..... [2]

- 21 Expand and simplify.

$$(x+3)(x+5)(2x+1)$$

..... [3]

1

61	62	63	64	65	66	67	68	69
----	----	----	----	----	----	----	----	----

From the list of numbers, write down

(a) a cube number

..... [1]

(b) a prime number.

..... [1]

2 A train journey starts at 23 30 and finishes at 07 15 the next day.

Find the time taken for this journey.

..... h min [1]

3 Simplify.

$$3p - t - p - 4t$$

..... [2]

19 y is inversely proportional to $\sqrt{x+2}$.

When $x = 2$, $y = 3$.

Find y in terms of x .

$y =$ [2]

7 Solve the equation.

$$7 - h = 3 - 5h$$

$h =$ [2]

- 8 Sacha buys b books and m magazines.
The cost of each book is \$12 and the cost of each magazine is \$5.

Write an expression, in terms of b and m , for the total cost of the books and the magazines.

\$ [2]

- 17 Simplify.

(a) $18x^{18} \div 3x^3$

..... [2]

(b) $(125y^{75})^{\frac{2}{3}}$

..... [2]

- 10 Without using a calculator, work out $2\frac{1}{4} - 1\frac{11}{12}$.

You must show all your working and give your answer as a fraction in its simplest form.

..... [3]

11 Solve the simultaneous equations.

$$3p - 2q = 7$$

$$p + 2q = 1$$

$$p = \dots\dots\dots$$

$$q = \dots\dots\dots [2]$$

12 $V = \sqrt[3]{\frac{x}{y}}$

Rearrange the formula to write x in terms of V and y .

$$x = \dots\dots\dots [2]$$

13 Find the n th term of each sequence.

(a) 21, 13, 5, -3, -11, ...

$$\dots\dots\dots [2]$$

(b) 2.5, 5, 10, 20, 40, ...

$$\dots\dots\dots [2]$$

- 23 Write $x^2 + 8x - 7$ in the form $(x + a)^2 + b$.

..... [2]

- 24 A rectangle has an area of 150 m^2 , correct to the nearest square metre.
The length of the rectangle is 22 m , correct to the nearest metre.

Calculate the upper bound of the width of the rectangle.

..... m [3]

- 25 Simplify.

$$\frac{3x - 2 - 3xy + 2y}{1 - y^2}$$

..... [4]

- 1 (a) (i) Write 70 as a product of its prime factors.

..... [2]

- (ii) Find the highest common factor (HCF) of 70 and 112.

..... [2]

- (iii) Find the lowest common multiple (LCM) of $70x^4y^2$ and $112x^3y^5$.

..... [2]

- (b) Simplify.

(i) $a^{12} \div a^4$

..... [1]

(ii) $\frac{5}{2b} \times \frac{bc}{20}$

..... [2]

- (c) Solve.

$4 + 2x = 15$

$x =$ [2]

(d) Solve. $\frac{34+2x}{5} = 4-x$

$x = \dots\dots\dots$ [3]

(e) $P = d + \sqrt[3]{m^2}$

(i) Find P when $d = 7$ and $m = -8$.

$P = \dots\dots\dots$ [2]

(ii) Rearrange the formula to make m the subject.

$m = \dots\dots\dots$ [3]

- 4 (a) Enzo, Rashid and Blessy each swim as many lengths of a swimming pool as they can in 15 minutes. The results are shown in the table.

Name	Number of lengths
Enzo	11.25
Rashid	18.75
Blessy	20

- (i) Find the number of lengths Enzo swims **as a percentage** of the total number of lengths all three people swim.

..... % [2]

- (ii) Write the ratio of the number of lengths each person swims in the form

Enzo : Rashid : Blessy.

Give your answer in its simplest form.

..... : : [2]

(iii) Each length of the pool is 25 m.

- (a) Work out Blessy's average swimming speed for the 15 minutes.
Give your answer in metres per second.

..... m/s [3]

- (b) Rashid continues to swim at the same rate.

Calculate the time it takes Rashid to swim a total distance of 5 km.
Give your answer in hours and minutes.

..... h min [4]

- (iv) Blessy swims for one hour.
The number of lengths she swims decreases by 5% every 15 minutes.

Calculate the number of lengths she swims in the final 15 minutes.

..... [3]

- (b) Another swimmer, Adam, swims 450 m, correct to the nearest 25 metres.
This takes 10 minutes, correct to the nearest minute.

Calculate the minimum distance Adam swims in one hour at this rate.

..... m [3]

1 (a) Anvi buys a new car.

- (i) The price of the car is \$28 240.
She is given a 7.5% discount.

Calculate the amount she pays.

\$ [2]

- (ii) The fuel tank in the new car has a capacity of 45 litres.
This is 72% of the capacity of the fuel tank in her old car.

Calculate the capacity of the fuel tank in her old car.

..... litres [2]

- (b) Aadi buys a new car costing \$28 000.
He pays for the car using a finance plan.
The finance plan is

- a deposit
- 47 equal monthly payments of \$330
- a final payment of \$11 490.

Using this finance plan, Aadi pays a total of \$31 900 for the car.

Calculate the deposit paid as a percentage of \$28 000.

..... % [4]

- (c) A car travels 64 km and uses 2.5 litres of fuel.
It then travels 128 km and uses 6 litres of fuel.

Calculate the rate at which the car uses fuel during the whole journey.
Give your answer in litres per 100 km.

..... litres per 100 km [2]

- (d) At the start of 2021 the value of a car was \$46 500.
At the end of 2021 the value of the car was 20% less.
At the end of 2022 the value of the car was 15% less than its value at the end of 2021.

Calculate the value of the car at the end of 2022.

\$ [2]

3 (a) Simplify.

(i) $3m - 5n - 4m + 8n$

..... [2]

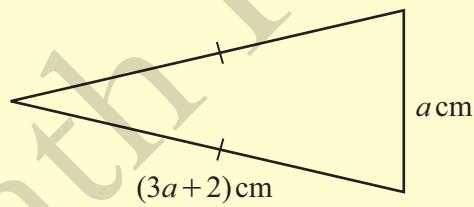
(ii) $(3a^2c^3)^4$

..... [2]

(iii) $\frac{4x}{5} - \frac{3x}{10} + \frac{2x}{15}$

..... [2]

(b) This isosceles triangle has a perimeter of 35.5 cm.



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Find the value of a .

$a =$ [3]

- (c) Using the quadratic formula, solve $5x^2 - 4x - 3 = 0$.
You must show all your working.

$x = \dots\dots\dots$ or $x = \dots\dots\dots$ [3]

- (d) Solve these simultaneous equations.

$$\begin{aligned}y &= x^2 - 4x + 5 \\y &= 2x - 3\end{aligned}$$

You must show all your working.

$x = \dots\dots\dots$ $y = \dots\dots\dots$

$x = \dots\dots\dots$ $y = \dots\dots\dots$ [5]

1 Dinari sells fruit and vegetables.

- (a) One day the mass of fruit and vegetables he sells is in the ratio fruit : vegetables = 9 : 8.
He sells 48 kg of vegetables.

Find the mass of the fruit he sells.

..... kg [2]

- (b) On another day he receives \$280 for the fruit and vegetables he sells.
The \$280 is in the ratio fruit : vegetables = $(c + 3) : (c - 1)$.

Find the amount he receives from selling the fruit.

\$ [3]

- (c) In one week Dinari buys fruit and vegetables for \$1620.
He sells the fruit and vegetables for \$1750.

Calculate his percentage profit.

..... % [2]

- (d) In another week Dinari sells fruit and vegetables for \$1738.
He makes a profit of 10%.

Calculate the amount he paid for the fruit and vegetables in that week.

\$ [2]

- 3 (a) Ed invests \$500 in an account paying $r\%$ per year simple interest.
At the end of 14 years the total amount in Ed's account is \$675.

Find the value of r .

$r = \dots\dots\dots$ [3]

- (b) Eva invests \$400 at a rate of 2.2% per year compound interest.

Calculate the total interest earned at the end of 11 years.

\$ $\dots\dots\dots$ [3]

- (c) Erin invests \$700 at a rate of $p\%$ per **month** compound interest.
At the end of 21 years the value of Erin's investment is \$1074, correct to the nearest dollar.

Calculate the value of p .

$p = \dots\dots\dots$ [3]

- 5 (a) Naomi runs 100 m in 15 seconds.

Calculate Naomi's average speed in kilometres per hour.

..... km/h [2]

- (b) Olav runs for 45 minutes at a speed of 9.5 km/h.
He then runs 8.1 km at a speed of 7.5 km/h.

Calculate Olav's average speed for the whole run.

..... km/h [3]

- (c) A train has length p metres.
The train passes through a station of length q metres.
The speed of the train is v kilometres per hour.

Find an expression for the time the train takes to completely pass through the station.
Give your answer in seconds, in terms of p , q and v .

..... s [3]

6 (a) Simplify $\frac{24u}{5y} \times \frac{10}{3u}$.

..... [2]

(b) Expand and simplify $(x-1)(x+2)(x+3)$.

..... [3]

(c) Solve the equation $2x^2 + x - 5 = 0$.
You must show all your working and give your answers correct to 2 decimal places.

$x =$ or $x =$ [4]