

Victorian Certificate of Education
Year

SUPERVISOR TO ATTACH PROCESSING LABEL HERE

STUDENT NUMBER

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Letter

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FOUNDATION MATHEMATICS

Written examination

Day Date

Reading time: *.*.* to *.*.* (15 minutes)

Writing time: *.*.* to *.*.* (2 hours)

QUESTION AND ANSWER BOOK

Structure of book

<i>Section</i>	<i>Number of questions</i>	<i>Number of questions to be answered</i>	<i>Number of marks</i>
A	20	20	20
B	12	12	60
			Total 80

- Students are permitted to bring into the examination room: pens, pencils, highlighters, erasers, sharpeners, rulers, one bound reference and one scientific calculator. Calculator memory DOES NOT need to be cleared.
- Students are NOT permitted to bring into the examination room: blank sheets of paper and/or correction fluid/tape.

Materials supplied

- Question and answer book of 35 pages
- Formula sheet
- Answer sheet for multiple-choice questions.

Instructions

- Write your **student number** in the space provided above on this page.
- Check that your **name** and **student number** as printed on your answer sheet for multiple-choice questions are correct, **and** sign your name in the space to verify this.
- Unless otherwise indicated, the diagrams in this book are **not** drawn to scale.
- All written responses must be in English.

At the end of the examination

- You may keep the formula sheet.

Students are NOT permitted to bring mobile phones and/or any other unauthorised electronic devices into the examination room.

SECTION A – Multiple-choice questions**Instructions for Section A**

Answer **all** questions in pencil on the answer sheet provided for multiple-choice questions.

Choose the response that is **correct** for the question.

A correct answer scores 1; an incorrect answer scores 0.

Marks will **not** be deducted for incorrect answers.

No marks will be given if more than one answer is completed for any question.

Unless otherwise indicated, the diagrams in this book are **not** drawn to scale.

Question 1

Unleaded petrol costs 198.2 cents per litre. A customer fills the petrol tank of their car with 62 litres of petrol. They use a voucher that offers a discount of 4 cents per litre.

The cost of filling the petrol tank is closest to

- A. \$120.40
- B. \$120.41
- C. \$122.88
- D. \$118.96
- E. \$152.00

Question 2

A hairdresser is mixing colours. Hair dye requires both colour and developer in a mixed ratio of 2:3

If 50 mL of colour is used, how much developer is needed?

- A. 50 mL
- B. 100 mL
- C. 60 mL
- D. 75 mL
- E. 30 mL

Question 3

Body surface area (*BSA*) measures the surface area, in square metres, of the skin of the human body. It has many important uses, such as determining the dosage of medications.

A formula for calculating *BSA* is

$$BSA = \frac{\sqrt{W \times H}}{60}, \text{ where } W \text{ is weight in kilograms and } H \text{ is height in centimetres}$$

A person has a *BSA* of 1.83 m² and weighs 68 kg.

The height of this person is closest to

- A. 0.19 m
- B. 0.97 m
- C. 1.35 m
- D. 1.69 m
- E. 1.77 m

Question 4

The price of a train ticket is \$6.

If the price is increased by 30%, the new price will be

- A. \$6.30
- B. \$1.80
- C. \$4.20
- D. \$7.80
- E. \$6.67

Question 5

Consider the four statements below.

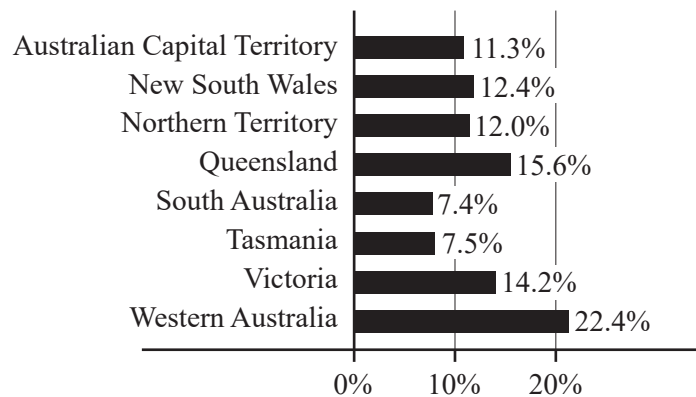
- I Tomato sauce is selling in 180 mL jars for \$1.96 and in 450 mL jars for \$2.76
- II Sugar is selling in a 1 kg bag for \$5.98 and in a 1.25 kg bag for \$7.48
- III Mouthwash is selling in 500 mL bottles for \$6 and in 600 mL bottles for \$7
- IV Juice is selling in 250 mL bottles for \$3.25 and 600 mL bottles for \$7.80

Which of the four statements above show items of the same proportion?

- A. all of the above
- B. II and IV
- C. II and III
- D. II only
- E. IV only

Question 6

The bar graph below shows the gender pay gap by state or territory in Australia in 2022.



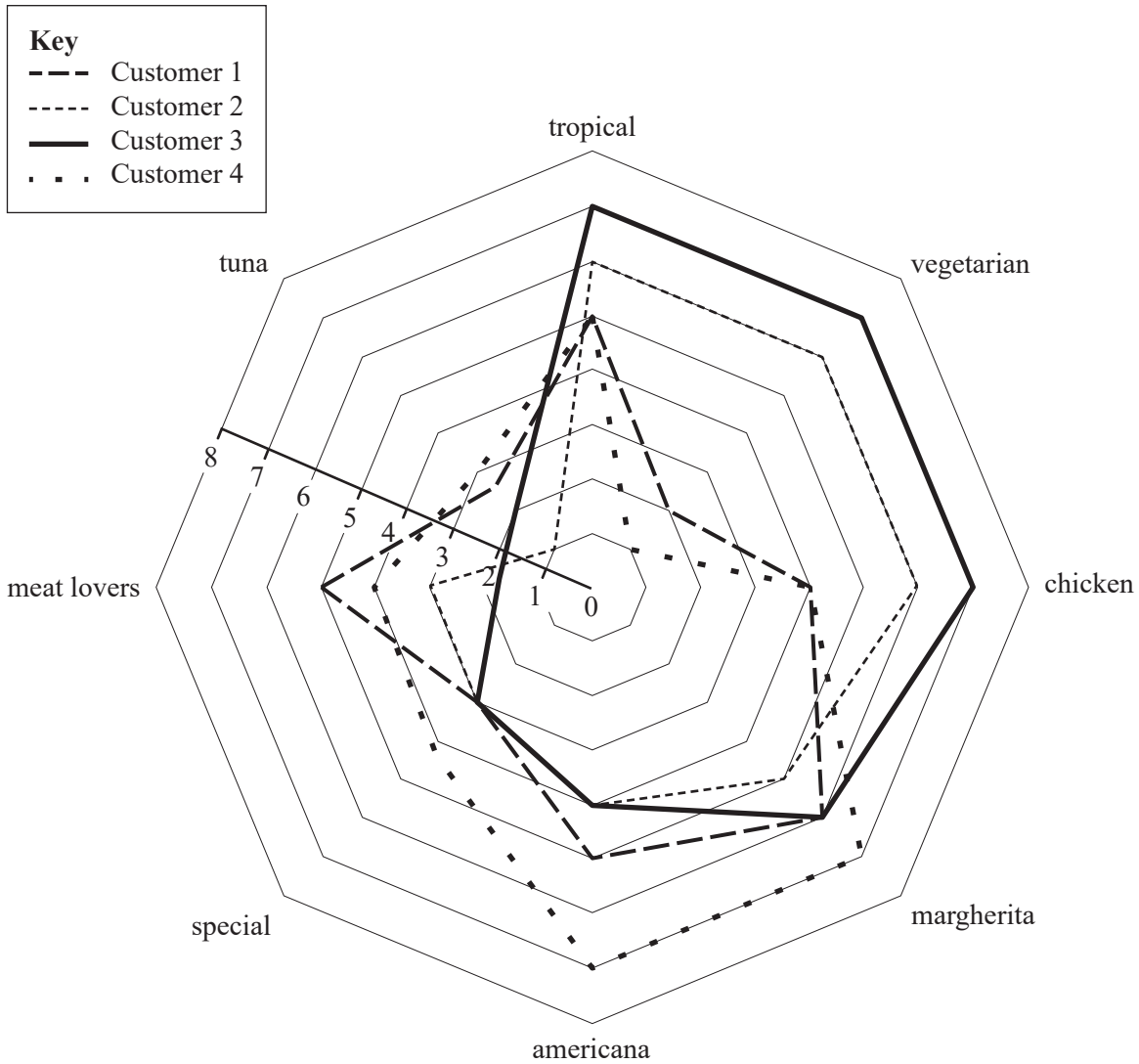
Data: Workplace Gender Equality Agency, 'Australia's Gender Pay Gap Statistics, August 2022', Australian Government, 2022, p. 4

Using the information in the graph, determine which state has the largest gender pay gap.

- A. New South Wales
- B. South Australia
- C. Tasmania
- D. Victoria
- E. Western Australia

Question 7

The graph below shows the number and type of pizzas ordered by four customers at a pizza shop over several months.



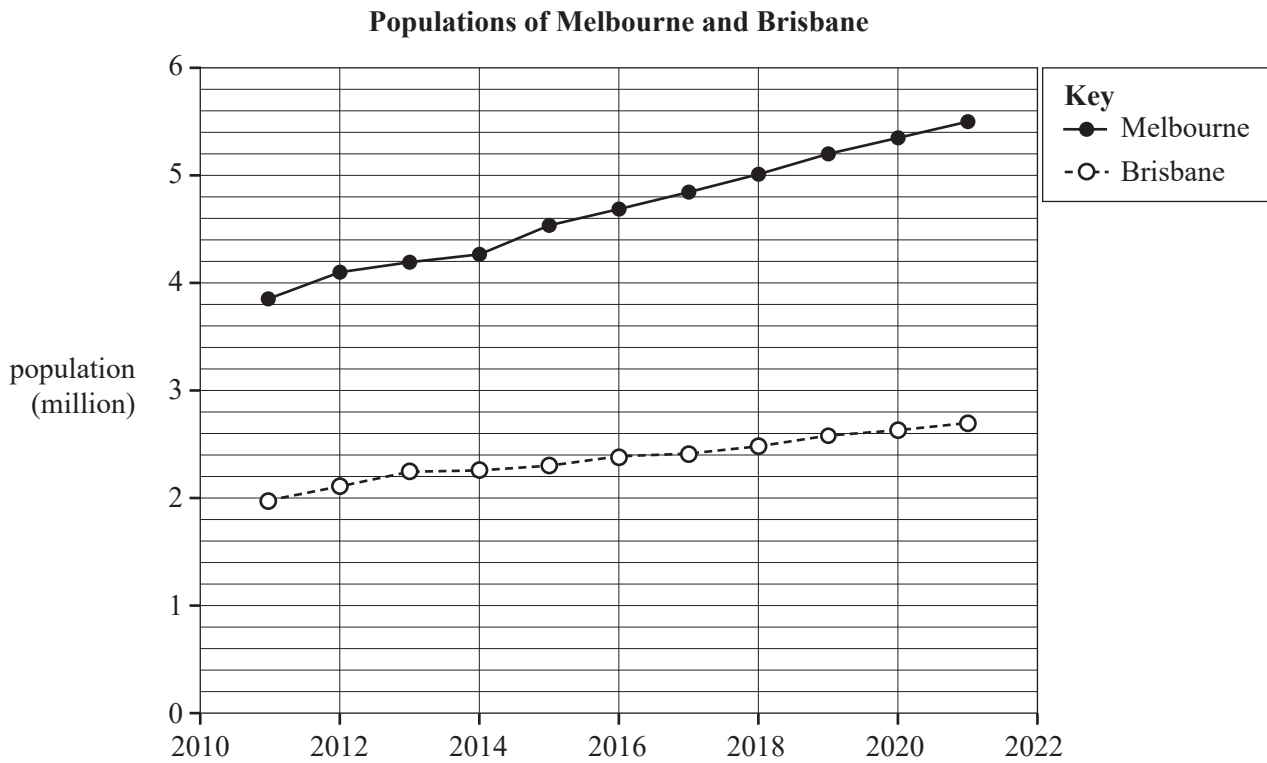
Of the four customers, Customer 3 ordered

- A. the most tropical and margherita and the fewest vegetarian pizzas.
- B. the fewest tropical and the most vegetarian and chicken pizzas.
- C. the fewest vegetarian, chicken and margherita pizzas.
- D. the most vegetarian, chicken and margherita pizzas.
- E. the most tropical, vegetarian and chicken pizzas.

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Question 8

The following graph shows the approximate metropolitan population of Melbourne and Brisbane from 2011 to 2021.

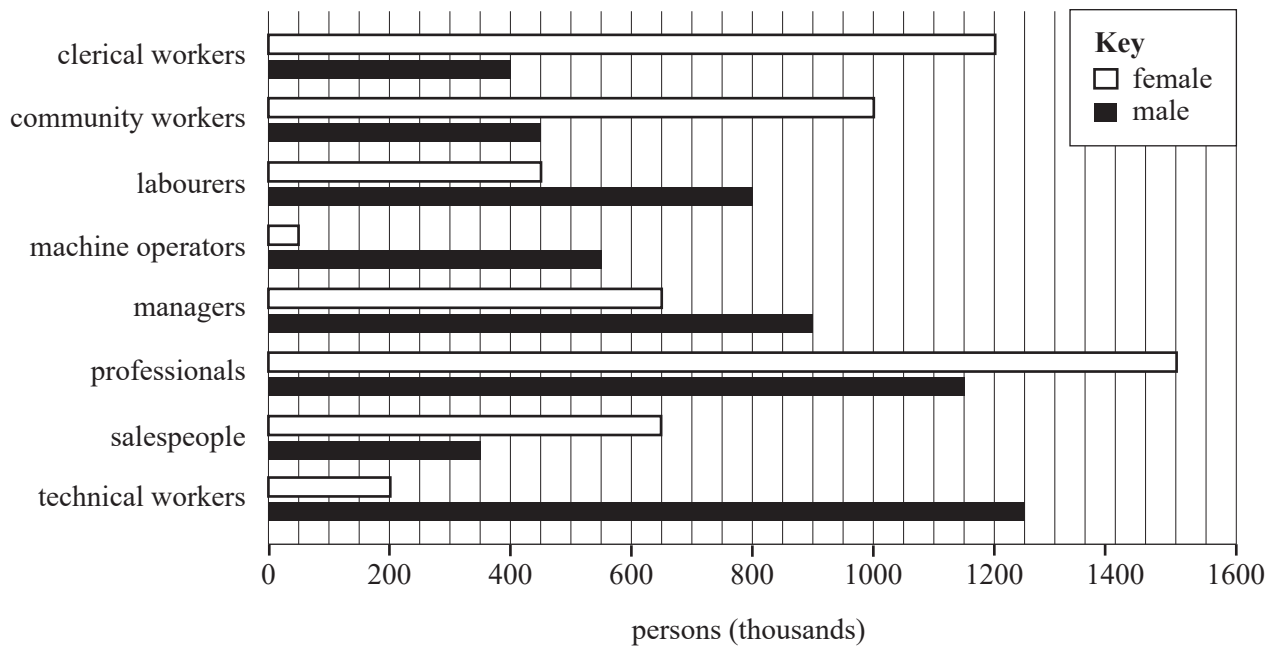


The change in the difference between the populations of Melbourne and Brisbane from 2011 to 2021 is closest to

- A. 0.9 million.
- B. 1.9 million.
- C. 2.8 million.
- D. 3.8 million.
- E. 5.5 million.

Question 9

The graph below shows the number of people employed per selected main occupation, by gender, during 2019–2020.



Data: adapted from Australian Bureau of Statistics (ABS), 'Jobs in Australia', 8 November 2022, <www.abs.gov.au/statistics/labour/jobs/jobs-australia/latest-release>

The main occupation that employed approximately twice as many people as 'machine operators' is

- A. community workers.
- B. labourers.
- C. technical workers.
- D. salespeople.
- E. professionals.

Question 10

The table below shows summary statistics, from the Australian Bureau of Statistics (ABS) 2021 Census, of average weekly income, in dollars, by gender, for workers in Australia.

Statistical measure	Female	Male
mean	1609.00	1872.90
standard deviation	114.15	177.88
minimum	1490.70	1612.30
first quartile (Q_1)	1540.05	1775.03
median	1590.85	1834.40
third quartile (Q_3)	1636.43	1938.80
maximum	1862.10	2103.00

Data: Australian Bureau of Statistics (ABS), 'Average Weekly Earnings, Australia', 18 August 2022, <www.abs.gov.au/statistics/labour/earnings-and-working-conditions/average-weekly-earnings-australia/latest-release>

The information in the table above suggests that the average weekly income of females is

- A. more variable and on average lower than that of males.
- B. less variable and on average higher than that of males.
- C. less variable and on average lower than that of males.
- D. more variable and on average higher than that of males.
- E. very similar to that of males.

Question 11

If a full-time employee in Australia accrues annual leave at a rate of 2.923 hours per full-time week of work, the amount of annual leave accrued by an employee who works half-time for a period of seven weeks is closest to

- A. 3.50 hours.
- B. 10.23 hours.
- C. 20.30 hours.
- D. 20.46 hours.
- E. 20.51 hours.

Question 12

The invoice below shows the cost of purchasing and installing three window frames.

Tax invoice	
Pretty Window Frames 1 Great View St, Melbourne ABN: 123 456 789 10	
1 September 2023	
To: Happy Client 1 New Street Hothamsville VIC	
Description	Total
3 window frames	
Installation fee	250.00
Materials	120.00
Total price including GST (10%)	895.40

Excluding the cost of the 10% goods and service tax (GST), the cost of one window frame is

- A. \$148.00
- B. \$175.13
- C. \$268.62
- D. \$444.00
- E. \$524.40

Question 13

In Australia, all employers must pay 10.5% of an employee's ordinary time earnings into their chosen superannuation fund. An employer has only paid 10% of an employee's ordinary time earnings into their chosen superannuation fund for the last six months. The employee's ordinary time earnings for this time period were \$34 000.

The extra amount that the employer must contribute to the employee's chosen superannuation fund for this time period is

- A. \$3570
- B. \$3400
- C. \$1700
- D. \$340
- E. \$170

Question 14

Real income growth is how much money is made after adjustments for inflation.

If income growth is at 2% and inflation is at 7%, then

- A. real income growth will decrease and purchasing power will increase.
- B. real income growth will increase and purchasing power will increase.
- C. real income and purchasing power will not change.
- D. real income growth will decrease and purchasing power will decrease.
- E. real income growth will increase and purchasing power will decrease.

Question 15

For the 2021–22 financial year, an Australian resident received an income of \$21 000 in Canadian dollars (CAD) from an overseas property in Canada. Their Australian salary for the 2021–22 financial year was \$92 000 in Australian dollars (AUD). The currency conversion from Australian to Canadian dollars for the 2021–22 financial year was

$$1 \text{ AUD} = 0.8885 \text{ CAD}$$

The income table for Australian residents for the financial year 2021–22 is shown in the table below.

Taxable income	Tax on this income
0 – \$18 200	Nil
\$18 201 – \$45 000	19 cents for each \$1 over \$18 200
\$45 001 – \$120 000	\$5092 plus 32.5 cents for each \$1 over \$45 000
\$120 001 – \$180 000	\$29 467 plus 37 cents for each \$1 over \$120 000
\$180 001 and over	\$51 667 plus 45 cents for each \$1 over \$180 000

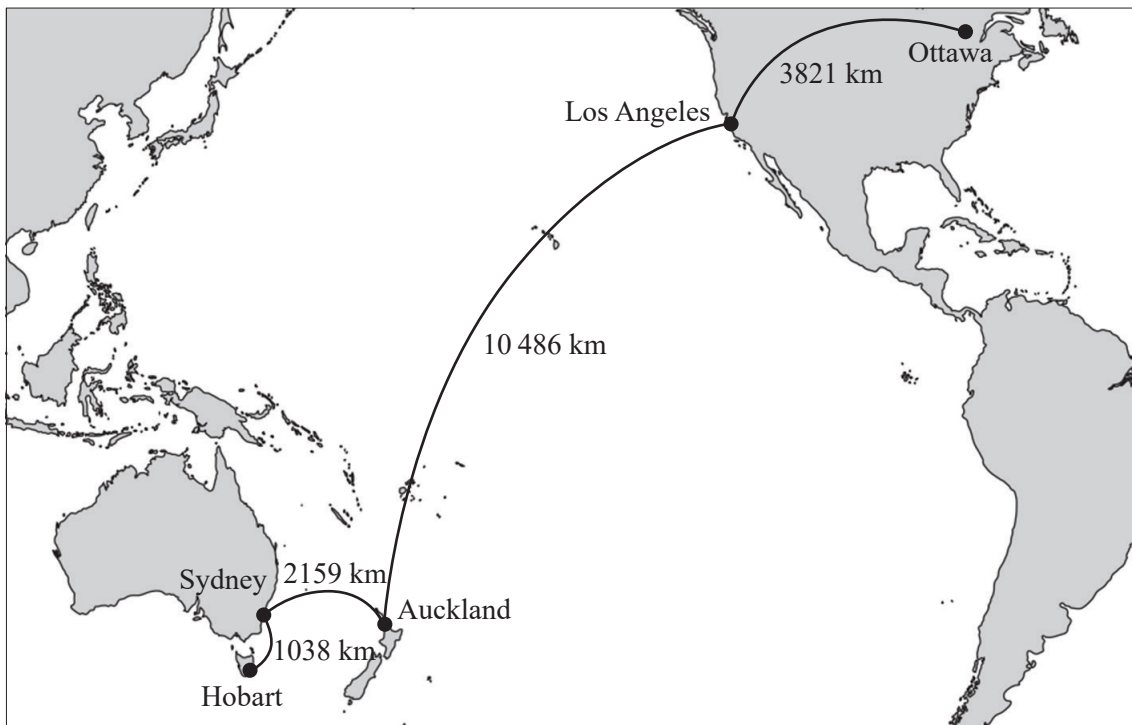
Source: Australian Tax Office (ATO), <www.ato.gov.au/rates/individual-income-tax-rates/>

Assuming there are no deductions, the income tax this resident will pay, in Australian dollars, for the 2021–22 financial year is closest to

- A. \$20 367.00
- B. \$23 152.25
- C. \$26 441.25
- D. \$27 192.00
- E. \$28 048.49

Question 16

The map below shows flight distances from Australia to North America.

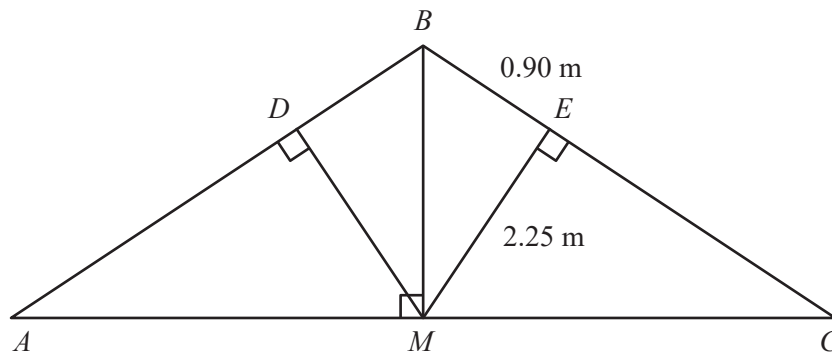


Calculate the distance travelled when flying from Hobart to Ottawa and back.

- A. 1038 km
- B. 7682 km
- C. 17504 km
- D. 32000 km
- E. 35008 km

Question 17

A roof truss has a design as shown below.



Triangle ABC is isosceles.

The length $BE = 0.90$ m

The length $EM = 2.25$ m




The width of the roof truss from A to C is closest to

- A. 2.4 m
- B. 5.6 m
- C. 6.1 m
- D. 12.1 m
- E. 12.6 m

Question 18

The following is an advertisement for a property that is for sale.

Farm for sale!

 5
  2
  2
 41.77 ha

House and garden: approx. 2000 m²

Land unsuitable for crops: 3.4 ha

The conversion of area from square metres to hectares is

$$10\,000 \text{ m}^2 = 1 \text{ ha}$$

The maximum number of square metres of land that is suitable for growing crops is closest to

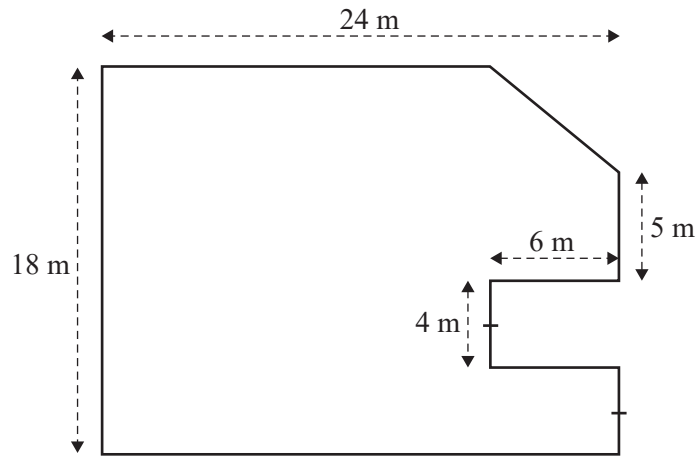
- A. 38 m²
- B. 2038 m²
- C. 3817 m²
- D. 381 700 m²
- E. 415 699 m²

Question 19

The size of a house can be described using the unit ‘squares’. The conversion from ‘squares’ to square metres is

$$1 \text{ square} = 9.29 \text{ m}^2$$

The floor plan below shows the layout of a new property.



The size of this house is closest to

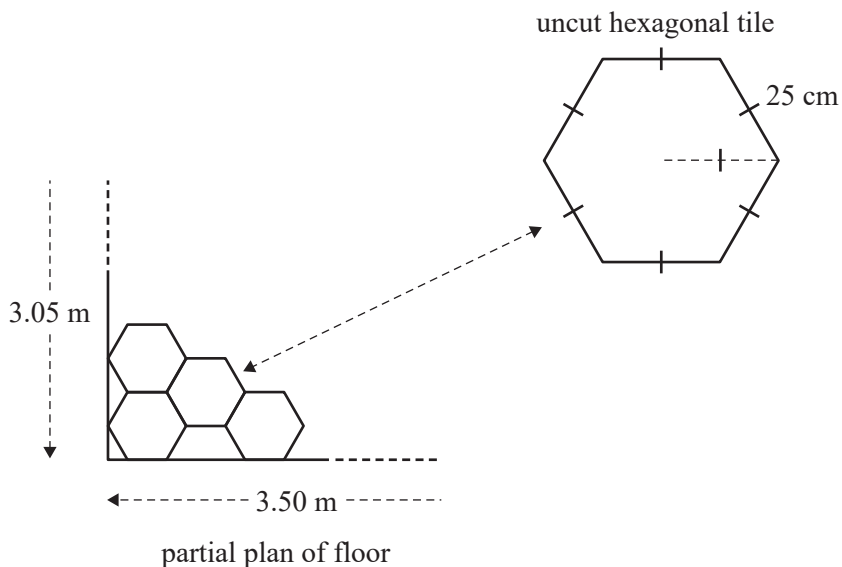
- A. 9.3 squares.
- B. 40.7 squares.
- C. 42.3 squares.
- D. 46.5 squares.
- E. 393.0 squares.

Question 20

The hexagonal tile shown in the diagram below will be used to cover the floor in a bathroom that is being renovated.

The shape of the floor is a rectangle of 3.50 m long and 3.05 m wide.

The floor will be covered according to the design shown in the diagram below and using as many uncut hexagonal tiles as possible. The remainder of the floor will be covered with cut hexagonal tiles.



The number of uncut hexagonal tiles that will be used to cover the floor of the bathroom is

- A. 42 tiles.
- B. 59 tiles.
- C. 72 tiles.
- D. 96 tiles.
- E. 168 tiles.

SECTION B**Instructions for Section B**

Answer **all** questions in the spaces provided.

In all questions where a numerical answer is required, you should only round your answer when instructed to do so.

Unless otherwise indicated, the diagrams in this book are **not** drawn to scale.

Question 1 (5 marks)

A Japanese salad dressing recipe contains 2 cups of vinegar, $\frac{1}{2}$ cup of soy sauce, $1\frac{1}{3}$ cup of dashi and $\frac{1}{4}$ tablespoon of chilli oil.

The volume, in millilitres, for 1 Japanese cup and 1 Japanese tablespoon are shown below.

Unit of measurement	Millilitres
1 Japanese cup	200
1 Japanese tablespoon	15

a. Complete the table below, rounding your answer to the nearest whole number.

1 mark

Unit of measurement	Millilitres
$\frac{1}{2}$ Japanese cup	
$\frac{1}{4}$ Japanese tablespoon	

Units of volume vary across the world. The volume, in millilitres, for 1 Japanese cup and tablespoon and 1 Australian cup and tablespoon are shown below.

Unit of measurement	Japan	Australia
1 cup	200 mL	250 mL
1 tablespoon	15 mL	20 mL

b. Find the fraction of 1 Australian cup that equals to 1 Japanese cup.

1 mark

of 1 Australian cup

- c. Calculate the approximate whole number of $\frac{1}{4}$ Australian cups that equals 1 Japanese cup. 1 mark

of $\frac{1}{4}$ Australian cups

- d. Complete the equation below. 1 mark

$\frac{1}{3}$ Australian cup + 1 Australian tablespoon \approx of 1 Japanese cup

- e. A recipe requires a ratio of one part truffle oil and three parts vinegar.
A chef has mixed a 300 mL mixture using three parts truffle oil and one part vinegar.

Calculate the quantity of extra vinegar, in millilitres, that would be required to obtain a mixture in the correct ratio.

1 mark

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Question 2 (5 marks)

To convert a *foot length* into a *shoe size*, the following formula can be used.

$$\text{shoe size} = \frac{3 \times \text{foot length}}{2.54} - k, \text{ where } k \text{ is a constant}$$

For men's shoes the constant k equals 25.

For women's shoes the constant k equals 23.

Shoe sizes found using the formula above are rounded up to the nearest half size.

Foot length is measured in centimetres.

- a. A customer with a *foot length* of 27.8 cm chooses a men's shoe.

Calculate the *shoe size* they would wear.

1 mark

- b. A customer with a *shoe size* of 8 wears a women's shoe.

Calculate the customer's *foot length*. Give your answer rounded to one decimal place.

1 mark

- c. Transpose the formula to make *foot length* the subject.

1 mark

- d. The number of pairs of shoes for three-year-olds sold at a particular retail outlet are shown in the table below.

Foot length	US	AUS	EU	Pairs of shoes sold
13.3–13.9 cm	6	5	22	4
14.0–14.5 cm	7	6	23	7
14.6–15.2 cm	8	7	24	20
15.3–15.9 cm	9	8	25	18
16.0–16.6 cm	10	9	26	11

Source: adapted from Williams website, <www.williamsshoes.com.au/size-guide>, © 2020 Munro Footwear Group

- i. State the floor and ceiling values, in centimetres, for the length of a shoe in Australian size 9.

1 mark

- ii. The sales manager had estimated that 80 pairs of shoes would be sold.

Calculate the percentage error in the actual number of pairs of shoes sold.

1 mark

Question 3 (5 marks)

Two quotes are obtained for plumbing work. All amounts exclude the cost of the 10% goods and services tax (GST).

Plumber A charges a \$150 call-out fee and \$100 per hour for each hour of work.

Plumber B charges a \$105 call-out fee and \$115 per hour for each hour of work.

- a. Calculate the difference between two quotes, a quote from Plumber A and a quote from Plumber B, for working 7 hours, excluding GST. 1 mark

- b. Plumber A and Plumber B charge the same amount for work completed for two different clients.
Calculate the number of hours each plumber has worked. 1 mark

- c. A budget of \$1250 is available for plumbing work.
Calculate the maximum number of work hours this budget allows and identify which plumber has provided this work. 1 mark

For the next financial year, both plumbers will increase their rates.

Plumber A will increase their rates by 10%.

Plumber B will increase their rates by 8%.

- d. Show that, after increasing their rates, Plumber A will charge a \$165 call-out fee and \$110 per hour for each hour of work. 1 mark

- e. Plumber A and Plumber B charge the same amount, at their increased rates, for work completed for two different clients.
Calculate the number of hours each plumber has worked. Write your answer in hours and minutes, rounded to the nearest minute. 1 mark

Question 4 (5 marks)

A local hospital has recorded the birth weights of female and male babies born in September. A back-to-back stem and leaf plot below, with stem intervals of one whole kilogram, has been used to present this data.

key: 1|6 = 1.6 kg

female	stem	male
	9	0
	9	1 8
8 1 0	2	2
8 7 6 4 2 0	3	1 4 5 7
5 2 1 1	4	1 1 4 7 9 9
	5	1

- a. Write down the most common weight interval, in kilograms, for the male babies. 1 mark

- b. Calculate the mean weight, in kilograms, for the female babies. Give your answer rounded to one decimal place. 1 mark

- c. Write down the lightest weight, in kilograms, for all the babies. 1 mark

- d. Compare the weights of the female and male babies using appropriate measures of centre and spread. 2 marks

Question 5 (5 marks)

The graph below shows the 10 countries with the highest average price, in US dollars, for a burger in July 2022.



Data: *The Economist*, July 2022 data release, <<https://github.com/theeconomist/big-mac-data/releases/tag/2022-07>>

- a. The conversion of US dollars (USD) to Australian dollars (AUD) is

$$1 \text{ USD} = 1.53 \text{ AUD}$$

Calculate the average price of a burger in Australia. Give your answer in Australian dollars, rounded to the nearest cent.

1 mark

- b. Prices of fresh ingredients have increased the cost of a burger by 15% in the United Arab Emirates.

Calculate the increased average price of a burger in the United Arab Emirates. Give your answer in US dollars, rounded to the nearest cent.

1 mark

- c. Calculate the percentage by which the average price of a burger in Norway is greater than the average price of a burger in the United States. Give the answer rounded to one decimal place.

1 mark

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The table below shows nutritional information for one burger.

Nutritional information

Nutrition summary					
	430 Cal	19 g	55 g	30 g	
	Calories	Total fat	Total carbs	Protein	
Saturated fat:	7 g	Total sugars:	11 g	Potassium:	456 mg
Dietary fibre:	5 g	Iron:	6 mg	Sodium:	1212 mg
Calcium:	100 mg	Cholesterol:	60 mg		
Total fat:	7 g	Vitamin D:	0 mcg		

- d. The recommended daily nutritional calorie intake is 2000 Cal.

Calculate the percentage of the recommended daily intake of calories gained after consuming a burger. Give your answer rounded to one decimal place.

1 mark

- e. While walking, a person burns 30 Cal/km.

Calculate the number of kilometres that a person would need to walk in order to burn the number of calories found in a burger. Round your answer to the nearest whole number.

1 mark

Question 6 (5 marks)

A drug company claims that it has created a new drug that reduces the level of pain in arthritis patients for at least 12 hours. Their claim is based on the recorded times for a sample of 10 arthritis patients, shown as Sample A in the table below, which measured the length of time, in hours, for which these 10 arthritis patients' pain levels were reduced after taking the drug.

Sample A (hours)	Sample B (hours)
6	9
12	11
5.5	8
3	7
4	6
3.5	5
6.5	10
10	11
9	10
8.5	5.5

- a. Calculate the median length of time, in hours, for which the patients in Sample A experienced reduced pain. 1 mark
- _____
- _____
- b. Calculate the range of lengths of times, in hours, for which the patients in Sample A experienced reduced pain. 1 mark
- _____
- _____
- c. Do the values shown for Sample A in the table above support the drug company's claim? Give a reason. 1 mark
- _____
- _____

DO NOT WRITE IN THIS AREA

- d. A second sample of 10 people, listed as Sample B in the table on page 22, recorded the length of time, in hours, for which they experienced reduced pain. Based on the Sample B times, the drug company has amended its original claim to suggest that the new drug reduces the level of pain in arthritis patients for at least nine hours.

Discuss the accuracy of the drug company's amended claim. Include summary statistics in your answer.

2 marks

DO NOT WRITE IN THIS AREA

Question 7 (5 marks)

A designer likes to create images and screen-print them onto T-shirts. They have set up a stall at the local market to sell the screen-printed T-shirts.

The cost to set up a mould to screen-print a chosen design is \$150.

The cost of the paint to screen-print 25 T-shirts is \$20.

The cost of one high-quality blank T-shirt is \$50.

All quoted costs are inclusive of 10% GST.

- a. Calculate the total cost of making 25 T-shirts. 1 mark

- b. T-shirts are sold for \$77 each, including GST. Calculate the profit, excluding GST and to the nearest dollar, if 25 T-shirts are sold. 2 marks

- c. Another designer sells blank T-shirts at a price of \$40 each, in batches of 100 T-shirts. A new mould to screen-print on these T-shirts was also set up at a cost of \$120. One hundred T-shirts were purchased at a price of \$40 each and then re-sold at a price of \$66 each, including GST. Calculate the minimum number of screen-printed T-shirts that need to be sold for this designer to make a profit. 2 marks

Question 8 (5 marks)

During a one-in-a-hundred-year natural disaster (1% annual probability event), 232 000 properties are likely to be affected across Greater Melbourne. The damage caused by this disaster would be equivalent to paying annual average damages of \$400 million. Of the properties that would be affected, 7.2% lie within mountainous areas.

- a. Show that approximately 16 700 properties within the mountainous areas are likely to be affected by the natural disaster. 1 mark

- b. Calculate the estimated annual cost for damage by a natural disaster in the mountainous areas. Write your answer in millions of dollars. 1 mark

- c. Explain what is meant by a one-in-a-hundred-year natural disaster (1% annual probability event)? 1 mark

- d. Consider the three quotes from providers of home insurance shown below.

<p>Quote 1 – Super Cheap insurance Annual fee: \$1200 Conditions: 30% off the first year for a five-year contract</p>
<p>Quote 2 – Fly My Way insurance Annual fee: \$1119 Conditions: 10% off the first year for a five-year contract</p>
<p>Quote 3 – Jam insurance Annual fee: \$1099 Conditions: No upfront discounts, no lock-in contract</p>

- State which company offers the lowest-priced option over five years. Calculate this cost. 2 marks

Question 9 (5 marks)

According to the latest census by the ABS, there were approximately 9.8 million households in Australia in 2021. Of these households, 6.2 million were homeowners.

- a. Of all homeowners, 32% did not have a mortgage.

Calculate the number of households who did not have a mortgage. Write your answer in millions, rounded to four significant figures.

1 mark

	million
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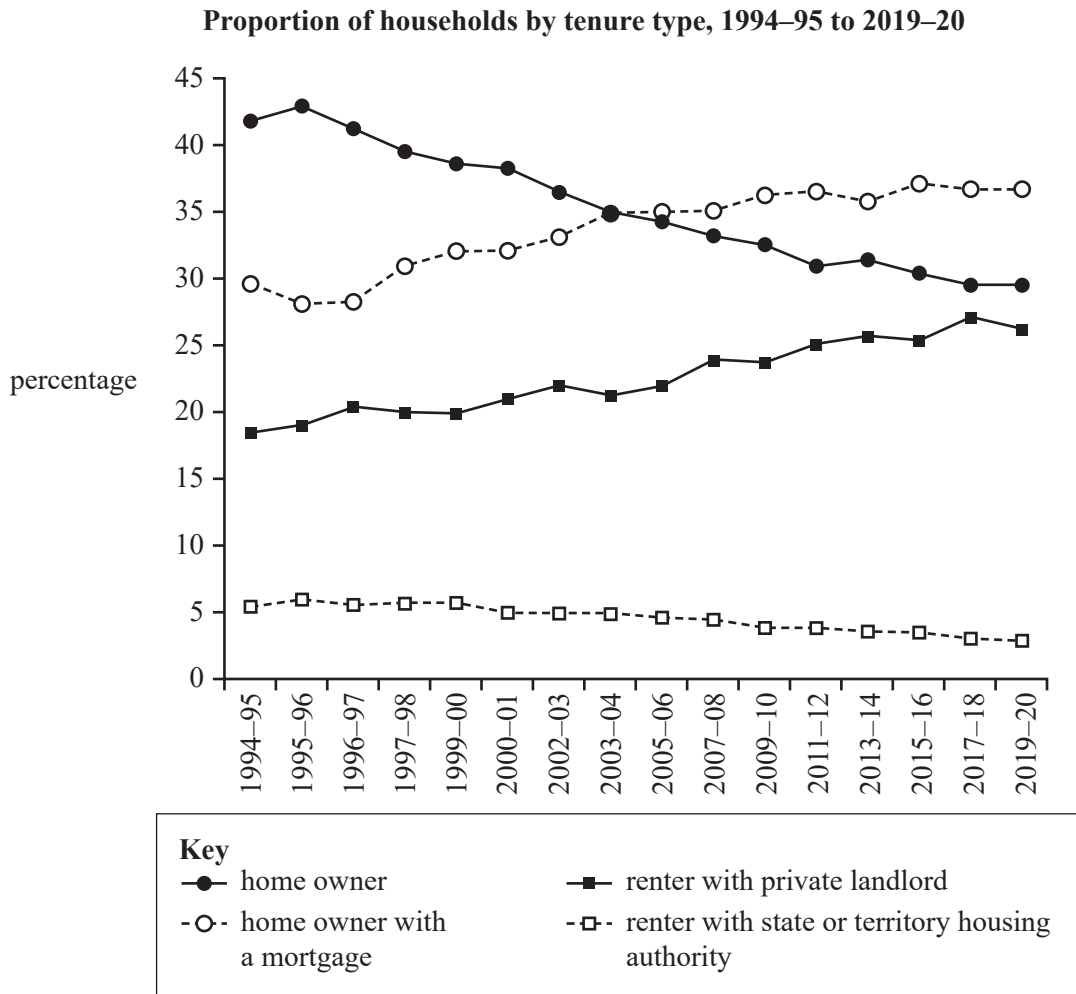
- b. Of all homeowners, 3.3 million had a mortgage.

Calculate the percentage of homeowners who had a mortgage. Give your answer rounded to one decimal place.

1 mark

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c. Consider the following graph.

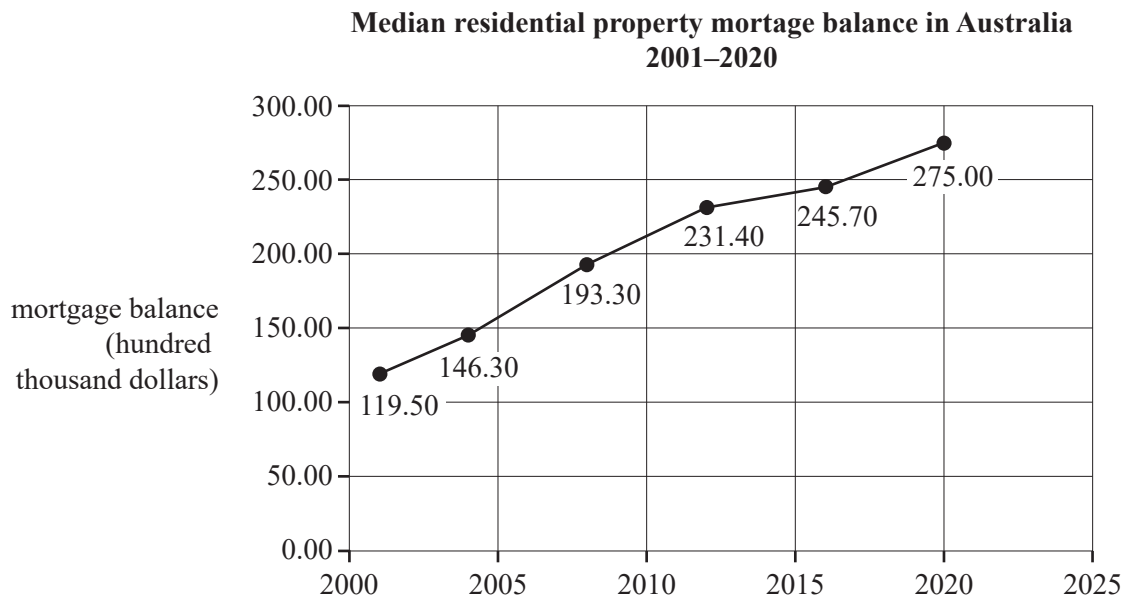


Source: adapted from Australian Institute of Health and Welfare (AIHW), 'Home ownership and housing tenure', 2 August 2022, p. 2, <www.aihw.gov.au/reports/australias-welfare/home-ownership-and-housing-tenure>

Describe the trends for homeowners in Australia between 1994 and 2020 shown in the graph above. 2 marks

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d. Consider the following graph.



Source: adapted from 'Australia: Residential property outstanding mortgage value, 2020', © Statista 2023, www-statista-com/statistics/1030534/australia-residential-property-outstanding-mortgage-value/

Calculate the difference in the median residential property mortgage balance between 2020 and 2004. Write your answer in whole dollars. Do not use scientific notation.

1 mark

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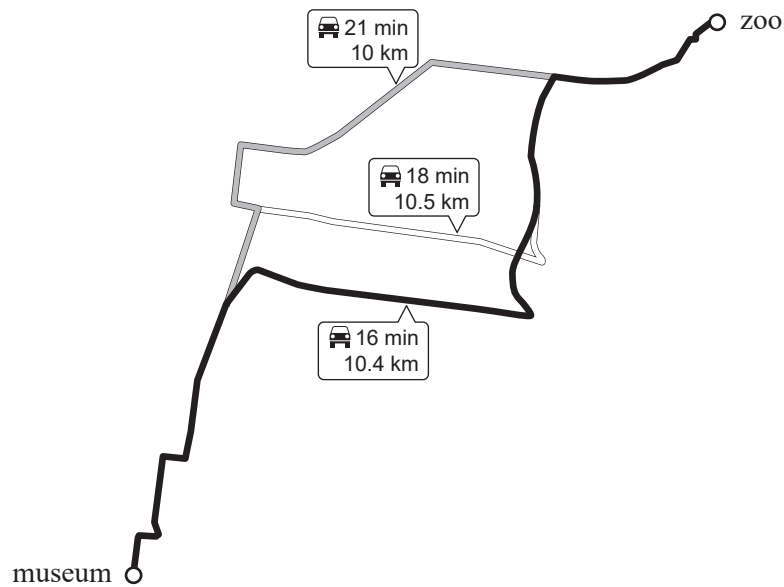
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**SECTION B – continued
TURN OVER**

Question 10 (5 marks)

A petrol tanker travels from a museum to the zoo. A map showing three routes is shown below.



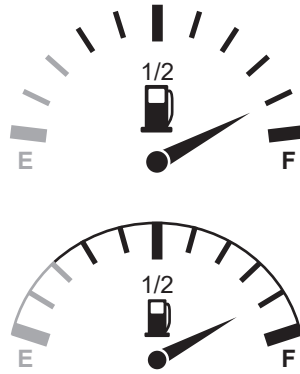
- a. Calculate the difference in the distance travelled between the fastest and slowest routes. Give your answer rounded to the nearest metre. 1 mark

- b. The petrol tanker makes three stops on the journey from the museum to the zoo. It leaves the museum at 2.00 pm. The petrol tanker’s first stop lasts 25 minutes. Each subsequent stop is double the time of the previous stop. Assume that the fastest route is used and that the time of travel remains constant over time.

Calculate the petrol tanker’s arrival time at the zoo. 1 mark

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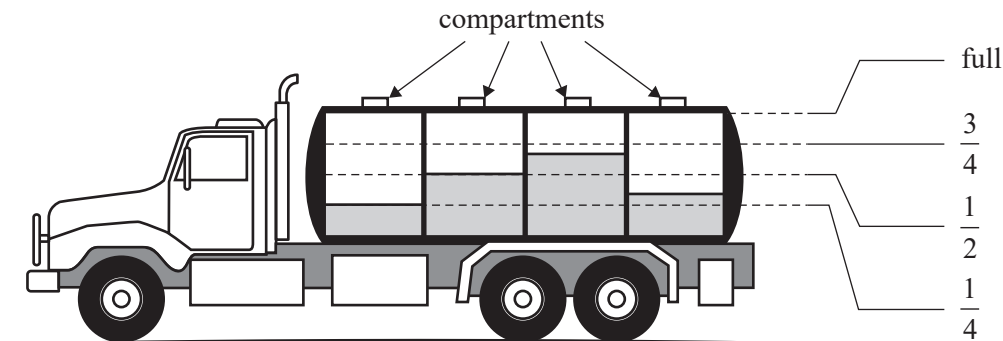
- c. The petrol tanker uses two petrol tanks of the same size. An image of the two petrol gauges on the dashboard in the truck cabin at the start of the journey is shown below.



Write down an estimate of the fraction of petrol remaining in the two petrol tanks combined.
Write your answer as a fraction in simplest form.

1 mark

- d. The petrol tanker is transporting chemicals stored in a carrying tank with four separate compartments.
An image of the chemicals remaining in the compartments is shown in the diagram below.



Show that the chemicals in the compartments are approximately 45% of the total capacity of the petrol tanker.

2 marks

Question 11 (5 marks)

A large farming property owns numerous water tanks.

One tank in the shape of a cylinder has a capacity of 5000 L. The area of its circular base is 2.78 m^2 .

The conversion from litres to cubic metres is

$$1000 \text{ L} = 1 \text{ m}^3$$

- a. Calculate the height of the water tank. Give your answer in metres, rounded to one decimal place. 1 mark

Another water tank, also in the shape of a cylinder, has a capacity of 20 000 L. The height of this water tank is double the height of the 5000 L water tank.

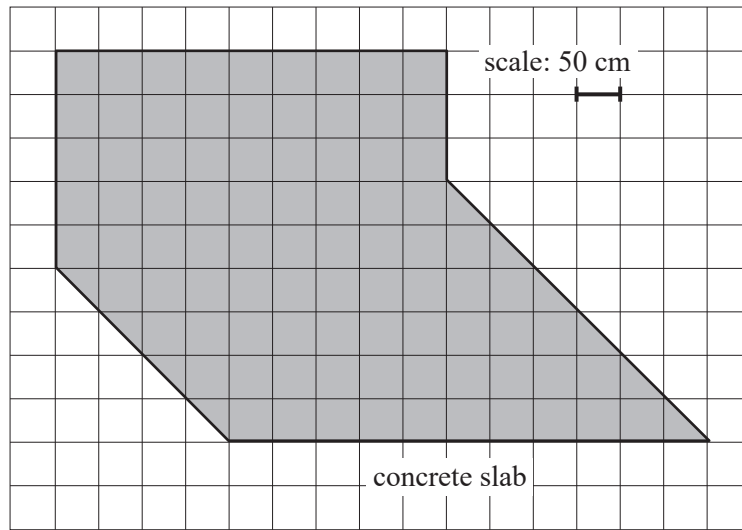
- b. Calculate the area of the circular base of the 20 000 L water tank. Give your answer, in square metres, rounded to two decimal places. 1 mark

- c. State the scale factor that exists between the areas of the circular bases of the two water tanks. Explain your answer. 1 mark

- d. The farming property uses the water in the two tanks for irrigation. The 20 000 L water tank, initially full, is used to irrigate the surrounding paddocks. The water is pumped from the water tank at an even rate of $5.2 \text{ m}^3/\text{h}$.

Calculate the time it will take for the water tank to empty. Give your answer in hours and minutes. 1 mark

- e. To make sure the 20 000 L water tank is stable, it was placed on a concrete slab with the following footprint.



Use the scale provided on the plan shown above to calculate the area of the concrete slab that remains uncovered. Give your answer in square metres, rounded to three significant figures.

1 mark

Question 12 (5 marks)

Builders use render on houses. Render is made of the dry materials sand, cement and lime, and of the wet material water.

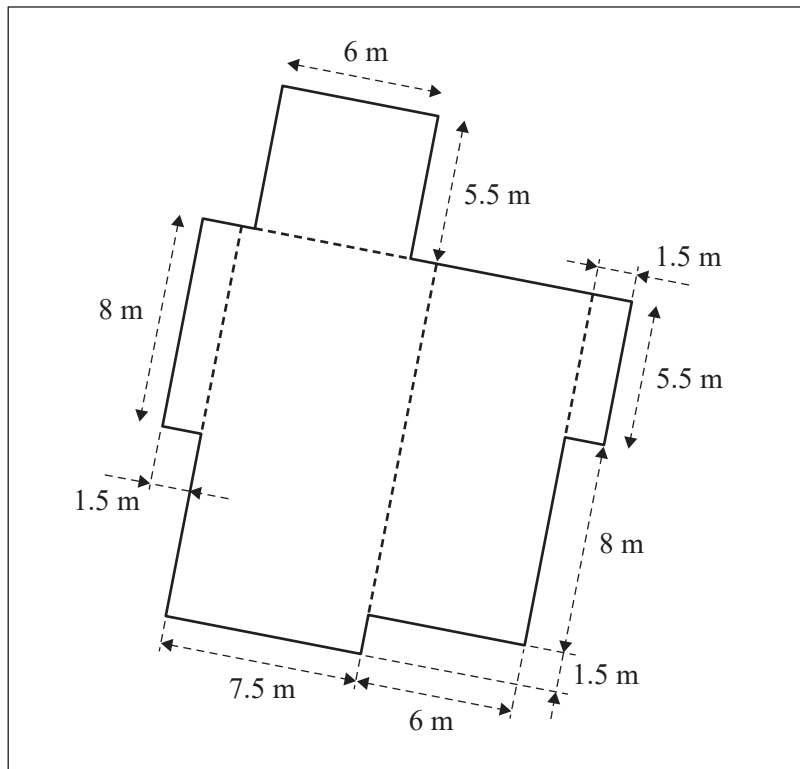
A render mixture of 6 kg of sand, 1 kg of cement and 1 kg of lime requires 3200 mL of water.

- a. Calculate the quantity of cement, in kilograms, required for a render made of 9 kg of sand. 1 mark

- b. Determine the volume of water, in mL, that must be added to a bucket containing 10 kg of dry material. 1 mark

A concrete slab is poured for the foundations of a house.

The floor plan below shows the length, in metres, of all outer edges of the foundations. The depth of the foundations is 20 cm.



- c. Calculate the total volume of the concrete slab poured for the foundations of the house. 2 marks

- d. To move concrete, concrete trucks must be hired. Each concrete truck has a capacity of 16 m^3 . Concrete can only be purchased in full truck loads of 16 m^3 . Concrete costs \$120 per cubic metre and hiring a concrete truck costs \$250 per truck.

Calculate the total cost to purchase and transport the concrete needed to pour this concrete slab for the foundations of this house. Give your answer to the nearest dollar.

1 mark

DO NOT WRITE IN THIS AREA

END OF QUESTION AND ANSWER BOOK



Answers to multiple-choice questions

Question	Answer
1	A
2	D
3	E
4	D
5	B
6	E
7	E
8	A
9	B
10	C
11	B
12	A
13	E
14	D
15	E
16	E
17	D
18	D
19	C
20	B