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Numeracy 2023

32406 Use mathematics and statistics to meet the numeracy demands of a range of situations

Credits: Ten

OUTCOMES	
1	Formulate mathematical and statistical approaches to solving problems in a range of meaningful situations.
2	Use mathematics and statistics to meet the numeracy demands of a range of meaningful situations.
3	Explain the reasonableness of mathematical and statistical responses to situations.

Enter your National Student Number (NSN) and School Code in the box at the top of this page.

You should attempt ALL the questions in this booklet.

Answer all parts of each question by filling in the gaps or selecting (✔) the correct answer.

If you need more room for any answer, use the extra space provided at the back of this booklet.

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QUESTION ONE: Mahi (Work)

Mei works at a cafe.

For each day Mei works, the cafe gives her $10 for travel.

Mei works 8 hours a day.

She is paid $22.70 per hour.

(a) Show how you would calculate Mei's pay for one day.

Cafe worker

Kyle delivers community newspapers.

Kyle is paid $27.30 to deliver all his newspapers.

This takes him 90 minutes.

(b) How much is Kyle paid per hour?

$ _____ per hour

Kyle delivering newspapers

Kate mows lawns.

Kate's container holds 5 litres of petrol.

It is already ¼ full.

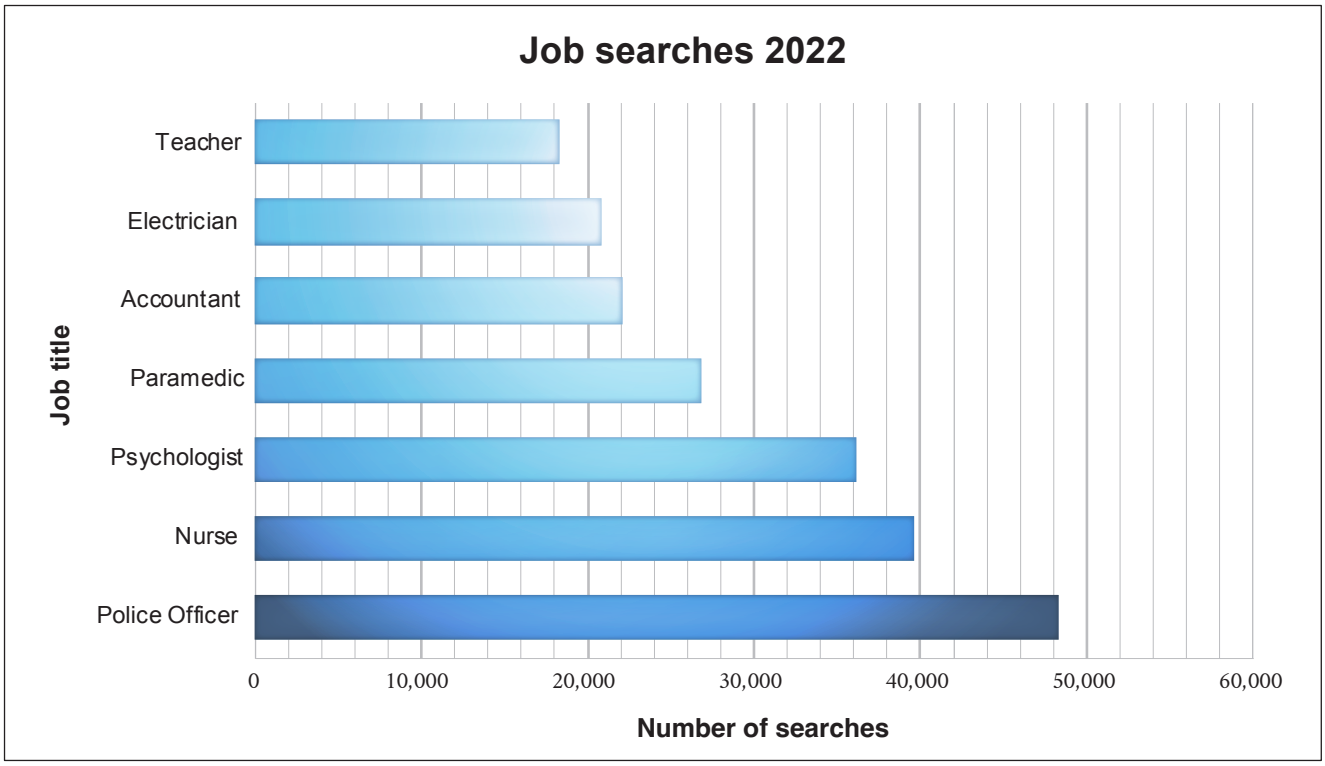
(c) Petrol costs $2.76 per litre.

How much will it cost Kate to fill the rest of the container with petrol?

$ _____

Petrol container

A careers website shows the most common job searches in 2022.



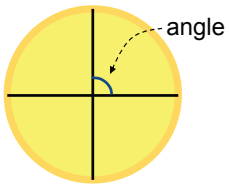
(d) Look at the graph above.

In total, about how many searches were made for "Nurse" and "Paramedic"?

_____ searches

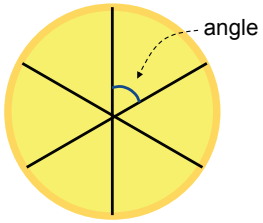
Lilly cuts pizzas so that each pizza has slices of equal size.

(e) Calculate the angle that is marked on each pizza.



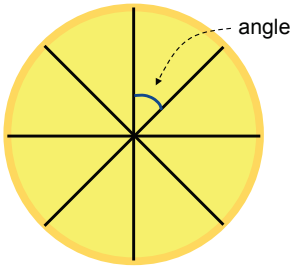
Small pizza

Angle = ☐ o



Medium pizza

Angle = ☐ o



Large pizza

Angle = ☐ o

Tui is helping her dad to build a rectangular deck. The deck will be 8 metres long and 2 metres wide.

A 1-metre-long strip of wood is called a linear metre.

Each square metre (m^2) of deck takes 11.5 linear metres of wood.

Tui says that about 190 linear metres are needed to build the deck.

Deck measuring 8 metres × 2 metres

Linear metres of decking wood

(f) Is she right? Use measurements to explain your answer.

Ingrid picks kiwifruit.

Ingrid is paid $33 for every bin she fills.

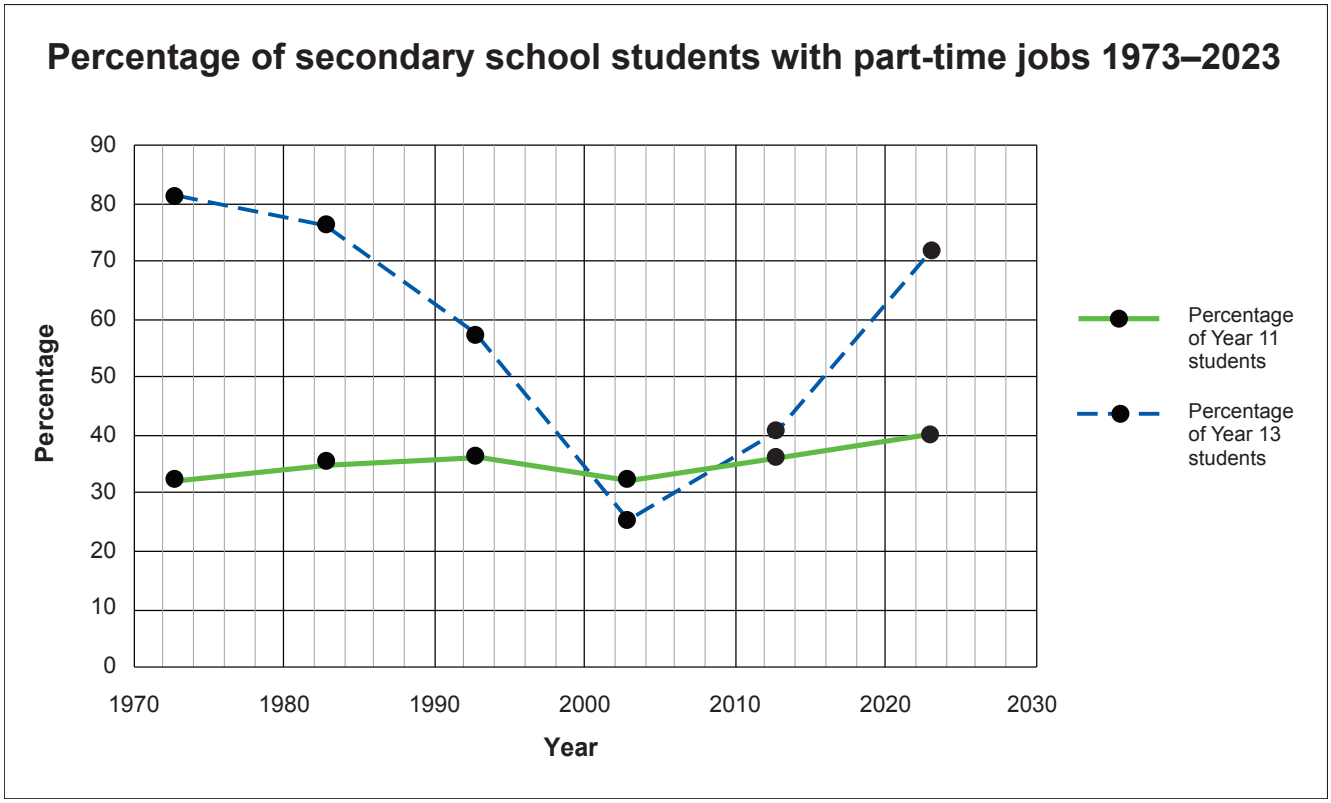
She averages 1⅓ bins per hour.

(g) How much money should Ingrid expect to make if she works for 10 hours?

$ _____

Kiwifruit bin

This graph shows the percentage of secondary school students with part-time jobs between 1973 and 2023.



(h) Is the following statement true?

The percentage of Year 13 students with part-time jobs is greater than the percentage of Year 11 students with part-time jobs.

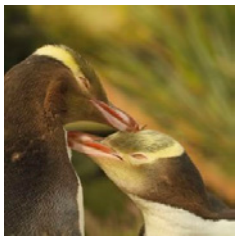
Explain your answer using numbers from the graph.

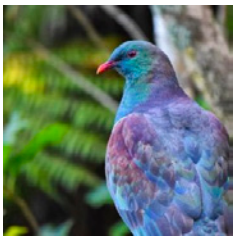
QUESTION TWO: New Zealand birds

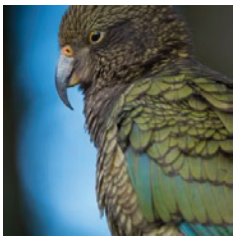
Here are 14 cards showing New Zealand birds.

Rock Wren

Kākāpō


Yellow-eyed Penguin

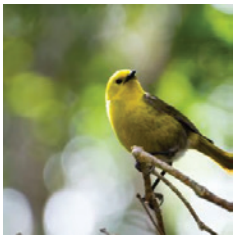

Kererū

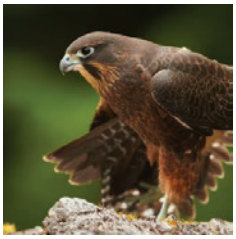

Kea

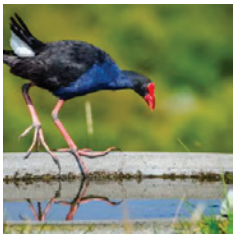
Kōkako

Bar-tailed Godwit

Fairy Tern


Yellowhead


New Zealand Falcon


Pūkeko

Kākāriki

Kiwi

Saddleback

One card will be chosen without looking.

(a) What is the probability that the chosen bird has a name starting with **K**?

Use a percentage, decimal, or fraction: _____

The pīwauwau (rock wren) is a tiny bird that weighs about the same as one biscuit.

A packet of 10 biscuits weighs 200 grams.

(b) Select (✓) which operation gives the weight of one pīwauwau, in grams.

- ☐ 200 × 10
- ☐ 2022 ÷ 10
- ☐ 10 ÷ 200
- ☐ 200 ÷ 10
- ☐ 200 – 10

In 1998 there were about 100,000 kiwi living in New Zealand.
In 2023 there are about 68,000 kiwi left.

(c) By what percentage have the kiwi numbers gone down between 1998 and 2023?

_____ %

Kiwi

The moa is an extinct bird.

A large moa weighed about 230 kilograms.

A large kiwi weighs about 3,300 grams.

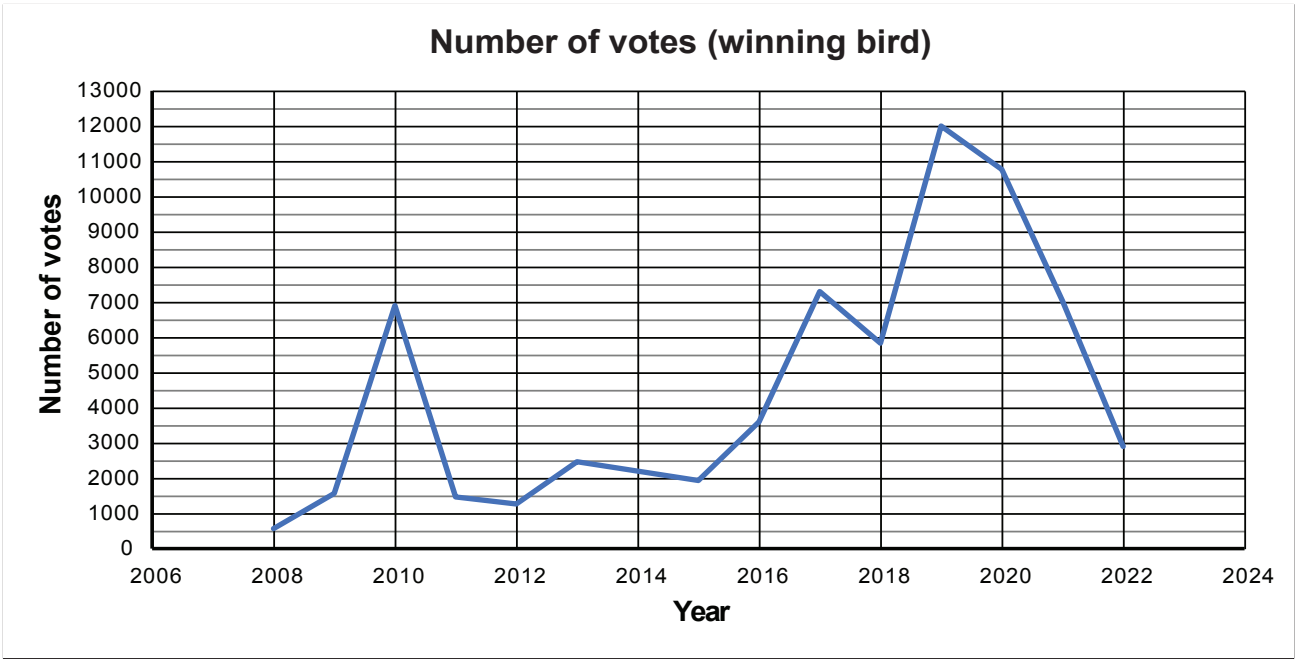
Moa and kiwi

(d) About how many times heavier was a moa than a kiwi?

_____ times heavier

Every year, *Forest & Bird* holds a competition where people vote for *Bird of the Year*.

This graph shows the number of votes for the winning bird since 2008.

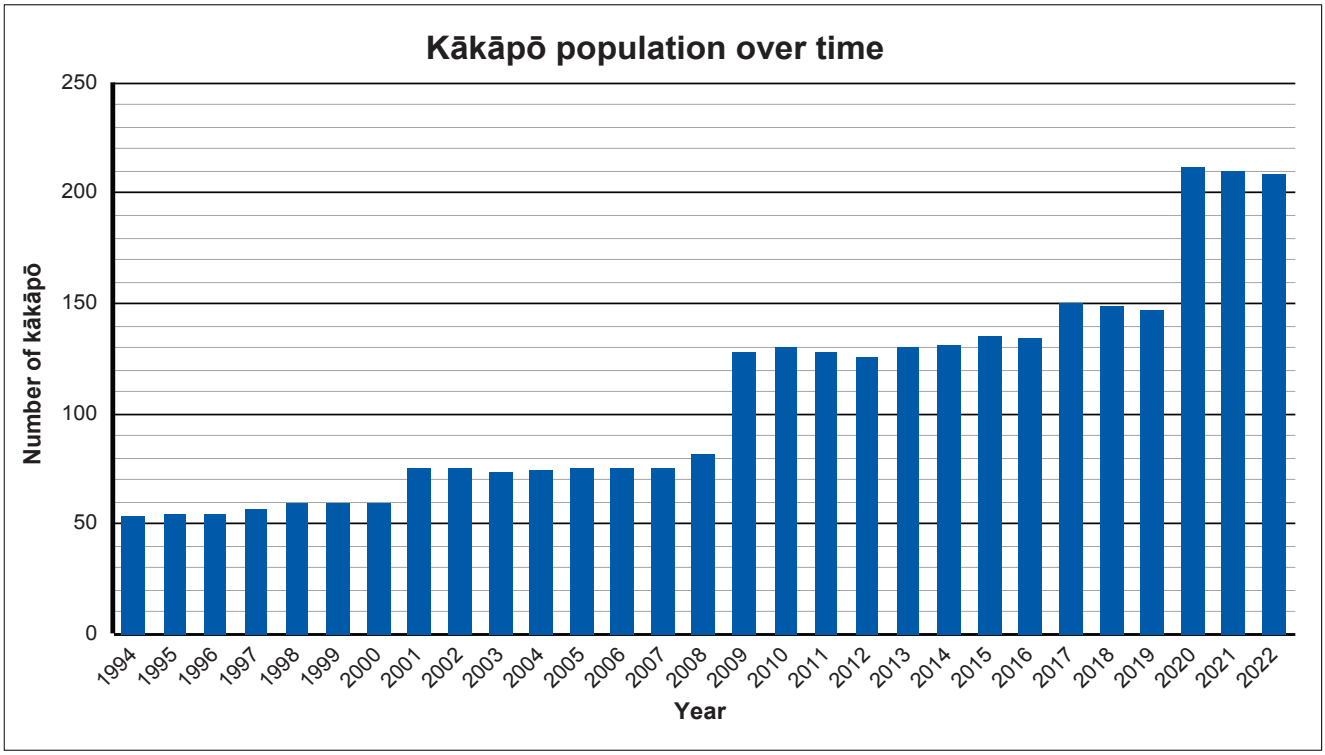


(e) About how many votes did the winning bird get in 2017?

_____ votes

Look at this graph of kākāpō numbers over time.

Someone has claimed that the number of kākāpō in 2022 is four times the number of kākāpō in 1994.

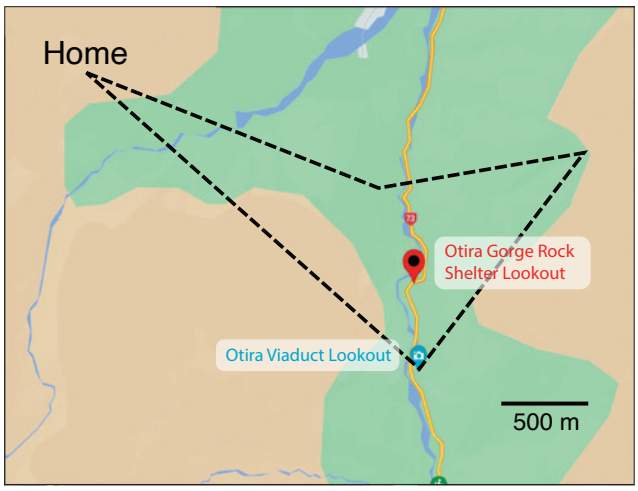


(f) Do you agree?

Explain your answer using numbers from the graph.

The movement of Cheeky, the kea, was tracked for one day.

This map shows where Cheeky went.



Cheeky's flight path

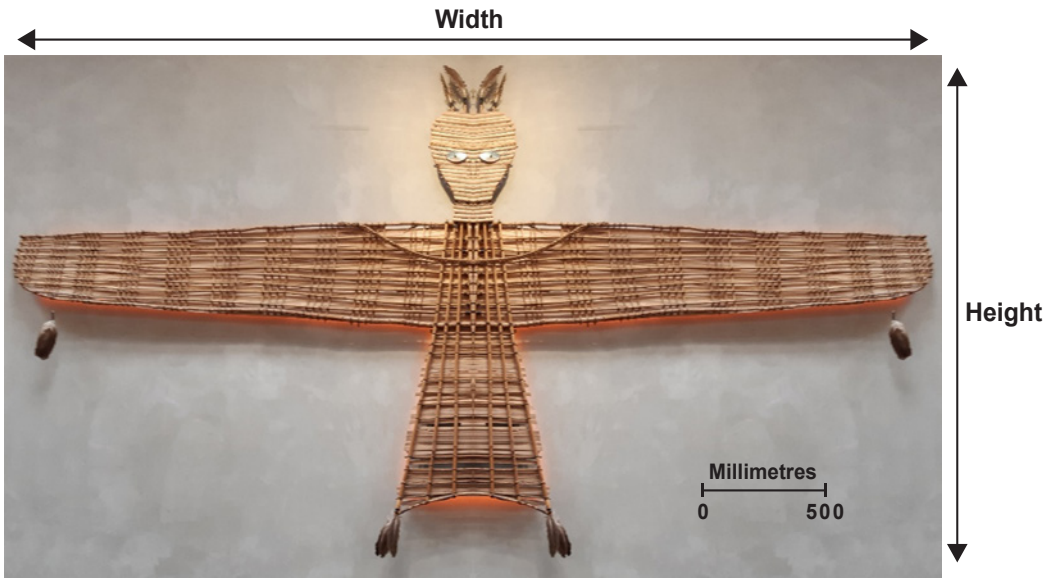
Cheeky the kea

(g) Select (✓) which answer is closest to the total distance that Cheeky flew.

- ☐ 700 m
- ☐ 7,000 m
- ☐ 70,000 m
- ☐ 70 km
- ☐ 70,000 cm

QUESTION THREE: Manu tukutuku

This is a manu tukutuku, a traditional Māori kite.



(a) The width of the manu tukutuku is 3,660 mm.

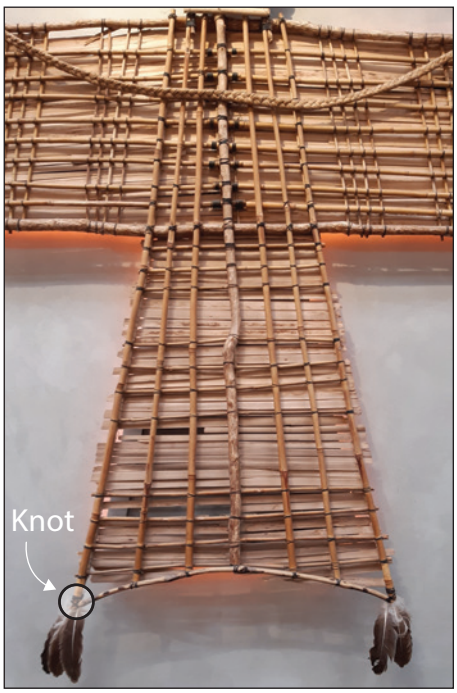
Estimate the height of the manu tukutuku.

Height = _____ mm

The body of the manu tukutuku has knots where sticks cross.

One knot is circled in this photo.

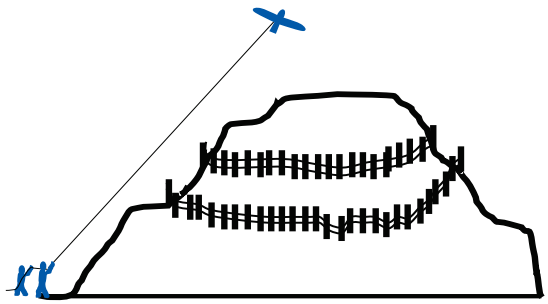
The body of the manu tukutuku has 22 sticks running horizontally (across) and 7 sticks running vertically (up).



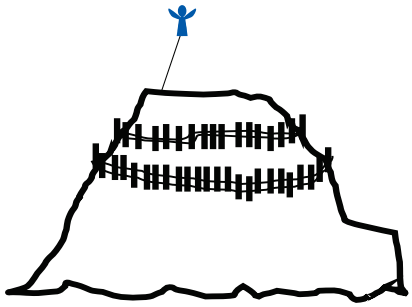
(b) Show how you would work out the total number of knots in the body of the manu tukutuku.

Manu tukutuku were often flown above a pā to mark the beginning of Matariki.

Here are two views of a manu tukutuku flying over a pā. One view is from the south, one view is from the east.

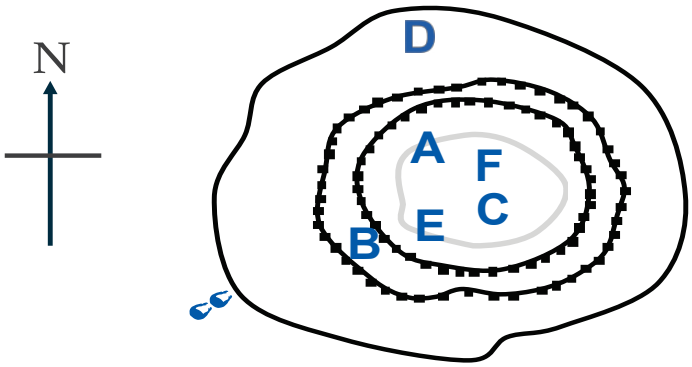


View from south



View from east

(c) Here is the view from above the pā.



View from above

Use the south and east views to work out which letter best shows the position of the manu tukutuku in the view from above.

Select (✓) the letter: ☐ A ☐ B ☐ C ☐ D ☐ E ☐ F

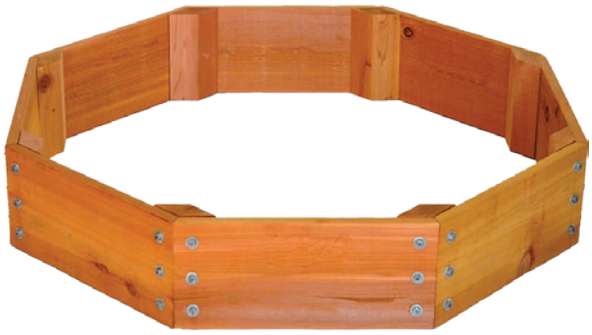
QUESTION FOUR: Garden

The picture shows an octagon-shaped garden frame.

All sides are the same length.

The perimeter of the frame measures 6 metres.

Note: Perimeter is the total distance around the outside of a shape.



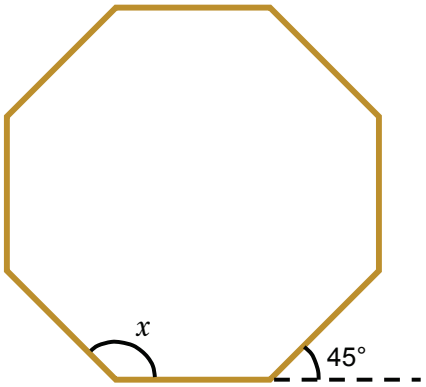
Octagon-shaped garden frame

(a) What is the length of **ONE** side?

_____ metres

In the garden frame, all the internal angles (like x) are equal.

Each external (outside) angle measures 45°.

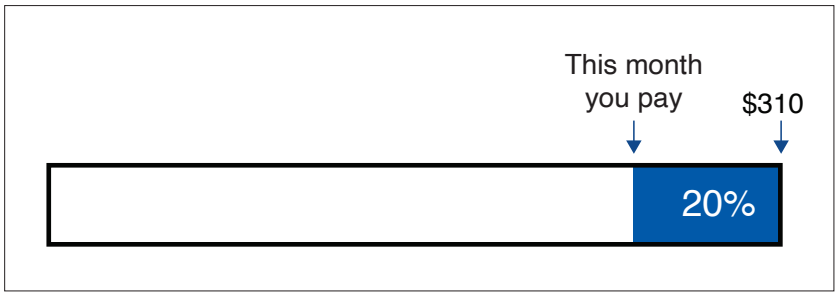


(b) How many degrees does each internal angle measure?

_____ °

The usual price of the octagon-shaped garden frame is $310.

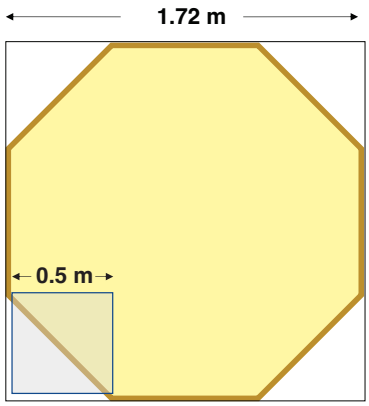
This month you get 20% off the usual price.



(c) What is the price of the octagon-shaped garden frame this month?

$ _____

Rob, the gardener, says that he can find the inside area of this octagon using these calculations:



$1.72 \times 1.72 = 2.96$ m^2 (rounded)

$2 \times (0.5 \times 0.5) = 0.5$ m^2

Area of octagon = $2.96 - 0.5 = 2.46$ m^2

(d) Explain how Rob is using the information in the diagram to get his answer.

Rob wants to fill the garden frame with topsoil.

The topsoil comes in bags that hold 25 litres.

He works out that the volume of the frame is 0.8 m^3. Rob also knows that 1 cubic metre (m^3) is the same as 1000 litres (L).

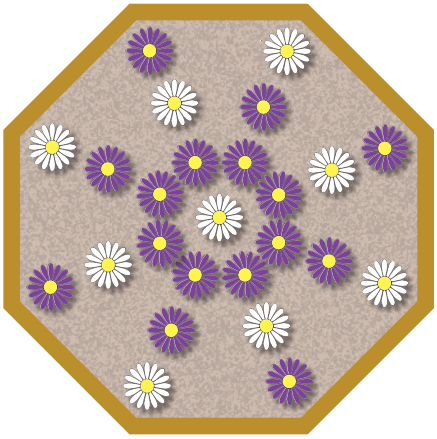
Garden frame with topsoil

(e) How many bags of topsoil does Rob need to fill the octagon-shaped garden frame?

_____ × 25 litre bags

Rob plants flowers.

The ratio of white to purple flowers is meant to be 2:3.



Rob's garden

(f) Has he planted his garden correctly?
Explain your answer using the number of white and purple flowers.

QUESTION FIVE: *Treat Week*

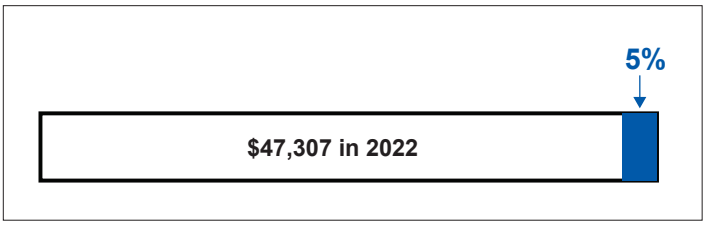
The *SPCA* runs annual *Treat Week* fundraisers. People make treats, such as cupcakes, to raise money to protect animals in New Zealand.

In 2022, there were 206 *Treat Week* fundraisers. A total of $47,307 was raised.

(a) On average, how much money did each fundraiser make?

$ _____

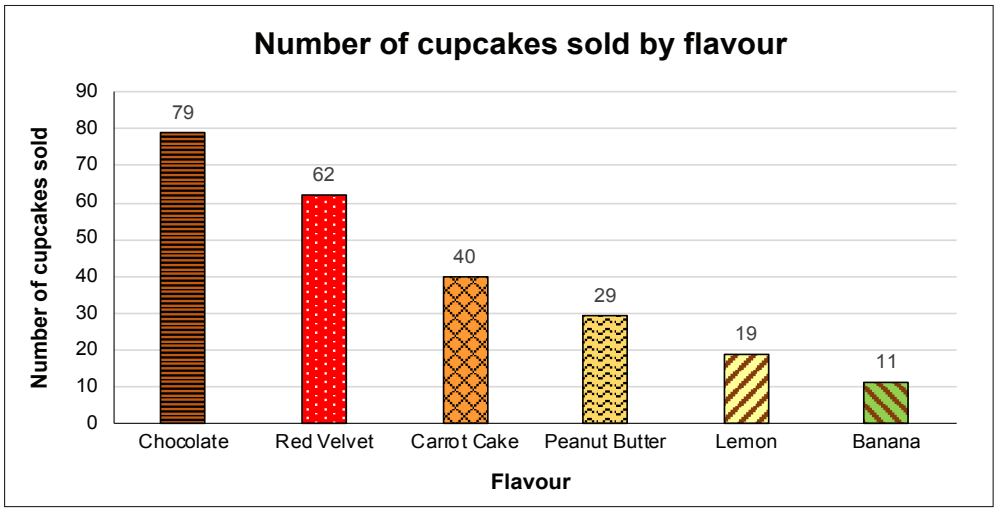
In 2023, the *SPCA* hopes to increase the amount of $47,307 raised in 2022 by 5%.



(b) What is the total amount the *SPCA* hope to fundraise during *Treat Week* 2023?

$ _____

Here is a graph of cupcake sales at a school for *Treat Week* 2022. In total, 240 cupcakes were sold.



(c) Is the following statement true?

About one third of sales were chocolate-flavoured cupcakes.

Explain your answer using numbers from the graph.

Remy bakes cupcakes to sell for *Treat Week*.

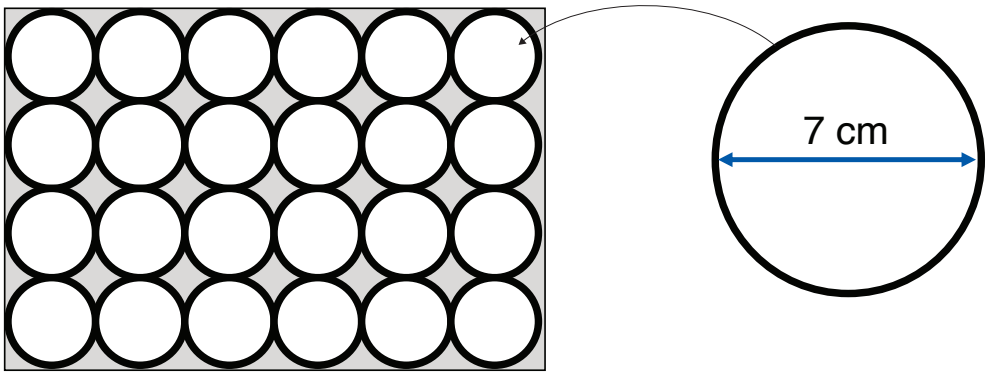
Remy buys these ingredients to bake 24 lemon cupcakes:

Cupcake ingredients	Cost of ingredients
Cupcake mix	$12.40
500 g butter	$5.40
1 L milk	$2.59
½ dozen eggs	$3.90
2 lemons	$1.69
Cupcake decoration pack	$6.59
24 cupcake baking cups	$2.00

(d) What is the cost of the ingredients for one cupcake?

$ _____

Remy takes 24 cupcakes to school in the rectangular carry tray shown below.



The top of each cupcake is a circle that measures 7 cm across.

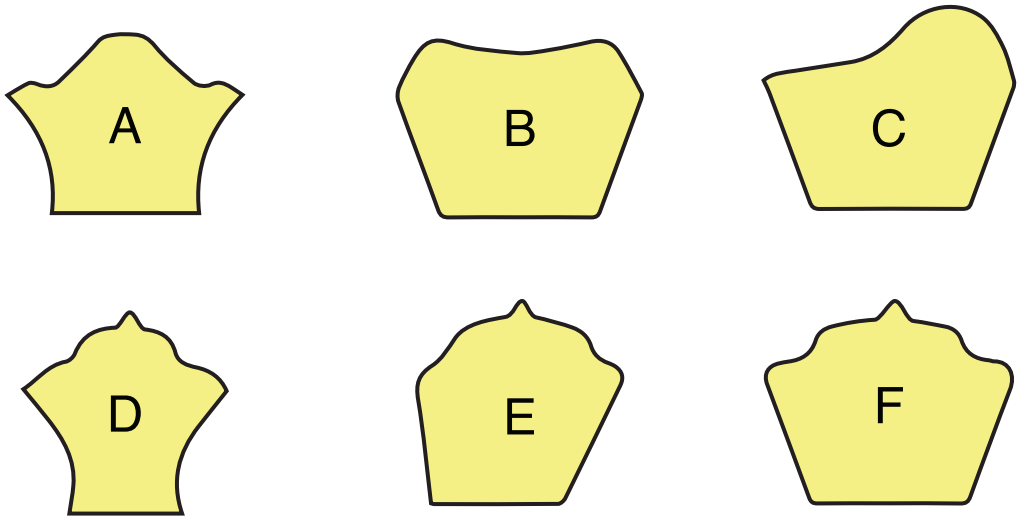
(e) What are the length and width of Remy's tray?

Length = _____ cm

Width = _____ cm

Remy takes a photograph of a cupcake.

(f) Which image most closely matches the side view of the cupcake?



Write the letter of the image here: _____

Extra space if required.
Write the question number(s) if applicable.

QUESTION NUMBER

Acknowledgements
Material from the following sources has been adapted for use in this assessment:

Question 1
Cafe worker, https:/ /www.pexels.com/photo/anonymous-person-preparing-coffee-to-client-in-cafe-4349766/
Kyle delivering newspapers, https://teens.lovetoknow.com/Jobs_for_Teens_13_and_Up
Petrol container, https://www.hgtv.com/lifestyle/clean-and-organize/safe-gasoline-storage-and-use
Kiwifruit bin, https://tumutimbers.co.nz/assets/Images/Photo-Galleries/KIWI-FRUIT-BIN.png

Question 2
Rock Wren, https://www.birdoftheyear.org.nz/
Kākāpō, https://www.birdoftheyear.org.nz/past-champions
Yellow-eyed penguin, https://www.birdoftheyear.org.nz/
Kererū, https://www.birdoftheyear.org.nz/
Kea, https://www.birdoftheyear.org.nz/
Kōkako, https://www.birdoftheyear.org.nz/
Bar-tailed Godwit, https://www.birdoftheyear.org.nz/
Fairy Tern, https://www.birdoftheyear.org.nz/
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Saddleback, https://cdn.download.ams.birds.cornell.edu/api/v1/asset/110235411/1800
Pīwauwau, https://www.birdoftheyear.org.nz/
Mallowpuffs packet, https://www.countdown.co.nz/shop/productdetails?stockcode=271145&name=griffins-mallowpuffs-chocolate-biscuits-original
Kiwi, https://www.wayfaringkiwi.com/wp-content/uploads/2020/12/where-to-see-kiwi-birds-in-new-zealand.jpg
Moa, https://cdn.britannica.com/40/201340-050-6510857E/South-Island-giant-moa-female-Dinornis-robustus.jpg
Kiwi (small), https://b2640405.smushcdn.com/2640405/wp-content/uploads/2021/12/smaller-kiwi.png?lossy=1&strip=1&webp=1
Flight distance map, https://goo.gl/maps/ZbmfPc93Xt1twBrS9
Cheeky, https://i.pinimg.com/originals/7d/d4/3c/7dd43cb68fe2c8023dd07294a8775429.jpg

Question 4
Octagonal garden frame, https://i.etsystatic.com/9973995/r/il/246ff0/2231501363/il_794xN.2231501363_d75y.jpg
Frame filled with soil, https://i.etsystatic.com/iap/a621bb/3641983566/iap_640x640.3641983566_qqfb46l5.jpg

Question 5
SPCA Treat Week banner, https://www.facebook.com/RoyalNZSPCA/photos/a.10150683912059438/10160009257239438/
Lemon cupcake, https://www.biggerbolderbaking.com/wp-content/uploads/2022/03/Lemon-Cupcakes1-500x500.jpg

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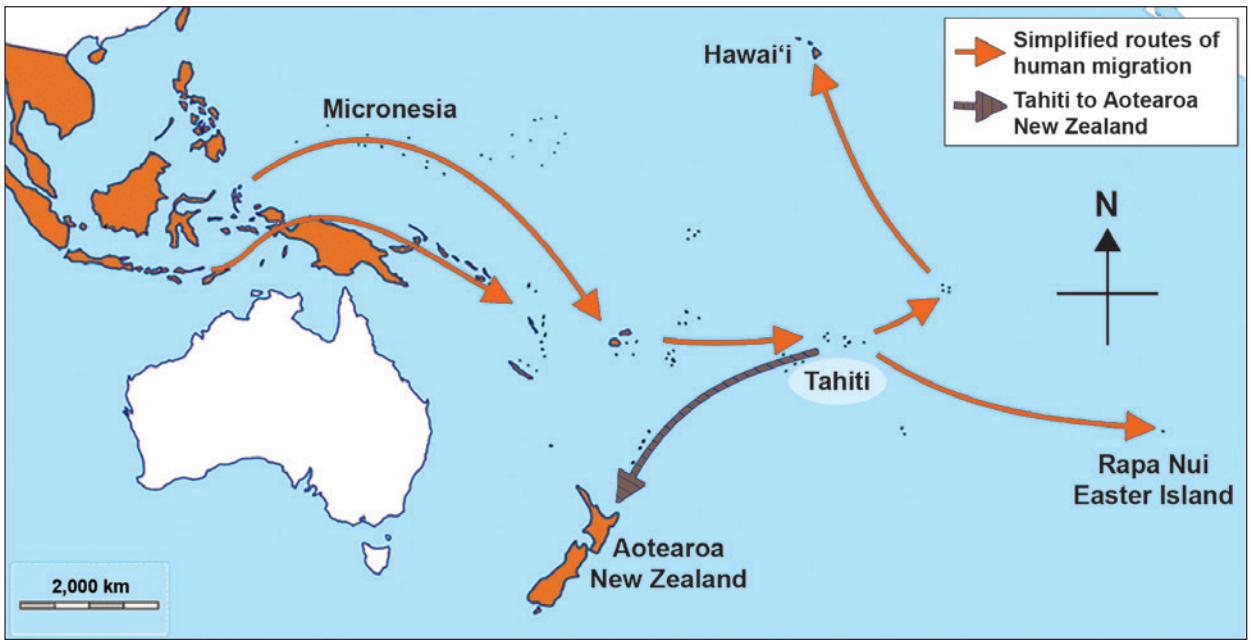
QUESTION ONE: Navigating the Pacific

Māori sailed from places like Tahiti to settle in Aotearoa New Zealand.

They came in waka hourua which are large canoes with twin hulls.

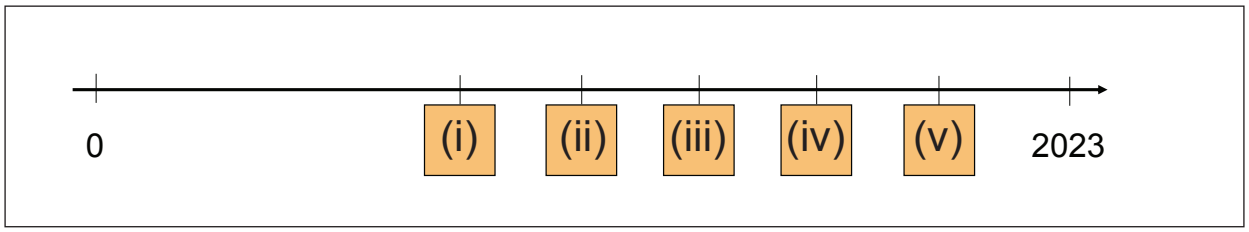


(a) Select (✔) the compass direction of the trip from Tahiti to Aotearoa New Zealand:

◯ West ◯ South ◯ South-east ◯ North-west ◯ South-west

This year it is 2023. Māori arrived in Aotearoa New Zealand around the year 1250.

That is almost 800 years ago.



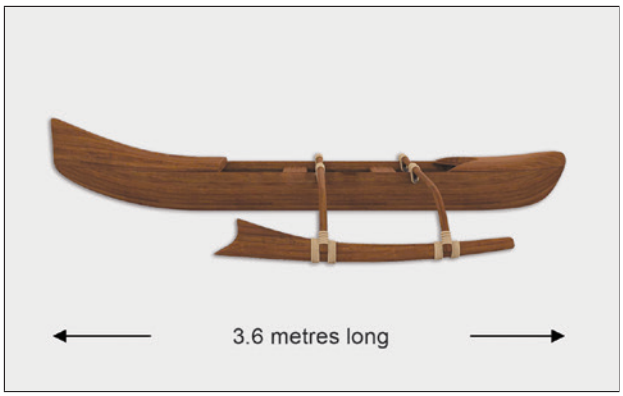
(b) Select (✔) the answer that marks where 1250 would be on the timeline:

◯ (i) ◯ (ii) ◯ (iii) ◯ (iv) ◯ (v)

Vaka and waka are Polynesian words for boat.

A vaka is 22 metres long. A small outrigger canoe is 3.6 metres long.

Vaka (waka)

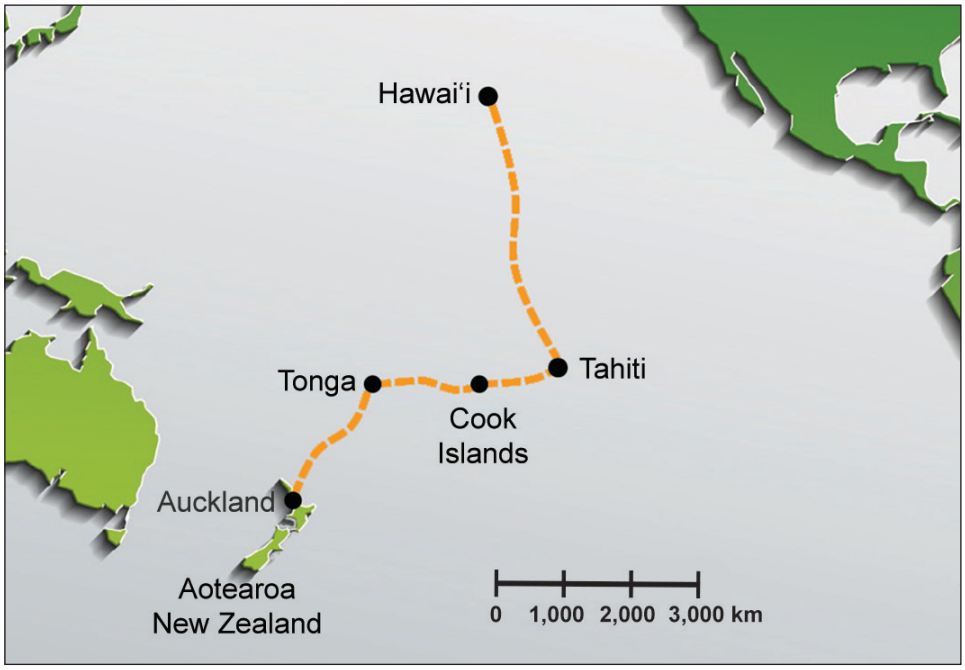


Small outrigger canoe

(c) How many times longer is the vaka than the small outrigger canoe?

_____ times longer

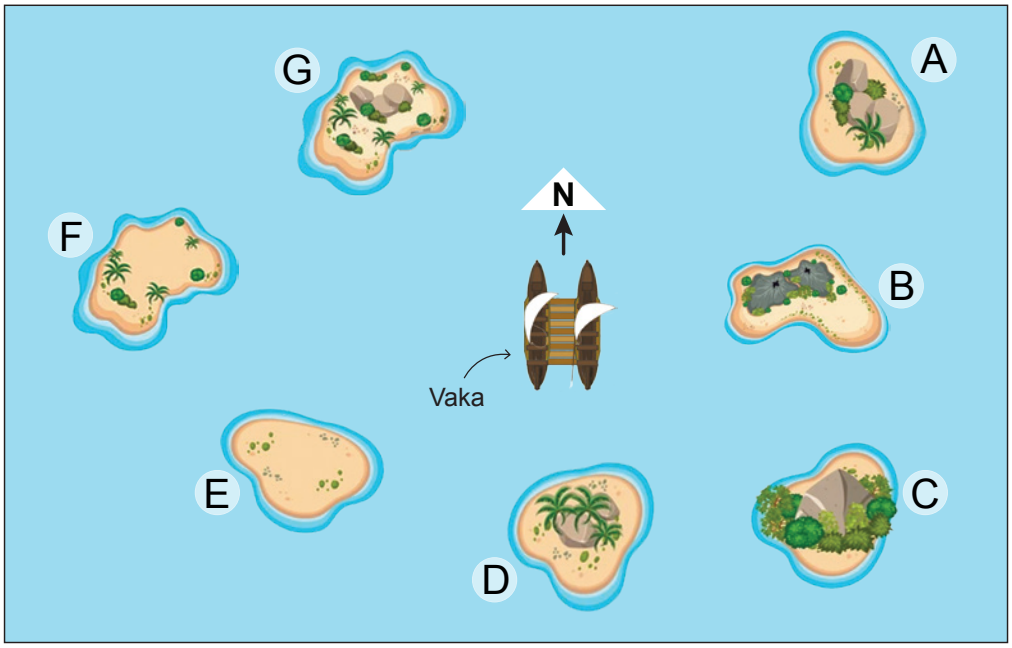
This map shows the route taken by a vaka on a journey from Auckland to Hawai'i.



(d) Using the scale on the map, which of the following estimates is closest to the total distance of the trip?

- ◯ 5,000 km
- ◯ 7,000 km
- ◯ 9,000 km
- ◯ 11,000 km
- ◯ 13,000 km

The vaka is facing north.

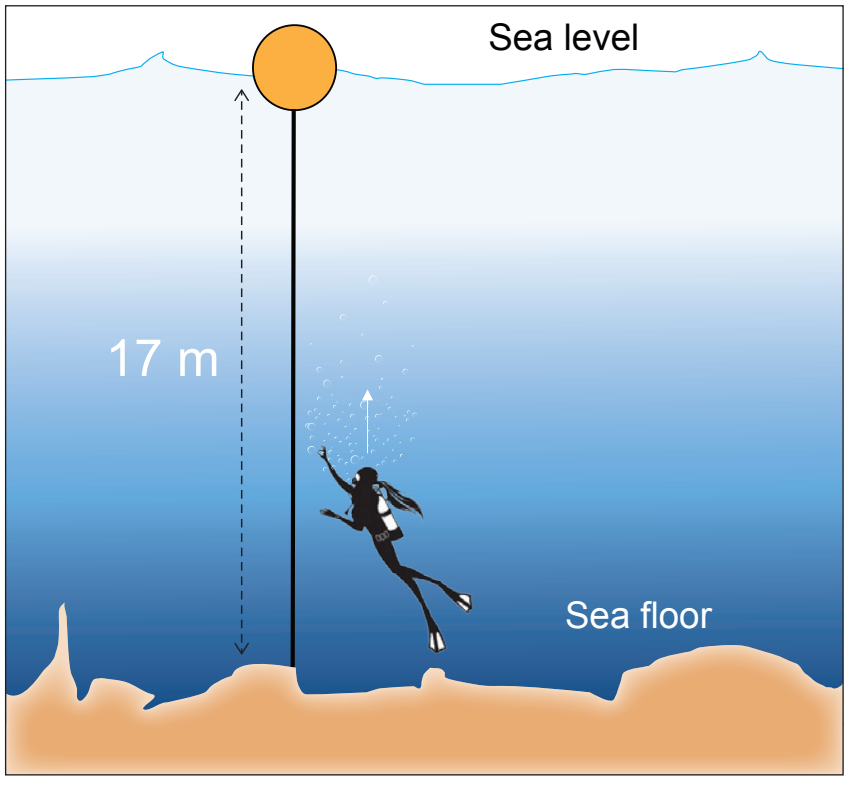


Vaka surrounded by seven small islands

(e) Which island does the vaka face if it turns 135° clockwise without moving forward? Select (✔) your answer from the choices below.

A	B	C	D	E	F	G
○	○	○	○	○	○	○

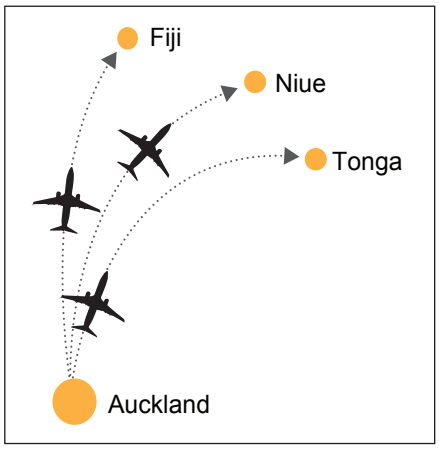
Hine dives for kōura (crayfish) on the sea floor. The sea floor is 17 metres below sea level.



(f) How many metres below sea level is Hine after she rises 8 metres from the sea floor? Write your answer as a negative number. For example, –2 means 2 metres below sea level:

_____ metres

Three flights leave from Auckland airport. Olioli claims that compared to flight times to Fiji and Niue, the flight to Tonga takes the longest.

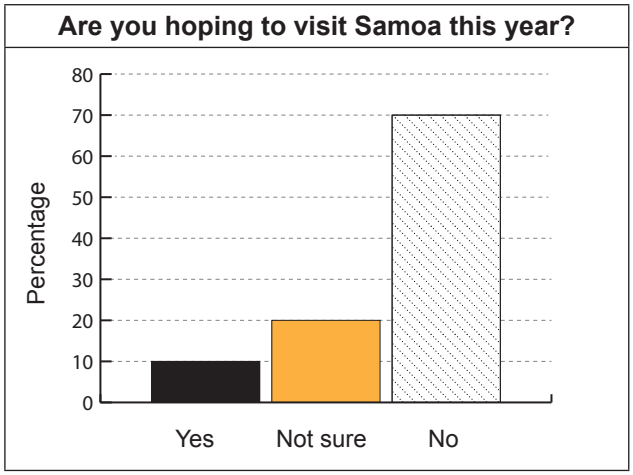


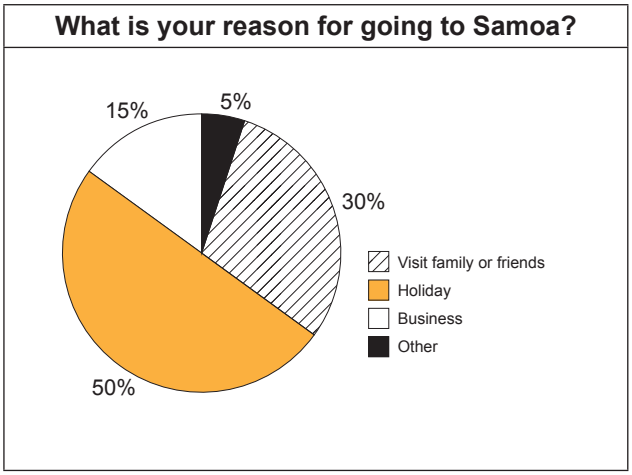
Destination	Leave (NZ time)	Arrive (NZ time)
Nadi (Fiji)	09:55	13:00
Nuku'alofa (Tonga)	11:25	14:15
Alofi (Niue)	08:15	11:45

(g) Is Olioli right? Use times to explain your answer.

1000 New Zealanders were asked, "Are you hoping to visit Samoa this year?" The people who said "Yes" were asked, "What is your reason for going to Samoa?"

These graphs show the data.



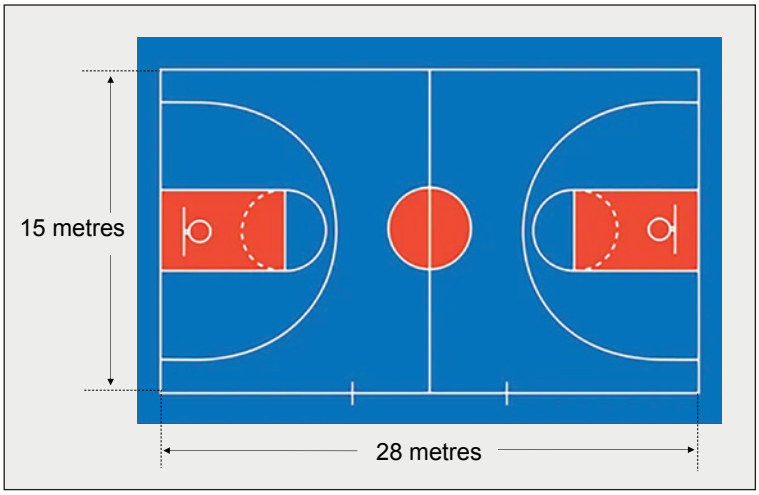


(h) Select (✔) all the statements that are **true about the 1000 New Zealanders**.
There is more than one answer.

- ◯ 10% of the people were hoping to visit Samoa this year.
- ◯ 200 people were not sure if they would visit Samoa this year.
- ◯ 500 people were hoping to visit Samoa to have a holiday.
- ◯ About ⅓ of the people hoping to visit Samoa this year were going to visit family or friends.

QUESTION TWO: Basketball

Here is a diagram of a basketball court that measures 15 metres in width and 28 metres in length.



(a) What is the area of the basketball court in square metres?

_____ m^2

Here are the players in a basketball team. Their heights are given in metres.

Nia 1.57 m	**Ani** 1.6 m	**Kendra** 1.94 m	**Sue** 1.7 m	**Mere** 1.78 m	**Lucy** 1.8 m	**Tania** 1.61 m	**Sina** 2.01 m

(b) Which two players need to swap places so that the heights are in order, shortest to tallest?

_____ and _____

A game of basketball is 40 minutes long. The coach wants all 8 players to get equal time on court, but only 5 players can be on at one time.

The coach thinks that each player should get 30 minutes on the court.

(c) Is he right? Use calculations to justify your answer.

The best angle for a jump shot is 48°.

(d) In the image below, circle ○ the **arrowhead** that is closest to that angle.

Lucy plays basketball.

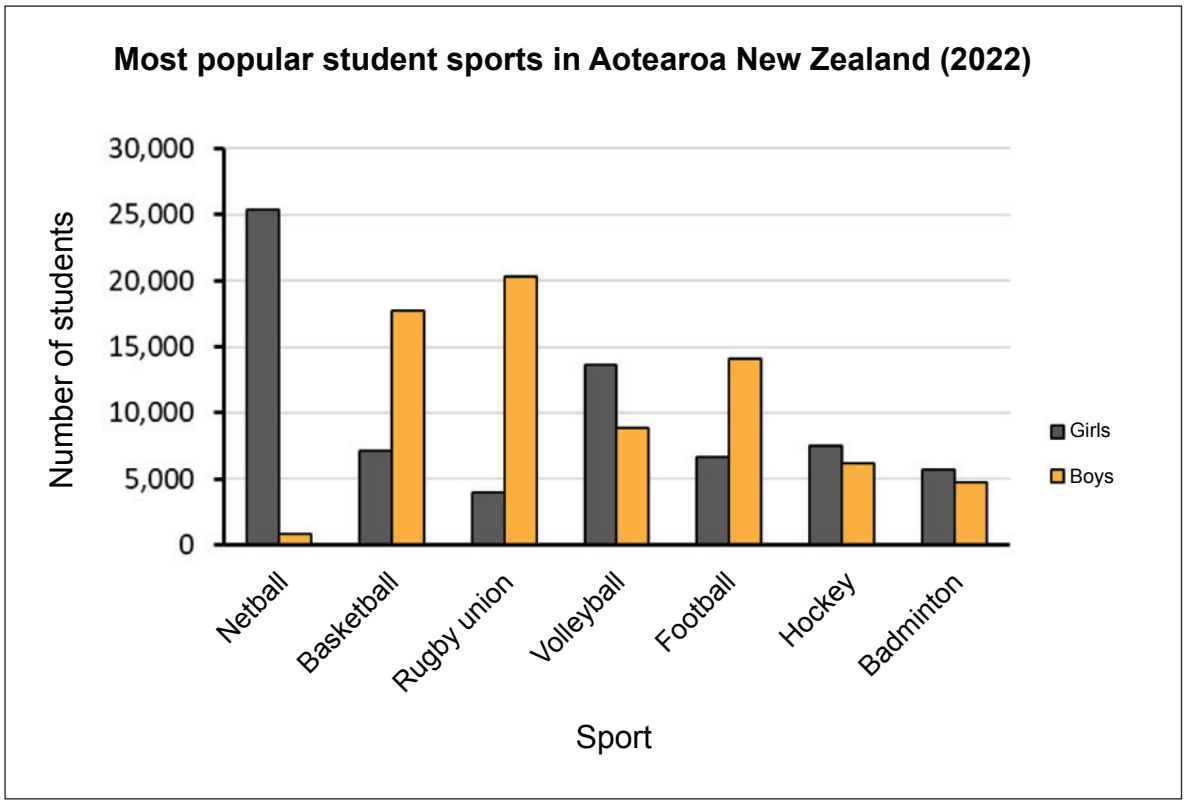
Including all games she has played, her average success rate for free throws is 50%.

Lucy is taking two free throws, one after the other. She is very confident that one of her shots will go in.

Lucy taking a free throw

(e) Do you think she is right? Explain your answer using ideas about chance.

The graph shows the most popular sports among students in Aotearoa New Zealand in 2022.



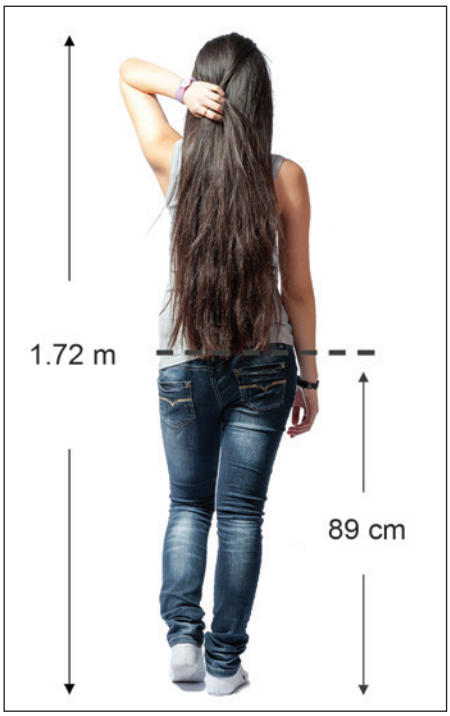
(f) What was the approximate total number of boys and girls playing basketball in 2022?

QUESTION THREE: *Shave for a Cure*

Mia is shaving her hair to raise money for charity.

She is 1.72 metres tall.

The distance from her hair to the ground is 89 centimetres.



Mia

(a) What is the length of Mia's hair in metres?

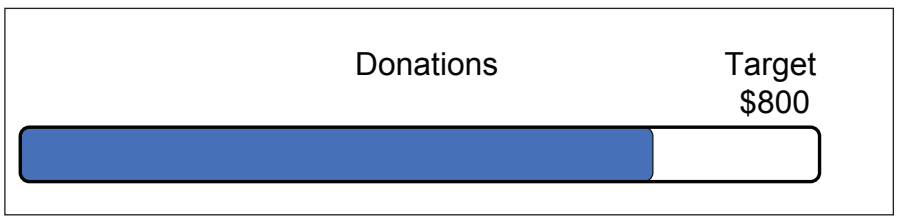
_____ m

Here are three options for donating to *Shave for a Cure*.

(b) How many *Transport to the hospital* donations will raise the same amount as **10** *Support person* donations?

_____

This bar shows the donations that Mia has received.

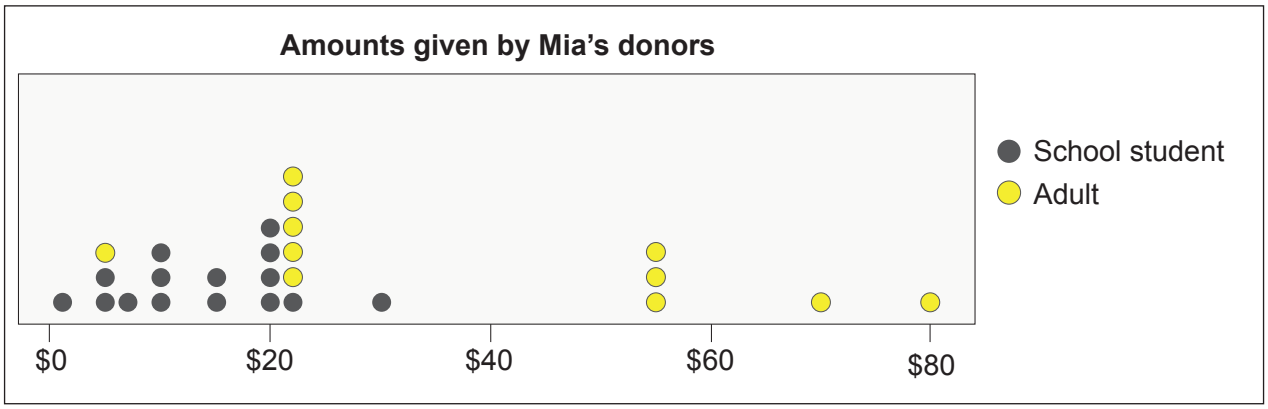


(c) About how much has Mia received in donations?

$ _____

The graph shows the amounts given by Mia's donors.

The amounts for school students and adults are shown in different colours.



(d) How are the amounts donated by school students different from the amounts donated by adults? Use numbers from the graph to support your answer.

Mia can sell her hair to a wig factory.

(e) If Mia sells 70 centimetres of her hair, how much money will she make?

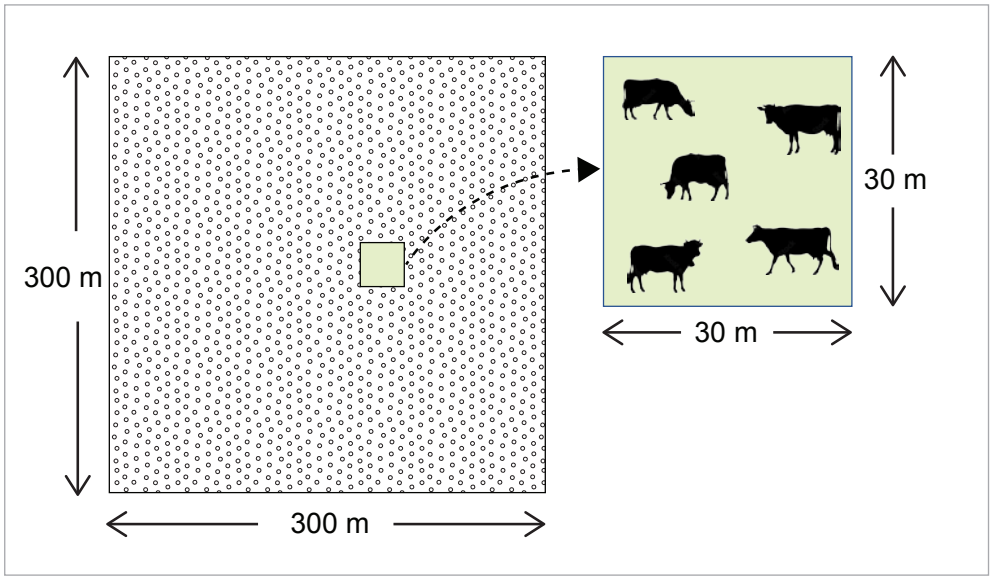
$ _____

QUESTION FOUR: Cows

The farmer's field measures 300 metres by 300 metres.

In a 30 metre by 30 metre section there are 5 cows.

The cows are evenly spread throughout the field.



(a) Estimate how many cows there are in the whole field:

_____ cows

Here is a picture of Daisy.

(b) Daisy sees her reflection in the water.

From the options below, select (✔) the picture that shows the reflection that Daisy sees.

On average, a dairy cow walks about 12,000 steps per day. Each step measures about 1.6 metres.

A farmer claims that each of her dairy cows walks 20 km per day.

(c) Is her claim reasonable? Write a calculation that supports your answer.

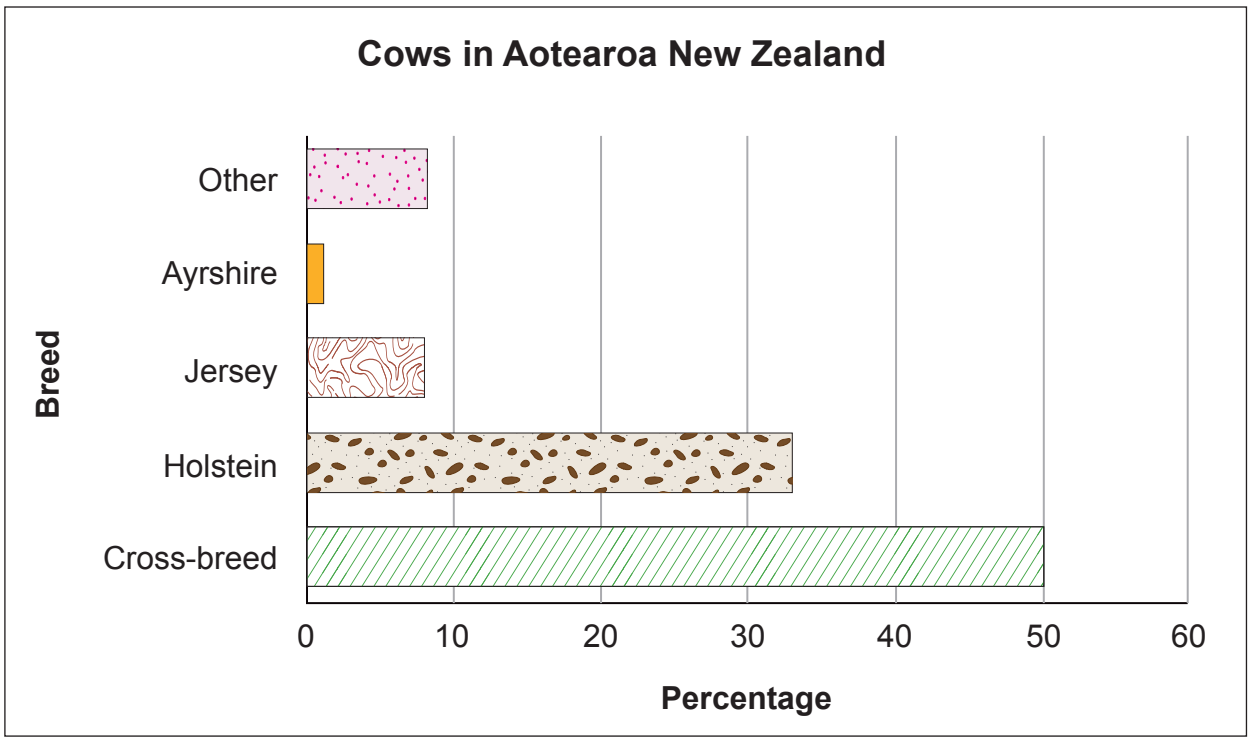
Mooloo, a cow, produces about 35 litres of milk per day.

A family uses 3 litres of milk every 2 days.

(d) Approximately how many days will 35 litres of milk last that family?

_____ days

There are about 6 million cows in Aotearoa New Zealand.



(e) Looking at the graph above, about **how many** cows in Aotearoa New Zealand are Jersey cows?

_____ Jersey cows

The farmer's herd has 300 Holstein cows and 200 Jersey cows.

There is no pattern to which cow turns up first to be milked.

(f) The farmer says that there is a 60% chance that the first cow is a Holstein. Is she right?

Use fractions or decimals to explain your answer.

QUESTION FIVE: Voting time

Voting determines the people and parties that will be in parliament.

Elections in Aotearoa New Zealand happen every 3 years.

2023 is an election year.

Parliament buildings, Wellington

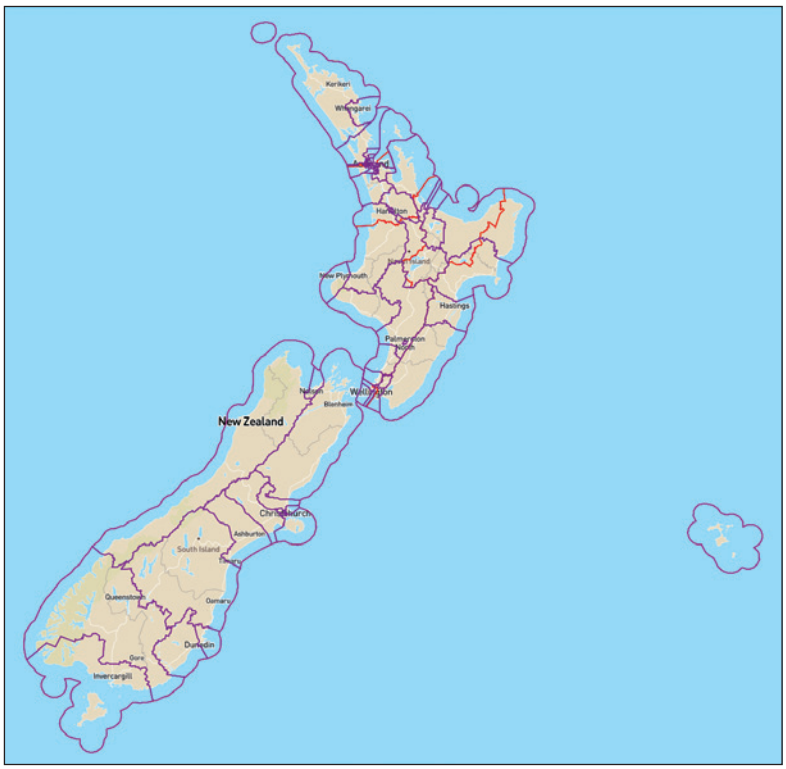
(a) Was 1987 an election year? Show the working you use to answer this question.

There are 72 electorates in Aotearoa New Zealand. That includes 7 Māori electorates.

About 3,900,000 people can vote.

(b) Select (✔) the equation that gives the average number of people per electorate:

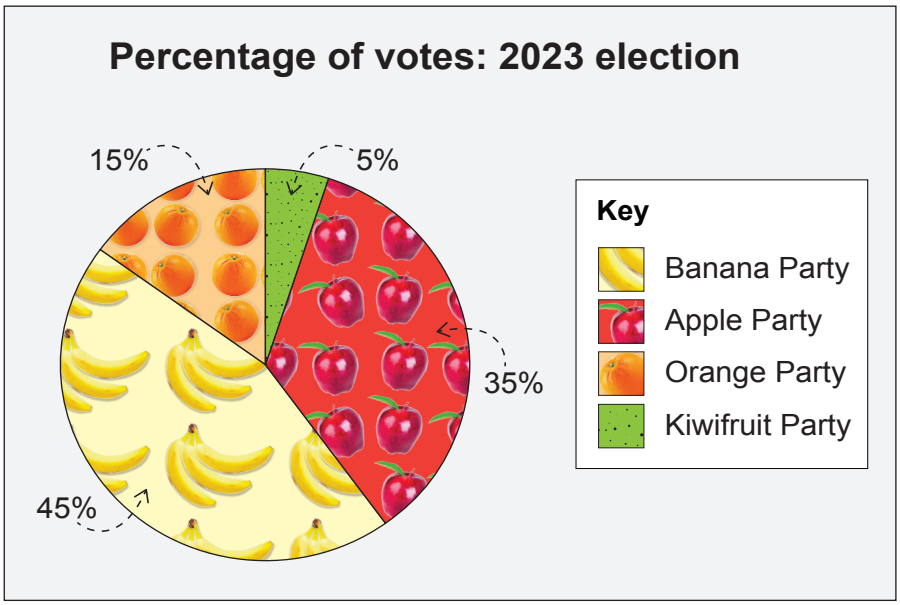
- 72 × 3,900,000 ◯
- 3,900,000 + 72 ◯
- 3,900,000 – 72 ◯
- 72 ÷ 3,900,000 ◯
- 3,900,000 ÷ 72 ◯



Electorate map of Aotearoa New Zealand

A political party is a group of people with similar ideas.

The Apple Party receives 35% of votes, so they get 35% of the 120 seats in parliament. That's 42 seats.

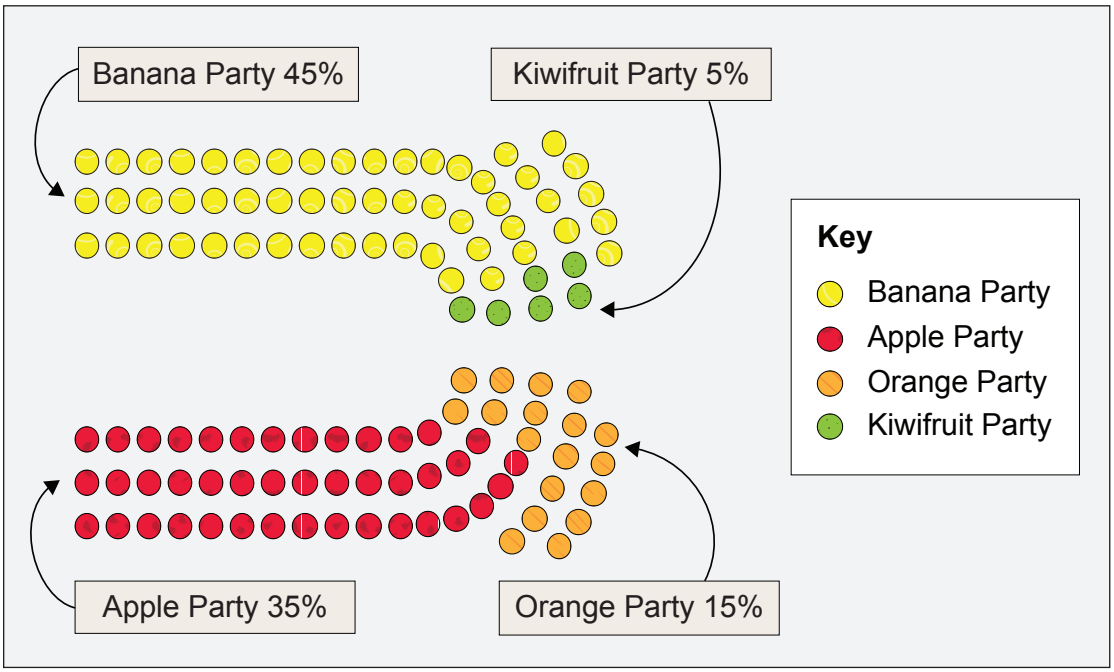


(c) How many seats does the Orange Party get?

_____ seats

To be the Government, parties need to work together and form a team called a coalition.

The team must have **over 50%** of the seats in parliament.



(d) Select (✔) all the teams that could form the Government:

- ◯ Banana and Orange Parties
- ◯ Apple and Banana Parties
- ◯ Apple and Orange Parties
- ◯ Orange and Kiwifruit Parties
- ◯ Kiwifruit and Banana Parties
- ◯ Orange, Kiwifruit, and Apple Parties

Every voter in Aotearoa New Zealand makes two choices. They vote for a **party**, and they vote for a **person**.

One combination is to vote for the Banana Party and Isaia Finaki. Another is the Orange Party and Henry Chote.

Party Vote	Person Vote
Apple Party	CHOTE, Henry
Banana Party	FINAKI, Isaia
Kiwifruit Party	JONES, Tayla
Orange Party	NUI, Rawiri
	PEREZ, Joe
	WANG, Chris

(e) How many different voting combinations are possible on this form?

_____ voting combinations

Extra space if required.
Write the question number(s) if applicable.

QUESTION NUMBER	

Extra space if required.
Write the question number(s) if applicable.

QUESTION NUMBER

Acknowledgements

Material from the following sources has been adapted for use in this assessment:

Question one

Polynesian migration, https://www.researchgate.net/publication/340980991/figure/fig1/AS:886207588343813@1588299762620/Schematic-map-showing-simplified-routes-of-human-aided-dispersal-of-Polynesian-rats.ppm
Vaka (waka), https://www.sail-world.com/Australia/photo/153655
Small outrigger canoe, https://thumbs.dreamstime.com/b/outrigger-boat-isolated-outrigger-boat-isolated-white-background-d-render-155707437.jpg
Journey from Auckland to Hawai'i, https://www.shutterstock.com/image-illustration/vector-flat-world-map-pacific-ocean-186564596
Small islands, https://www.shutterstock.com/image-vector/set-beautiful-tropical-island-illustration-600w-1117207331.jpg
Vaka (waka), https://www.rnzcgp.org.nz/news/equity/the-meihana-model/
Diver, https://www.vectorstock.com/royalty-free-vector/scuba-diver-gives-a-sign-vector-1228527.jpg

Question two

Basketball court, https://www.shutterstock.com/image-vector/basketball-court-floor-line-on-260nw-1012129195.jpg
Basketball player silhouettes, https://www.shutterstock.com/image-vector/women-basketball-vector-background-silhouette-set-148018928
Stopwatch, https://www.shutterstock.com/image-vector/illustration-metal-framed-timer-number-600w-132875495.jpg
Basketball player, https://www.shutterstock.com/image-photo/girl-holading-basketball-1080423551
Girl holding basketball, https://www.shutterstock.com/image-photo/female-high-school-basketball-player-shooting-198896321
Most popular student sports graph, https://en.wikipedia.org/wiki/Sport_in_New_Zealand

Question three

Girl with long hair, https://www.shutterstock.com/image-photo/back-young-woman-long-hairs-dressed-130542362
Ambulance icon, https://stock.adobe.com/images/ambulance-vector-icon/259011369
Support person icon, https://www.vectorstock.com/royalty-free-vector/hands-support-people-human-rights-day-line-icon-vector-33393898
You choose icon, https://www.vectorstock.com/royalty-free-vector/hand-holding-heart-icon-trust-and-care-symbol-vector-39784577
Woman with flying hair, https://myloview.com/poster-girl-with-flying-hair-young-smiling-girl-with-long-healthy-hair-no-50F6882

Question four

Cow silhouettes, https://stock.adobe.com/au/images/cow-silhouettes/67246226
Daisy with ear tags, https://www.seekpng.com/ipng/u2w7u2q8r5a9e6w7_logo-dairy-cow-logo/
Cow walking, https://vetlife.co.nz/wp-content/uploads/2021/01/Web-blog-heading-images4.jpg
Mooloo the cow, https://www.shutterstock.com/image-photo/holstein-black-white-cow-being-milked-666057604
Milk splash, https://img.freepik.com/premium-photo/milk-yogurt-splash-white-splash-3d-rendering_99236-359.jpg
Glass of milk, https://img.freepik.com/premium-photo/glass-milk-isolated-white_62856-4083.jpg
Holstein cow, https://img.freepik.com/premium-photo/holstein-cow-standing_191971-14133.jpg

Question five

Parliament buildings, Wellington, https://www.lowyinstitute.org/sites/default/files/styles/interpreter_article_image/public/beehive%20bro%202.jpg
72 electorates Aotearoa New Zealand, https://vote.nz/maps/find-your-electorate/
Apple, https://www.freepik.com/free-photo/red-apple-with-green-leaf-white-background_1018481.htm
Banana, https://img.freepik.com/premium-photo/ripe-banana-isolated-white_146936-1096.jpg
Kiwifruit, https://stock.adobe.com/nz/images/gold-kiwi-isolated-on-transparent-png/573374618?asset_id=573374618
Orange, https://www.walmart.ca/en/ip/orange-seedless/6000191272335

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Numeracy 2022

32406 Use mathematics and statistics to meet the numeracy demands of a range of situations

Credits: Ten

PILOT ASSESSMENT

OUTCOMES	
1	Formulate a mathematical and/or statistical approach to solving problems in a range of meaningful situations.
2	Use mathematics and statistics to address the numeracy demands of a range of meaningful situations.
3	Explain the reasonableness of mathematical and statistical responses to situations.

You should attempt ALL the questions in this assessment.

Answer all parts of each question by filling in the gaps or selecting (✔) the correct answer.

If you need more room for any answer, use the extra space provided at the back of this booklet.

Check that this booklet has pages 2–20 in the correct order and that none of these pages is blank.

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QUESTION ONE: Eggs

This table shows how eggs are graded by minimum weight

Grade	4	5	6	7	8
Weight	35 g +	44 g +	53 g +	62 g +	68 g +

(a) What grade is an egg that weighs 60 grams?

- ☐ Grade 4
- ☐ Grade 5
- ☐ Grade 6
- ☐ Grade 7
- ☐ Grade 8

(b) Calculate the minimum weight of one dozen (12) eggs that are grade 7.

Picture of one dozen (12) eggs

(c) On average, New Zealanders eat about 250 eggs each per year. The population of New Zealand is just over 5 million people.

Here is a headline from a newspaper:

> **IT'S NO YOLK!**
>
> **New Zealanders eat over 1 billion eggs per year.**

Is the headline realistic? Explain your answer using the information provided in part (c).

QUESTION TWO: Making Muffins

Aloma wants to use the following ingredients to make 12 white chocolate raspberry muffins.

- 2½ cups self-raising flour
- 100 g butter
- 1 cup sugar
- 1 cup milk
- 1 egg
- 1 cup frozen raspberries
- 90 g white chocolate buttons

(a) 1 cup of flour weighs 125 grams. Aloma has a 1.5 kg bag of flour. How many cups can she fill from the 1.5 kg of flour?

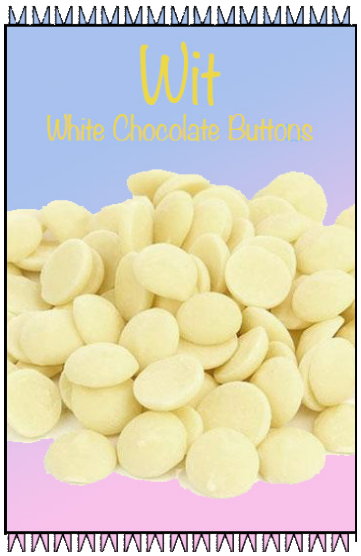
_____ cups

(b) At the supermarket, Aloma finds two different brands of white chocolate buttons.

Blanco Buttons

100 grams for $1.40

Wit Buttons



290 grams for $3.60

Which is the best buy for Aloma – Blanco Buttons or Wit Buttons?
Explain your answer using the price information above.

(c) The recipe only makes 12 muffins. Aloma needs to make enough muffins for 30 people. How can she alter the amount of ingredients to give every person at least one muffin?

- ☐ Add 150 g to each amount of ingredient
- ☐ Add 1.5 cups to each amount of ingredient
- ☐ Multiply each amount of ingredients by at least 2.5
- ☐ Divide each amount of ingredients by 1.5 or more
- ☐ Double each amount of ingredients

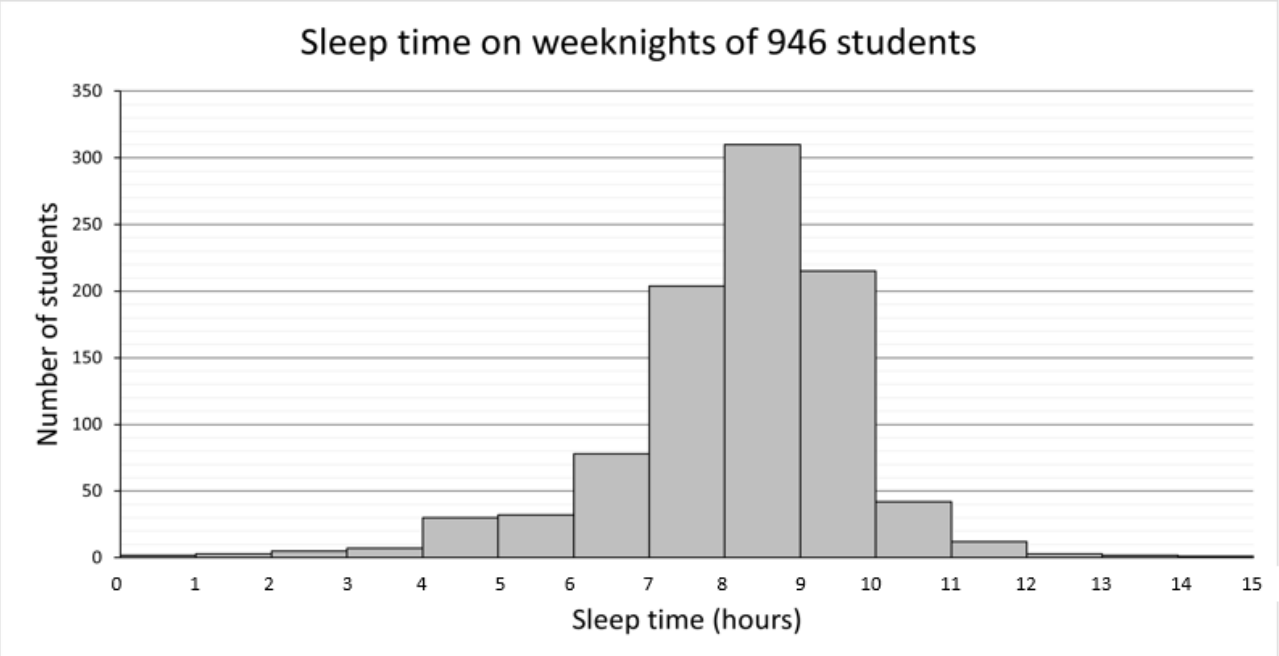
QUESTION THREE: Enough Sleep?

(a) Dallas goes to sleep at 9.30 pm and wakes up at 7.15 am the next morning.
How long does Dallas sleep for?

_____ hours

_____ minutes

(b) Here is a graph that shows average sleep time for a sample of 946 Year 9 to 13 Students.



About what percentage of students in the sample of 946 said that they got less than 8 hours sleep each night?

_____ %

(c) The Ministry of Health recommends that teenagers, aged 13–18 years, should get 8 to 10 hours sleep per night.

A friend of Dallas claims that only one half of the students in this sample get enough sleep.

Do you agree with the friend's claim? Explain your answer using information from the graph and the Ministry of Health recommendation.

QUESTION FOUR: Checking the Advertising

(a) The admission prices at Kaitiakitanga Wildlife Park are as follows:

Adults	$36.00
Children (5-15 Years)	$10.50

In the school holidays the park offers a special deal for a family pass. The advertisement for the deal reads:

$80 Family Pass
Kaitiakitanga Wildlife Park
2 adults and up to 3 children
Save over $20

Is the advertisement true? Will a group that uses the family pass save money? Explain your answer using the advert and the pricing information.

(b) Lara needs three notebooks for a course she is doing. The advertisement for the notebooks reads:

Course Notebooks
$2.99 each
Buy 1 and get 1 half price

Should Lara buy four notebooks using the "Buy 1 and get 1 half price" deal or should she buy three notebooks for $2.99 each? Explain your answer using the information provided above.

(c) Flora sees the following advertisement for jackets.

25% OFF
Now $59.99
Save $21.00

Flora knows the usual price of the jacket is $80.99. Which of the following statements is correct?

- ☐ The advertised price is exactly 21% off.
- ☐ The advertised price is less than 25% off.
- ☐ The advertised price is 25% off.
- ☐ The advertised price is more than 25% off.

QUESTION FIVE: Winter Olympics

Zoi Sadowski-Synnott – New Zealand snowboarder

Zoi Sadowski-Synnott represented New Zealand in snowboarding at the 2022 Winter Olympics.
A single trip down the course is called a run. On one run, Zoi attempted a 1260 jump. That means she tried to turn 1260° before landing.

(a) How many full and part rotations are in a 1260 jump?

- ☐ 2
- ☐ 2 ½
- ☐ 3
- ☐ 3 ½
- ☐ 4

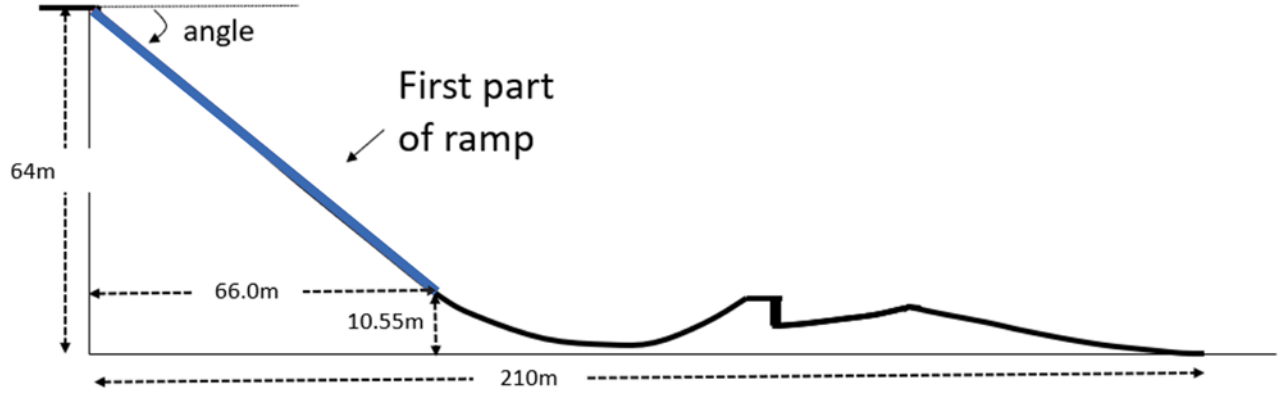
(b) Zoi's first run was scored by six judges from different countries. To get an overall score for the first run, the highest and lowest numbers were removed (Japan and Canada's scores have been removed).

Japan	France	USA	Australia	Canada	Switzerland
	93	94	93		93

Zoi's score was the average of the remaining four numbers. What score did Zoi get for her first run?

Big Air ramp is lit up at Shougang Park

(c) Below is a side on view of the 'Big Air' ramp. The diagram is NOT to scale.



A presenter speaking on TV said that the first part of the ramp drops at an angle of about 40°.
Is 40° a good estimate of the angle?

Explain your answer using information from the diagram.

QUESTION SIX: Huia catches the bus

Each weekday morning, Huia catches the bus from Rata to Graham where she works. Here is the timetable:

City to Graham Timetable

City Centre	Rata	Clarke	Te Puia	Seddon	Kirk	Ngata	Graham
7:15am	7:23am	7:39am	7:51am	8:03am	8:17am	8:31am	8:42am
8:05am	8:13am	8:29am	8:41am	8:53am	9:07am	9:21am	9:32am
8:55am	9:03am	9:19am	9:31am	9:43am	9:57am	10:11am	10:22am
9:45am	9:53am	10:09am	10:21am	10:33am	10:47am	11:01am	11:12am
10:35am	10:43am	10:59am	11:11am	11:23am	11:37am	11:51am	12:02pm
11:25am	11:33am	11:49am	12:01pm	12:13pm	12:27pm	12:41pm	12:52pm

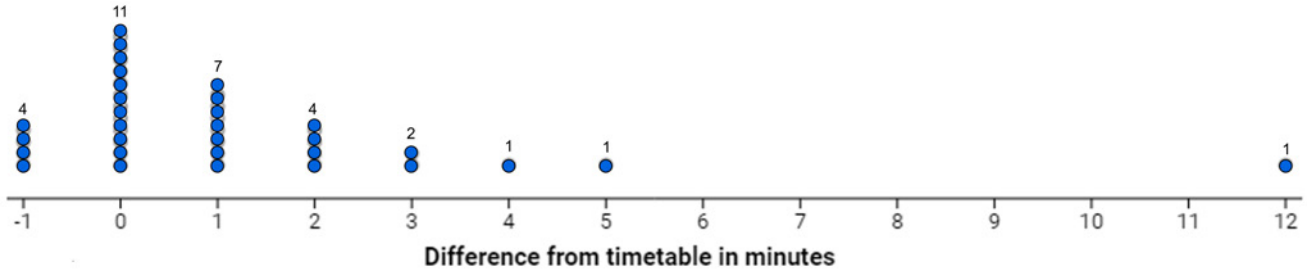
(a) How often does a bus leave the City Centre for Graham?

- ☐ Every 30 minutes
- ☐ Every 40 minutes
- ☐ Every 50 minutes
- ☐ Every hour
- ☐ Every 90 minutes

(b) How long does Huia's bus trip take from Rata to Graham?

_____ minutes

(c) Huia likes to arrive at work early and has created a graph to record the arrival times of the 9:03 am bus at her stop.



A difference of –1 means the bus arrives one minute early.

Huia says, "The chance of the bus being on time, or early, is 50%".
Do you agree with Huia? Explain your answer using information from the graph above.

QUESTION SEVEN: Buying Bananas

At Saffron's Fruit n' Veg Shop the price of bananas is $2.70 per kilogram.

(a) What will a 750 g bunch of bananas cost, to the nearest cent?

- ☐ $1.80
- ☐ $2.03
- ☐ $2.25
- ☐ $4.73

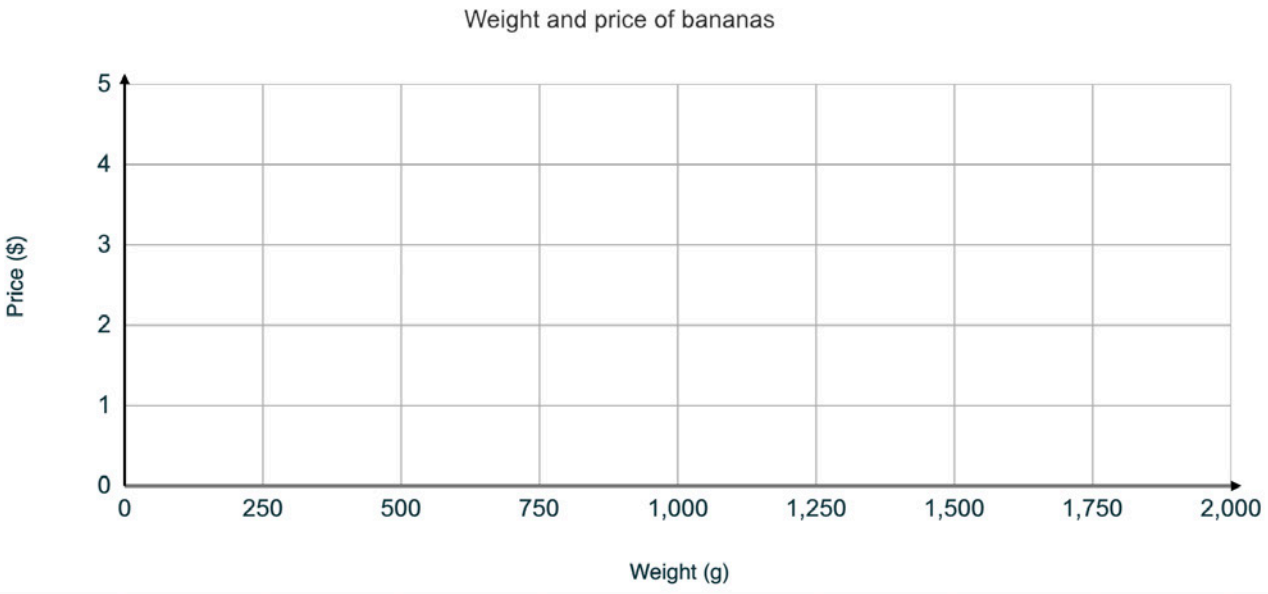
(b) What is the weight of a banana that costs $0.50?

_____ grams

(c) This table shows the weights and prices of two bunches of bananas.

Weight	Price
1 kilogram	$2.70
500 grams	$1.35

Plot the weight and price for the two bunches of bananas on the graph below. Draw a line through the points and continue the line to the edges of the graph in each direction.



Explain how the line could be used to find the price of a bunch of bananas that weighs 1.2 kilograms.

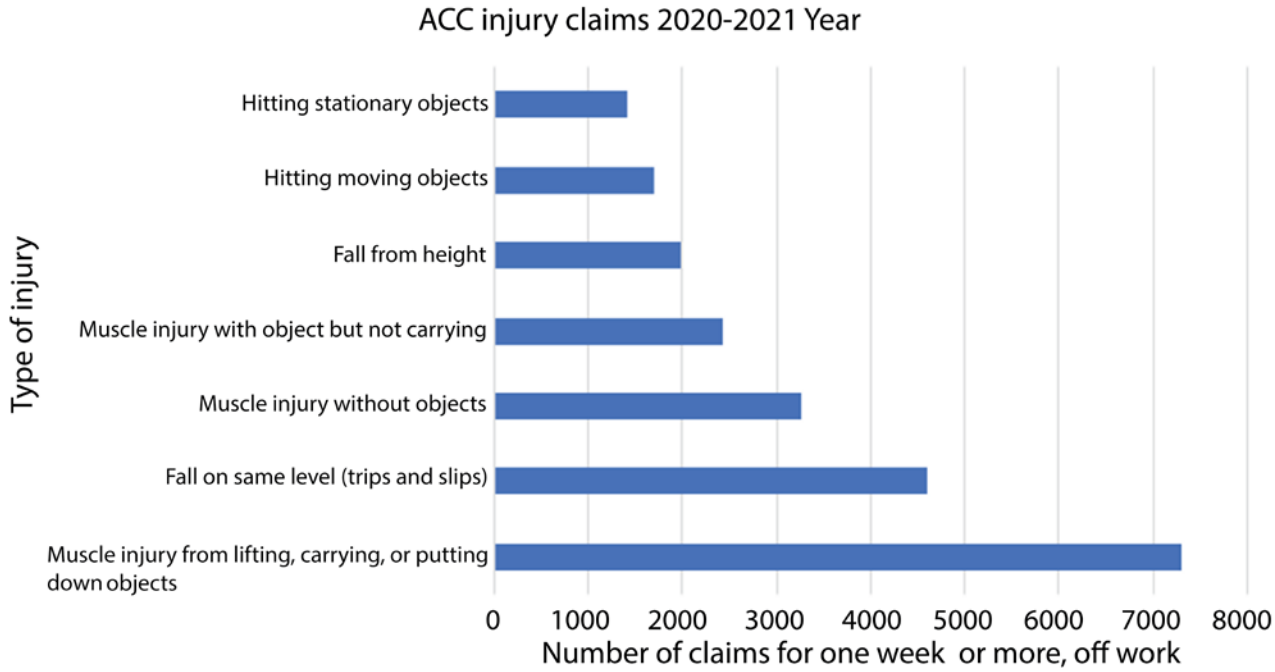
QUESTION EIGHT: Accidents in the workplace

When someone has an accident at work, they are supported by the Accident Compensation Commission (ACC). During 2021, injuries at work cost ACC a total of $924,020,378 in claims. There are about 2,750,000 workers in New Zealand.

(a) On average, about how much money is claimed per worker?

- ☐ $3.50
- ☐ $35.00
- ☐ $350.00
- ☐ $3,500.00

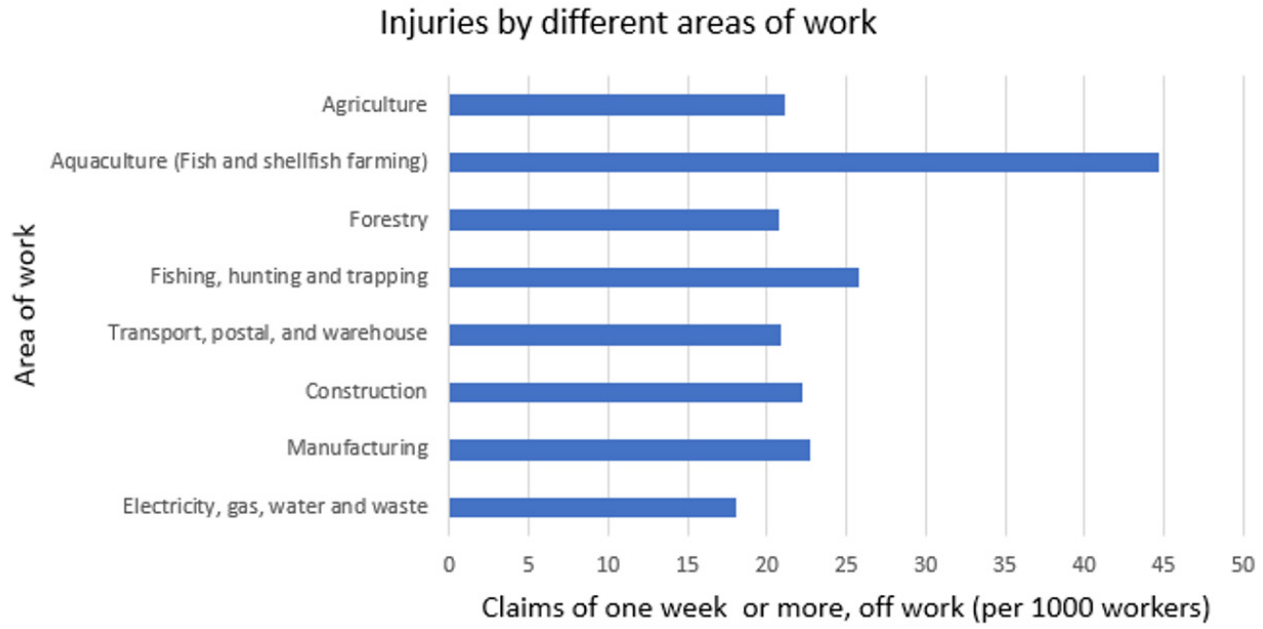
(b) This graph shows the number of ACC claims where people had to stay away for one week or more, from work. It also shows the types of injury.



Select the statements which are true (more than one statement can be true):

- ☐ most injuries are strains and tears to muscles.
- ☐ more injuries come from falling over on a flat surface than falling from height.
- ☐ getting hit by objects is the most common cause of injury.
- ☐ car accidents are a major type of injury in the workplace.
- ☐ over 3000 claims were the result of muscle injury without objects.

(c) Carla wonders if some types of work are more dangerous than others. She finds this graph.

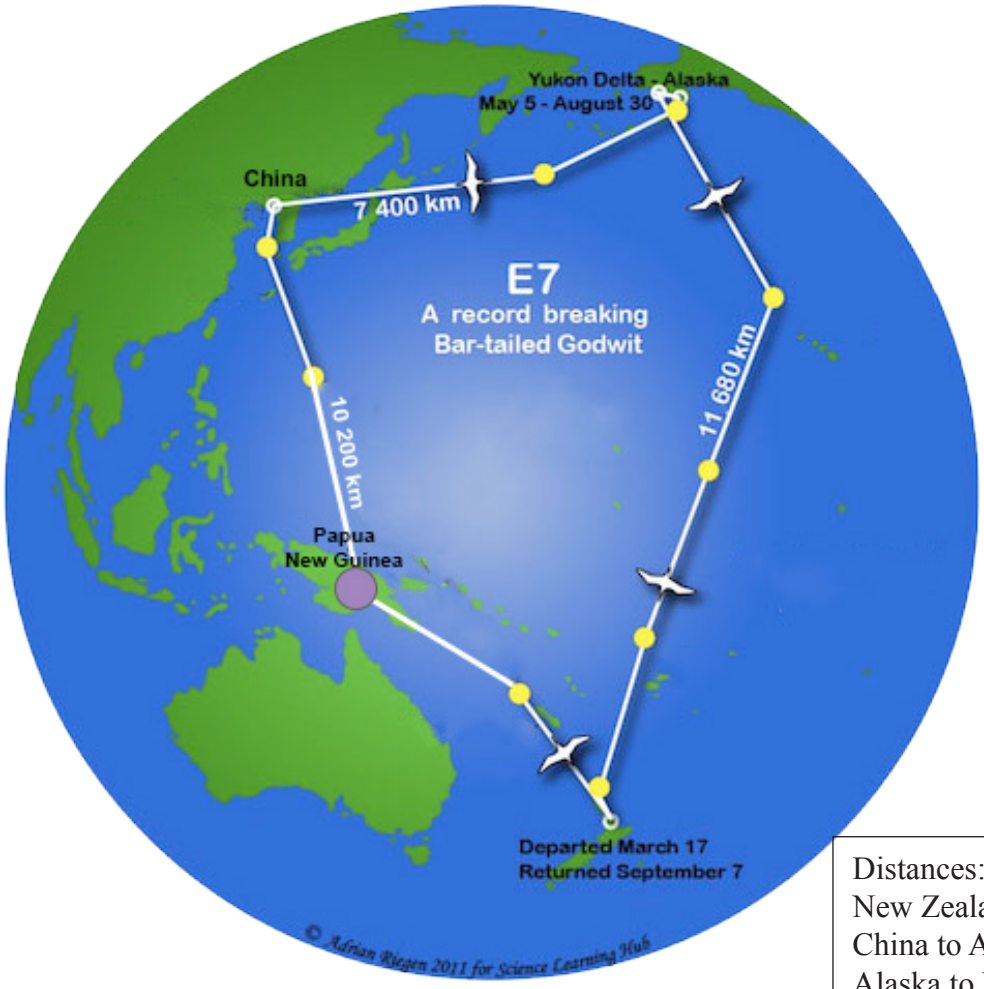


Carla's dad works on a mussel farm. Each day he lifts ropes loaded with shellfish, and full bins, on and off the boats. Carla claims "Aquaculture has a high rate of injury because workers move heavy objects."

Does Carla's claim make sense? Explain your answer using information from the graphs in both (b) and (c).

QUESTION NINE: Kūaka / bar-tailed godwits

Māori regard kūaka (bar-tailed godwits) as birds of mystery. That is because it is believed that kūaka travel through the ancestral home of Hawaiki. They migrate between New Zealand and Alaska each year as shown on the map below.
Kūaka make a non-stop flight from Alaska to arrive in New Zealand in September.



Distances:
New Zealand to China 10 200 km
China to Alaska 7 400 km
Alaska to New Zealand 11 680 km

(a) Papua New Guinea is the second of the 'stopover sites'. It is marked by the purple spot on the map. In which direction is the flight path from New Zealand to the stopover site in Papua New Guinea.

- ☐ North
- ☐ West
- ☐ North-east
- ☐ North-west

(b) In 2007, scientists attached a tracking device on a single kūaka, that they nicknamed E7. The map above shows the distances E7 flew as she migrated.

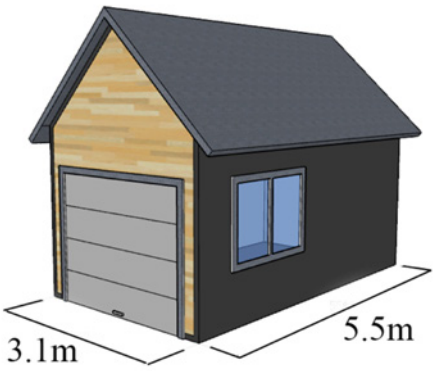
What was the total length of E7's round trip journey?

_____ km

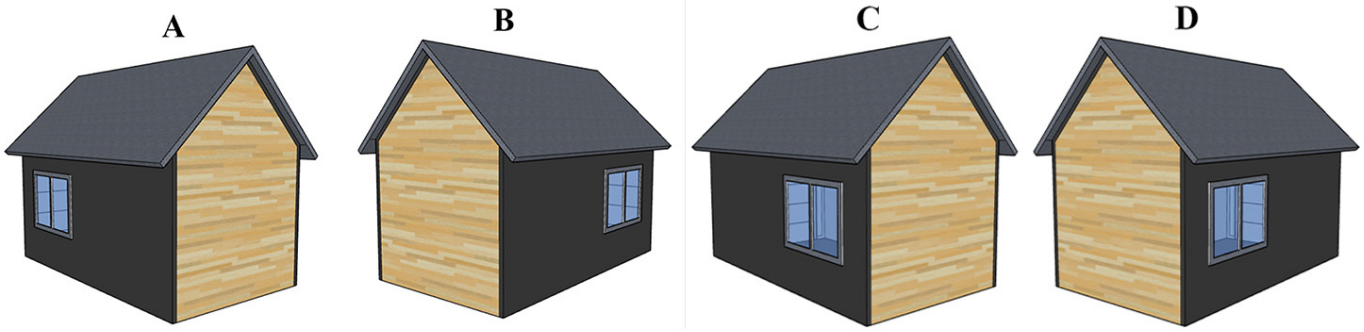
(c) In 2020, another kūaka flew non-stop for 12 200 km from Alaska to New Zealand in 11 days. Explain how to calculate this bird's average speed, in kilometres per hour, for that flight.

QUESTION TEN: Sleepout

Charlie's garage has one window and a front door.
The garage is 3.1 metres wide and 5.5 m long.



(a) Which of the diagrams below shows the garage viewed from where Charlie is standing?



☐ A ☐ B ☐ C ☐ D

(b) Charlie wants to change the garage into a sleepout. He covers the floor with carpet tiles. Charlie finds some carpet tiles online.

Each tile measures 500 mm by 500 mm and they come in packs of 15 tiles. How many packs will Charlie need?

_____ packs

(c) Charlie's sleepout also needs a heat pump. The walls are 2.4 metres high, and the room will be insulated. A general rule for the heat pump output needed is given by this formula:

output needed (kW) = 0.12 x *area of the room (m^2)*

Charlie also finds the following information online:

Area of the room	Heat pump output
10 m^2	1.5 kW
15 m^2	1.8 kW
20 m^2	2.2 kW
25 m^2	2.7 kW
30 m^2	3.2 kW
35 m^2	3.8 kW
40 m^2	4.3 kW
45 m^2	4.9 kW

Which heat pump output is best for Charlie to buy?
Explain your answer using information from both the formula and the table.

Extra space if required.
Write the question number(s) if applicable.

QUESTION NUMBER

Extra space if required.
Write the question number(s) if applicable.

QUESTION NUMBER

Acknowledgements
Material from the following sources has been adapted for use in this assessment:

Question One
https://samoamarket.com/collections/farmer-joe-vouchers?page=3
Question Two
https://www.thecakemixer.co.nz/products/belgian-white-chocolate-buttons-250gm
https://samoa.eatthekiwi.com/products/sv-white-compound-buttons-1kg

Question Five
https://www.thecoast.net.nz/news/zoi-sadowski-synnott-has-won-new-zealands-first-medal-at-the-beijing-winter-olympics/
https://www.youtube.com/watch?v=fAdPttnqdEc
https://news.cgtn.com/news/2021-11-15/Big-Air-Shougang-to-be-kept-as-permanent-facility-after-Beijing-2022-15cWe5wPSRa/index.html

Question Nine
https://www.sciencelearn.org.nz/resources/316-tracking-e7

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Numeracy 2022

32406 Use mathematics and statistics to meet the numeracy demands of a range of situations

Credits: Ten

PILOT ASSESSMENT

OUTCOMES	
1	Formulate a mathematical and/or statistical approach to solving problems in a range of meaningful situations.
2	Use mathematics and statistics to address the numeracy demands of a range of meaningful situations.
3	Explain the reasonableness of mathematical and statistical responses to situations.

You should attempt ALL the questions in this assessment.

Answer all parts of each question by filling in the gaps or selecting (✔) the correct answer.

If you need more room for any answer, use the extra space provided at the back of this booklet.

Check that this booklet has pages 2–24 in the correct order and that none of these pages is blank.

YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE ASSESSMENT.

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QUESTION ONE: Hāngī Sales

Kahu and Henrietta raise money for their kapa haka group by selling hāngī packs. They have many costs.

Fixed costs are costs that stay the same no matter how many hāngī packs they sell, like hiring tables, baskets, sacks, cutlery, plates, and a tent.

Some costs vary depending on how many hāngī packs they sell, like the amount of food, firewood, and packaging they use. These are called **variable costs**.

(a) Kahu and Henrietta know their fixed costs are $300.00 and their variable costs are $8.00 per hāngī pack. What is the total amount it will cost them to make 500 hāngī packs?

$_____

(b) Meat is the biggest food cost. Henrietta gets a 30% discount from her helpful local butcher. Write the discounted cost of one kilogram of pork chops in the text box in the table.

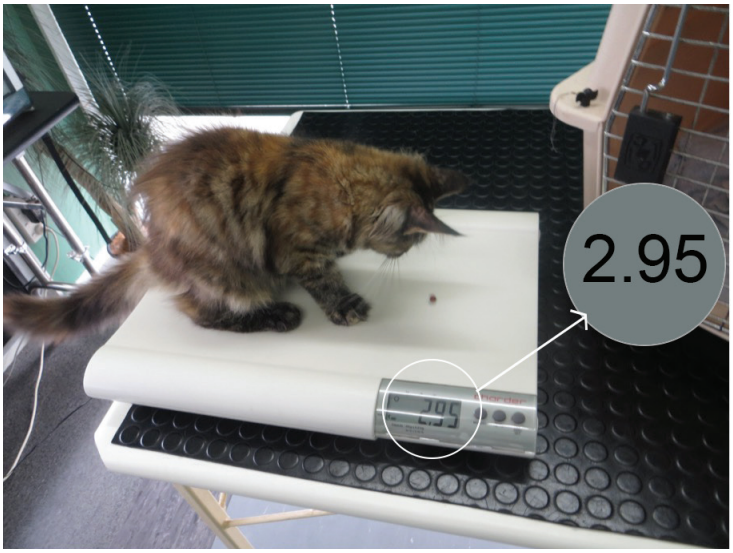
Meat	Price per kilogram	Discount (30%)	Amount charged per kilogram
Chicken pieces	$12.00	$3.60	$8.40
Lamb chops	$18.70	$5.61	$13.09
Pork chops	$15.00		$_____

(c) Kahu and Henrietta create this graph to show how much money they will raise for different numbers of hāngī pack sales.

Kahu says that they will need to sell over 100 hāngī packs before they make any money.
Is he right? Explain your answer using information from the graph.

QUESTION TWO: Georgia the Maine Coon

Georgia is a Maine Coon kitten. This picture shows her being weighed.



(a) Which measurement gives her correct weight?

- ☐ 2.95 grams
- ☐ 2.95 tonnes
- ☐ 2950 grams
- ☐ 2950 kilograms

(b) Georgia is fed both dry food and wet food, using this chart.

represents dry food (biscuits)

represents one sachet of wet food.

Feeding Table

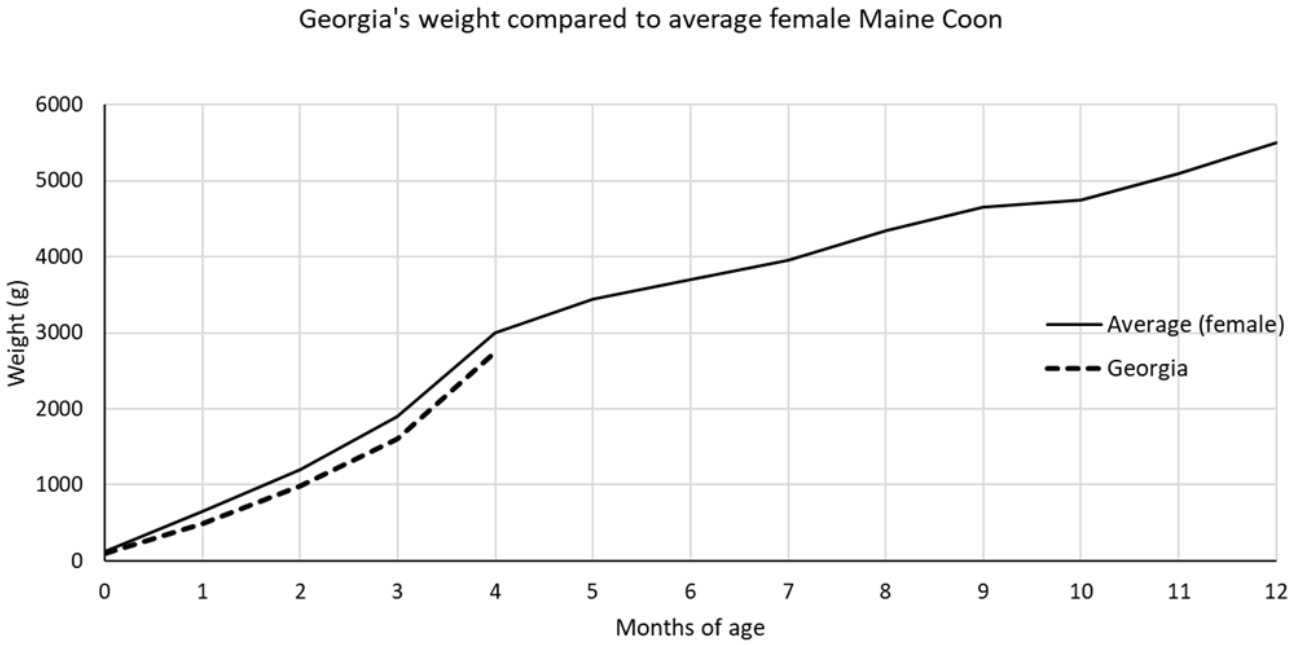
Kitten's Age	3-4 Months	5-7 Months	8-11 Months
kg	Kitten's weight **1.5 – 3.6 kg**	Kitten's weight **2.6 – 4.8 kg**	Kitten's weight **3.4 – 6.3 kg**
24 hours	69-100g or 56-87g + $\frac{1}{2}$	77-109g or 56-87g + 1	77-93g or 56-72g + 1

Georgia turned 4-months-old today. Lana, the cat's owner, goes for the second option of dry and wet food. Calculate the amount of dry food and number of sachets of wet food Georgia ate **in the last month**.

Write on the lines to record your response:

Dry food: _____ g Number of wet food sachets: _____

(c) Lana weighs Georgia every month and records the data in this graph.

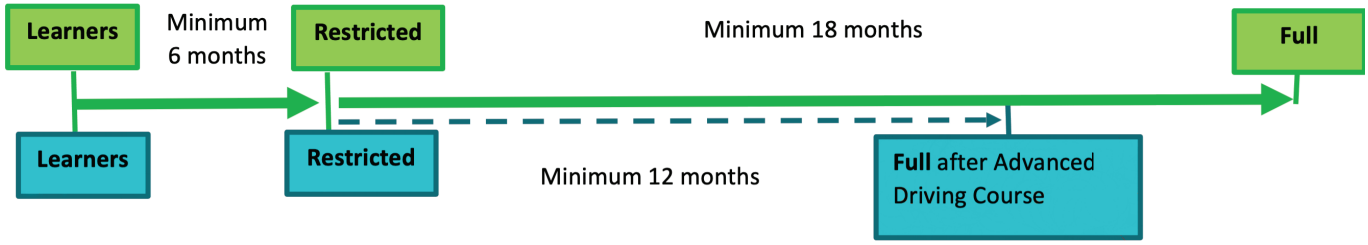


Lana predicts that Georgia will weigh about 5.0 kilograms when she turns one year old. Is Lana's prediction reasonable? Explain your answer using information from the graph.

QUESTION THREE: New Zealand Driver's Licence

Pita is 16 years old. She is finding out how much it will cost to get her Class 1 driver's licence.

(a) This chart shows the time required to progress from a learner licence to a restricted licence to a full licence.



Pita passes her Learner Licence Test of the road code during March 2022, and then takes an Advanced Driving Course. What is the earliest month and year she will be able to get her full licence?

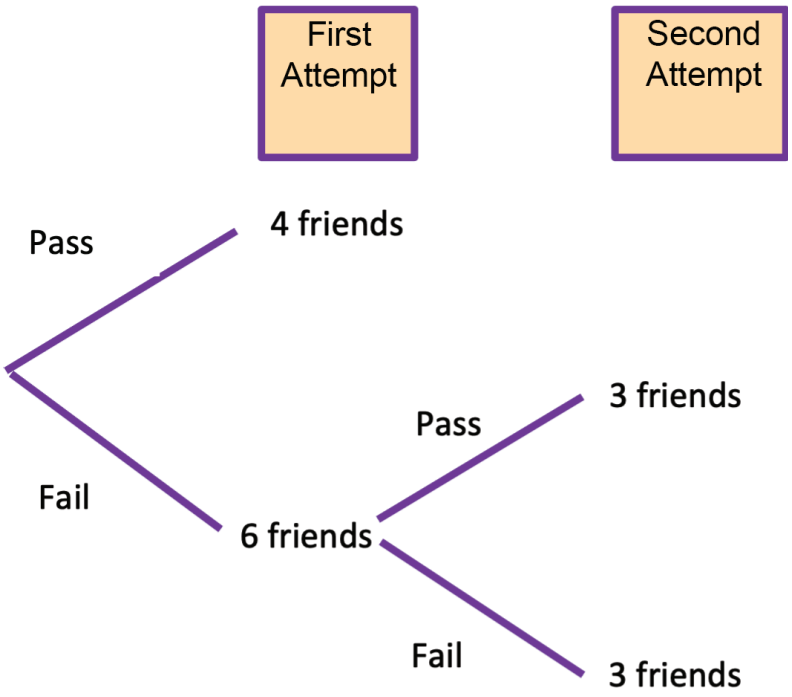
_____

(b) Use the table below, to work out the final cost for Pita to get her full licence. Assume she passes each test the first time. Ignore the cost of the advanced driving course.

	Application Fee	Test Fee	Total
Learner Licence	$48.20	$45.70	$93.90
Restricted Licence	$48.20	$86.60	$134.80
Full Licence	$49.60	$59.90	$109.50

Final cost: $_____

(c) Pita asks ten of her older friends about the difficulty of the Learner Licence test. Four of her friends passed on their first attempt, and another three passed on their second attempt.



Waka Kotahi NZ Transport Agency claims that there is a 70% pass rate for the test, each time it is attempted. Does that claim match the data from Pita's friends? Explain your answer using the information provided.

QUESTION FOUR: Soccer Boots

Kent High School are starting a new women's soccer team. The school will pay for soccer boots, so the teacher in charge investigates the cheapest deal available on soccer boots for the team of 11 players and 1 reserve. The teacher finds two shops with good deals.

Primal Sports	Wholesale Sports
30% off of full price on boots! Full price: $140.99 per pair	*Wholesale Prices every day!* $1180 for a dozen (12) pairs of soccer boots

(a) What is the discounted price of one pair of boots from Primal Sports?

_____

(b) Which is the cheapest place to buy the full team set of boots from?

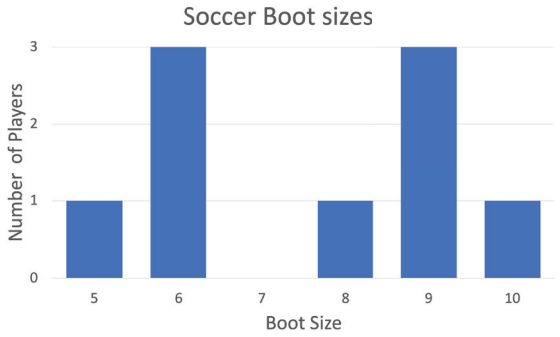
- ☐ Primal Sports
- ☐ Wholesale Sports
- ☐ Both places are the same
- ☐ Not possible to decide from the information given

(c) Here are the sizes of the boots needed for the team members.

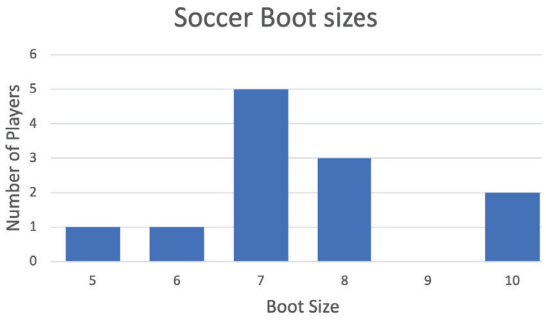
Boot size	Number of players
5	2
6	0
7	3
8	5
9	1
10	1

Which graph below shows the data in the table on the previous page?

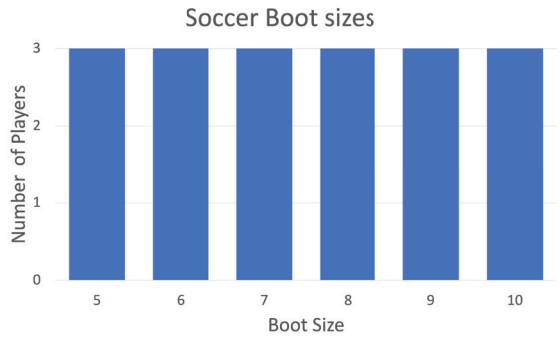
1.



2.



3.



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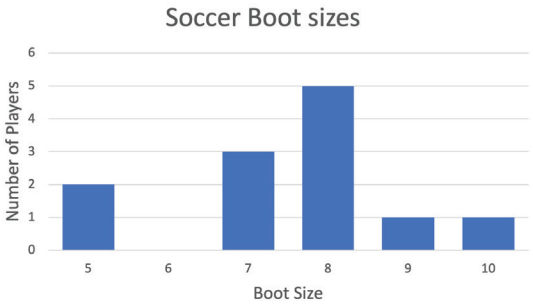


Graph: _____

QUESTION FIVE: In Charge

Electric cars are becoming more common in New Zealand.
The battery display of a 2021 Pulse electric car looks like the picture shown.
The bars show the fraction of the full battery charge that is left.

(a) All 11 bars light up when the battery is charged to 100%. What percentage charge is left on the battery in this picture?

- ☐ 30–45%
- ☐ 45–60%
- ☐ 60–75%
- ☐ 75–90%

(b) The 2021 Pulse has a maximum distance of 270 kilometres on a fully charged battery. About how many kilometres can a 2021 Pulse travel on a 60% charge?

_____ km

(c) Here is the fuel cost, purchase price, and maximum distance of a Pulse compared to similar-sized hybrid and petrol-only cars. A hybrid uses both petrol and electricity.

Vehicle	**Fuel cost**	**Purchase price**	**Maximum distance (full tank)**
Pulse	$3.00 per 100 km	$61,990.00	270 km
Hybrid (Petrol + Electric)	$11.00 per 100 km	$45,190.00	960 km
Petrol Only	$15.00 per 100 km	$32,490.00	780 km

It is often claimed that "Hybrid cars give you the best value for money."
Do you agree with the claim? Explain your answer using information from the table.

This page has been deliberately left blank.
The examination continues on the following page.

QUESTION SIX: Visit to Vanuatu

Sofia is planning a trip to Port Vila, the capital city in Vanuatu, to visit her grandmother.
Her only other trip by plane was to Christchurch from her home city of Auckland. That flight took 1 hour and 20 minutes.

(a) Estimate the time of Sofia's direct flight from Auckland to Vanuatu, use the provided map.

_____ hours _____ minutes

(b) Sofia needs to buy some money (Vanuatu Vatu) using New Zealand dollars.

She looks up the exchange rate

1 New Zealand Dollar equals
75 Vanuatu Vatu (VUV)

How many New Zealand dollars will it cost her to buy 10,000 Vanuatu Vatu VUV?

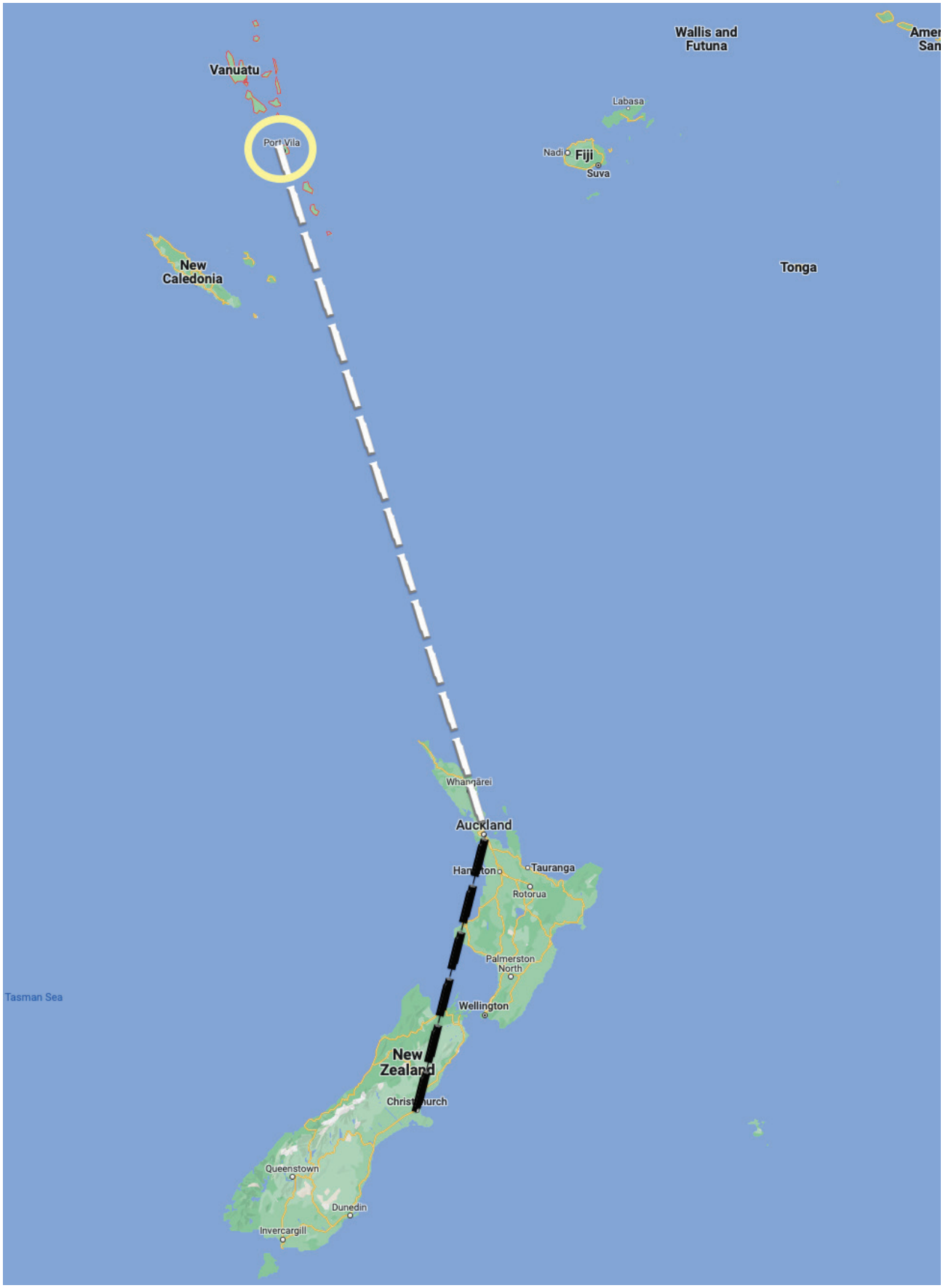
$NZD _____

(c) Sofia reads that the cost of food is 10% cheaper in Port Vila (Vanuatu) than Auckland.

Here is a table comparing prices for some items.

Item	Auckland Price	Port Vila Price
Milk 1L	$NZ 3.12 (VUV 225.35)	VUV 226.00 ($NZ 3.13)
Twelve Eggs	$NZ 7.06 (VUV 509.51)	VUV 451.20 ($NZ 6.25)
Bananas 1kg	$NZ 2.79 (VUV 201.35)	VUV 50 ($NZ 0.67)
Loaf of bread	$NZ 3.30 (VUV 237.99)	VUV 240.15 ($NZ 3.33)
Rice 1kg	$NZ 3.21 (VUV 231.32)	VUV 235.31 ($NZ 3.12)

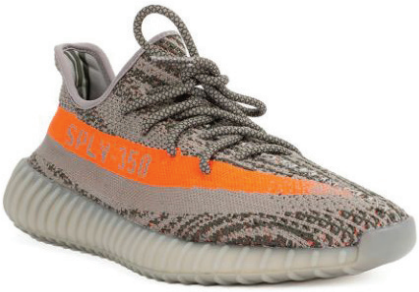
Is food really 10% cheaper in Port Vila? Explain your answer using the information provided.


Wallis and
Futuna
Vanuatu
Port Vila
Labasa
Nadi
Fiji
Suva
New
Caledonia
Tonga
Auckland
Tauranga
Rotorua
Palmerston
North
Wellington
Tasman Sea
New
Zealand
Queenstown
Dunedin
Invercargill

QUESTION SEVEN: Online Shopping

Maziah wants to buy a pair of Breezy shoes. She visits Sole Train, her local shoe shop in Whanganui. Maziah also looks at two online shopping sites, Alleyquick and Rainforest, to compare prices.

Here are the current deals.

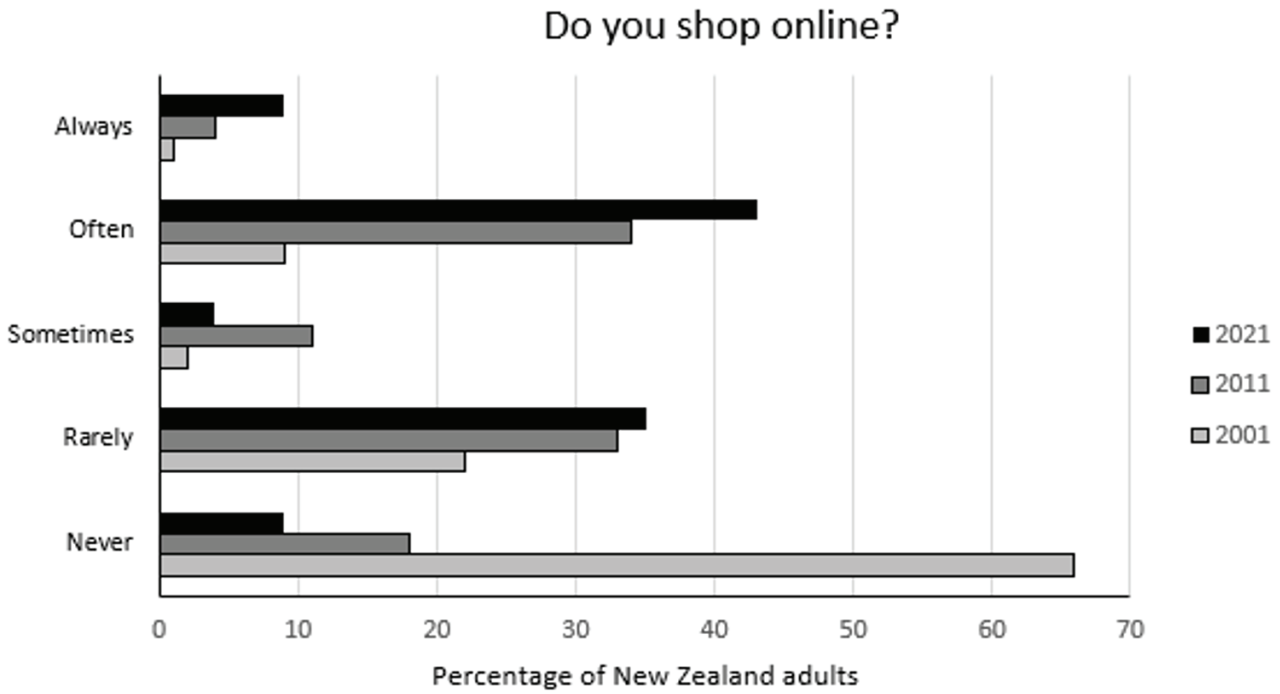
Sole Train	Alleyquick	Rainforest
		
Breezy Shoes Normal Price $180.00 This month only 25% off.	Breezy Shoes Great Price $120.00 Free shipping.	Breezy Shoes Discount Price $95.00 + $37.00 Shipping.

(a) Maziah wants the best deal but also likes to buy local if she can. Which place should she buy from? Explain your answer using the information provided.

(b) If Maziah orders the shoes online, it will take 6–8 weeks for them to arrive.
It is now mid -July. When is the earliest she can expect the shoes to arrive?

- ☐ mid-August
- ☐ late-August
- ☐ early-September
- ☐ mid-September
- ☐ late-September
- ☐ early-October

(c) In three surveys, ten years apart, New Zealand adults were asked, "Do you shop online?"



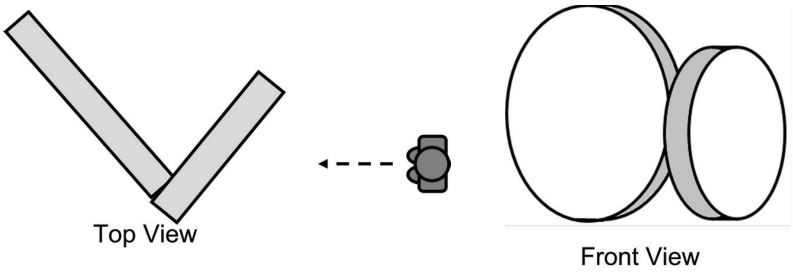
An article discussing the survey results states, "It is clear from the data that by 2031 New Zealand adults will mostly shop online. That could mean the end of retail stores in New Zealand."

Do you agree? Explain your answer using information from the graph.

QUESTION EIGHT: Kiwifruit Capital

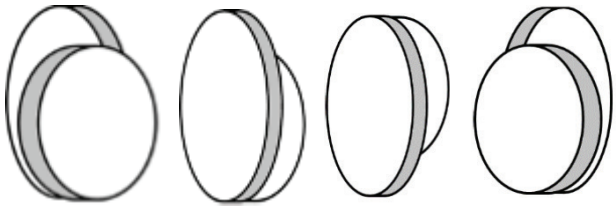
There are plans for the town of Te Puke to get a new sculpture that reflects its status as "Kiwifruit Capital of the World."

Here are the top and front views:

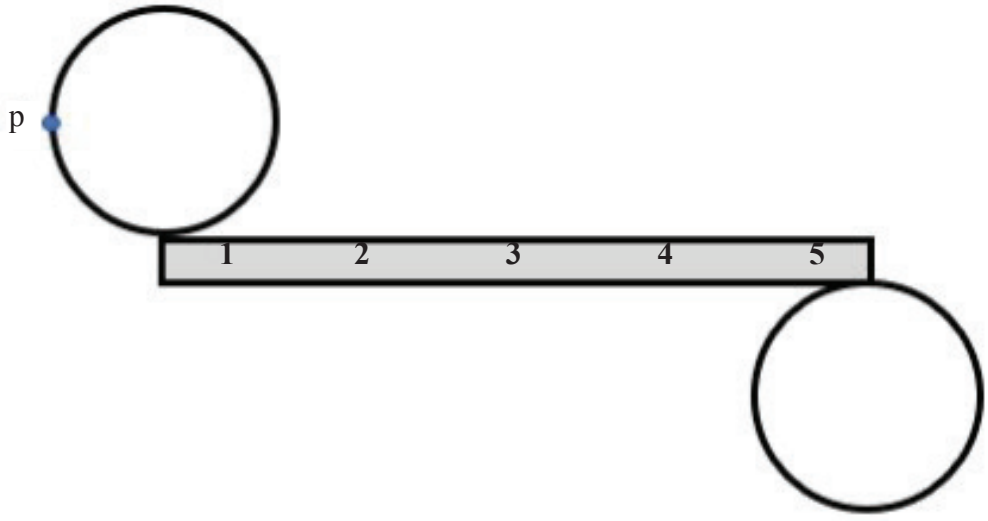


(a) Which image of the kiwifruit sculpture shows what the person in the top view diagram would see?

☐ ☐ ☐ ☐



(b) The sculpture is to be made of steel. Here is the flat pattern for the smaller cylinder of the kiwifruit slices. Circle the number on the grey rectangle in the image to show where point "p" will join the cylinder when the pattern is put together into a kiwifruit slice.

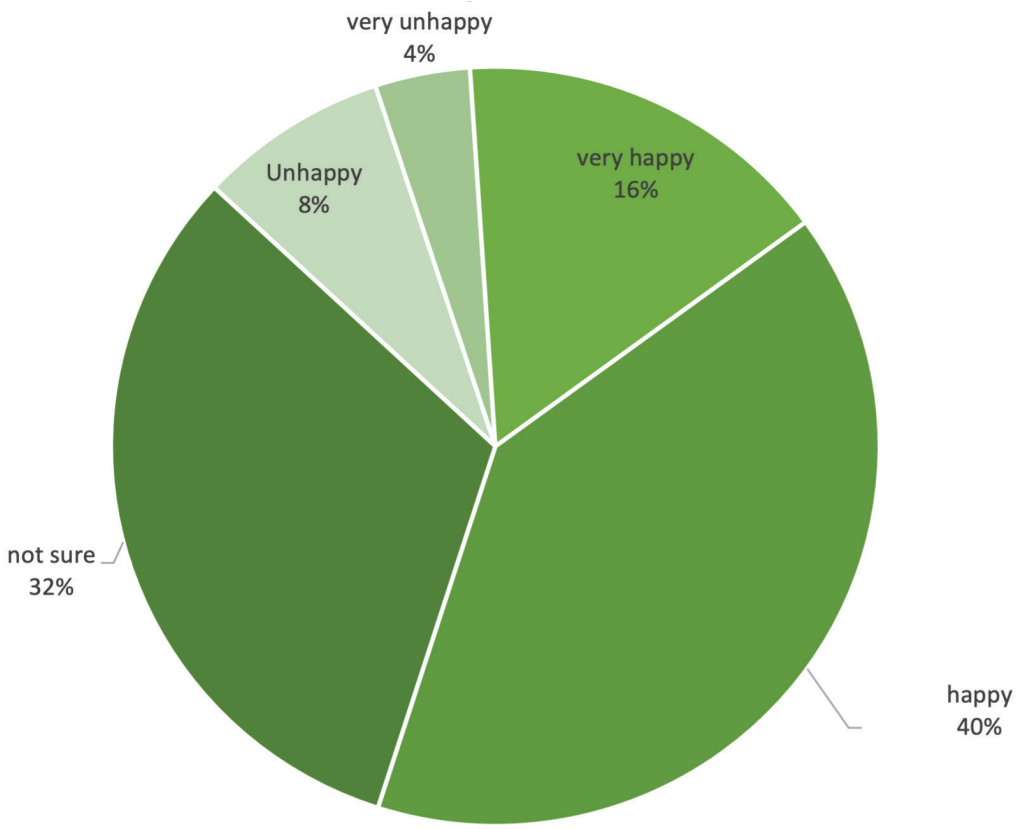


(c) The business group in the town surveys people in the main street on Saturday morning. People are asked: "How pleased are you about the design of the kiwifruit slices sculpture?" and they can respond with choosing from

"very happy", "happy", "not sure", "unhappy", or "very unhappy".

Here is a graph of their responses:

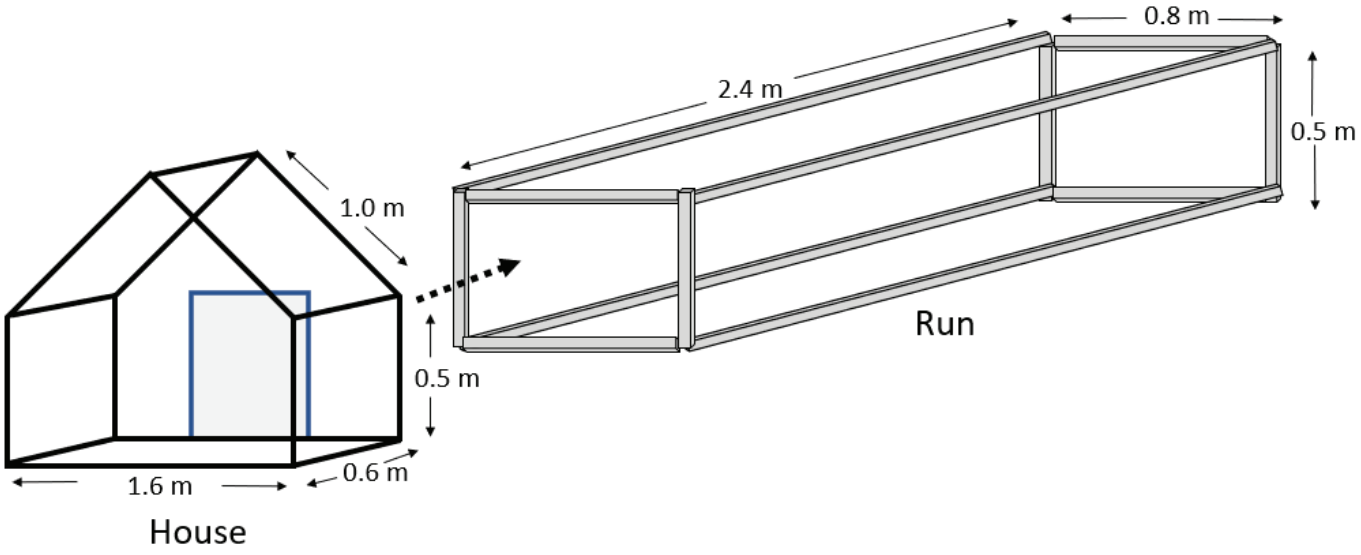
How pleased are you about the design of the kiwifruit slices sculpture?



Is the following claim justified?
"Over half of people in the sample of Te Puke residents were pleased with the design."
Explain your answer using the information provided.

QUESTION NINE: The Rabbit Hutch

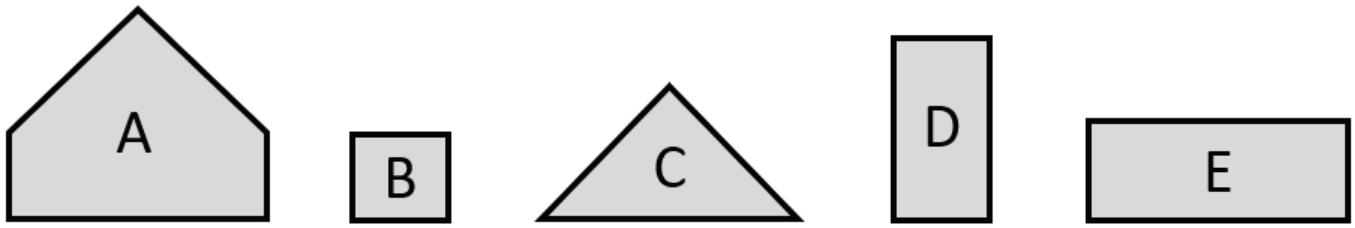
Kendra gets a new pet rabbit for her birthday. She designs this hutch for her new pet. It has two parts; the house, and the run, where the rabbit can be outside.



(a) Kendra builds the run from framing timber that comes in lengths of three metres.
How many lengths does she need to buy to make the run?

- ☐ Four
- ☐ Five
- ☐ Six
- ☐ Seven
- ☐ Eight

(b) Kendra builds the house from plywood. Here are some pieces she might cut out:



How many of each piece should she use?

_____ of Piece A _____ of Piece B _____ of Piece C _____ of Piece D _____ of Piece E

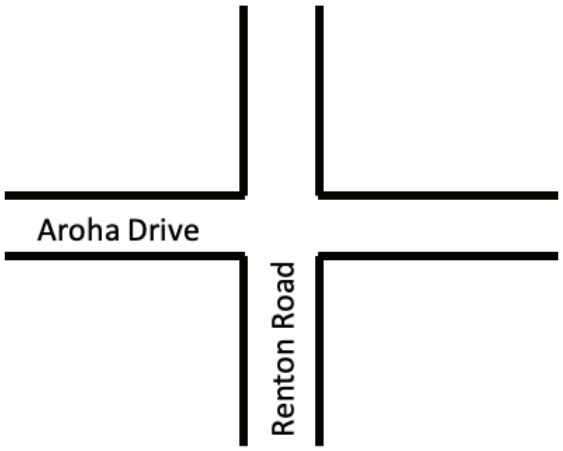
(c) All faces of the run are covered in netting except the face that joins the house. The bottom of the run must have netting or the rabbit will dig its way out.
Calculate the area of netting that Kendra needs.

_____ m^2

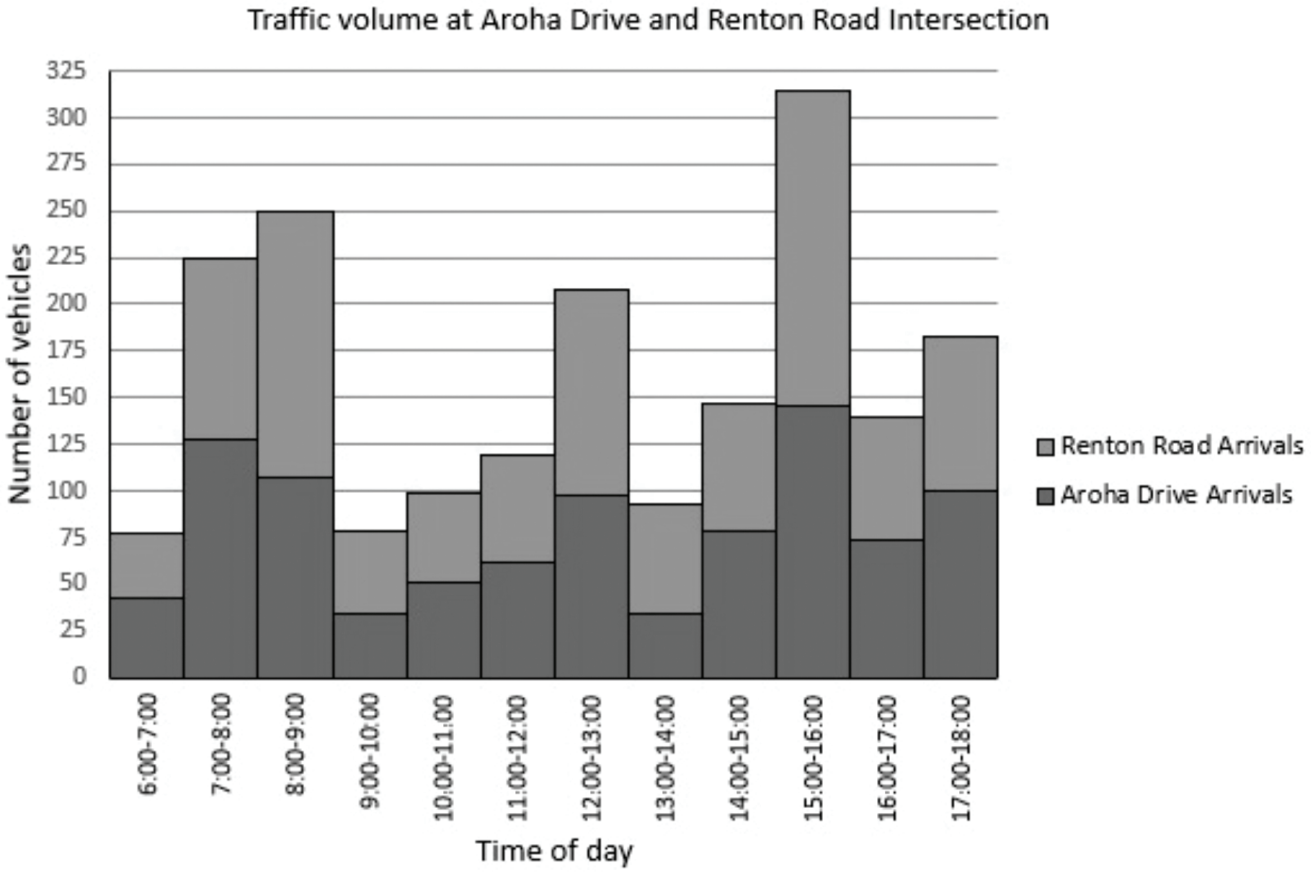
This page has been deliberately left blank.
The examination continues on the following page.

QUESTION TEN: Crash Course

Aroha Drive and Renton Road meet at a busy intersection. An electronic counter records how many vehicles go through the intersection.



The graph below shows how many vehicles go through the intersection between 6:00am and 6:00pm on a Friday.



(a) About how many vehicles in total go through the intersection between 4:00pm and 5:00pm?

- ☐ 14
- ☐ 74
- ☐ 147
- ☐ 314

(b) About how many more vehicles pass through the intersection in the busiest hour than in the quietest hour?

_____

(c) The Council will put in traffic lights if an intersection has over 200 vehicles per hour passing through it at busy times. Does the information in the graph support the case for putting in traffic lights? Explain your answer.

Extra space if required.
Write the question number(s) if applicable.

QUESTION NUMBER

Extra space if required.
Write the question number(s) if applicable.

QUESTION NUMBER

Acknowledgements
Material from the following sources has been adapted for use in this assessment:

Question One
https://www.newzealand.com/nz/feature/maori-hangi/

Question Two
https://www.istockphoto.com/photo/maine-coon-kitten-8-weeks-old-in-front-of-white-background-gm1067755362-285571576

Question Seven
https://www.zhihu.com/question/421887016
https://www.flightclub.com/yeezy-boost-350-v2-beluga-reflective-gw1229
https://www.fukexie.com/37840.htmll

Question Eight
https://www.nzherald.co.nz/bay-of-plenty-times/news/new-kiwifruit-icon-for-te-puke/CEM7QGZE3EUCBKULIQKYYAOXEA/

To be completed by candidate

Name: _____

NSN | | | | | | | | | | |

School Code | | | | |

SUPERVISOR'S USE ONLY

Draw a cross through the box (☒) if you have NOT written in this booklet

32406 TERM 2

NZQA | Mana Tohu Mātauranga o Aotearoa
New Zealand Qualifications Authority

Numeracy 2024

32406 Apply mathematics and statistics in a range of everyday situations

Credits: Ten

OUTCOMES	
1	Formulate mathematical and statistical approaches to solving problems in a range of everyday situations.
2	Use mathematics and statistics to meet the numeracy demands of a range of everyday situations.
3	Explain mathematical and statistical responses to situations.

Enter your National Student Number (NSN) and School Code into the space above.

You should attempt ALL the questions in this booklet.

If you need more room for any answer, use the extra space provided at the back of this booklet.

Check that this booklet has pages 2–19 in the correct order and that none of these pages is blank.

Do not write in the margins (⁞⁞⁞⁞⁞). This area will be cut off when the booklet is marked.

YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.

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QUESTION ONE: Tuatara

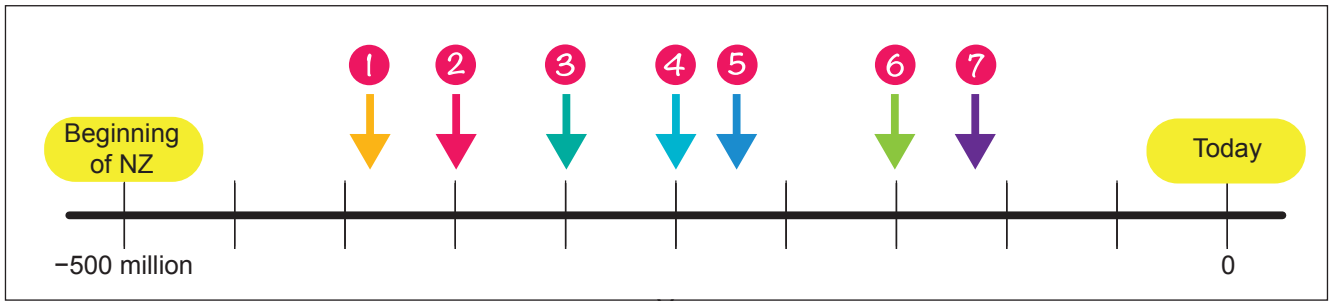
New Zealand is home to the last surviving dinosaur – the tuatara.

Tuatara first lived about 225 million years ago.

The oldest rocks show New Zealand is at least 500 million years old.

(a) On the timeline below, **circle the arrow** that shows 225 million years ago.

A tuatara on a log



Tuatara eat small animals, such as wētā, worms, beetles, and spiders.

The tuatara weighs one kilogram.

The wētā weighs 25 grams.

(b) How **many times heavier** is the tuatara than the wētā?

_____ times heavier

A tuatara eating a wētā

Tuatara are endangered.

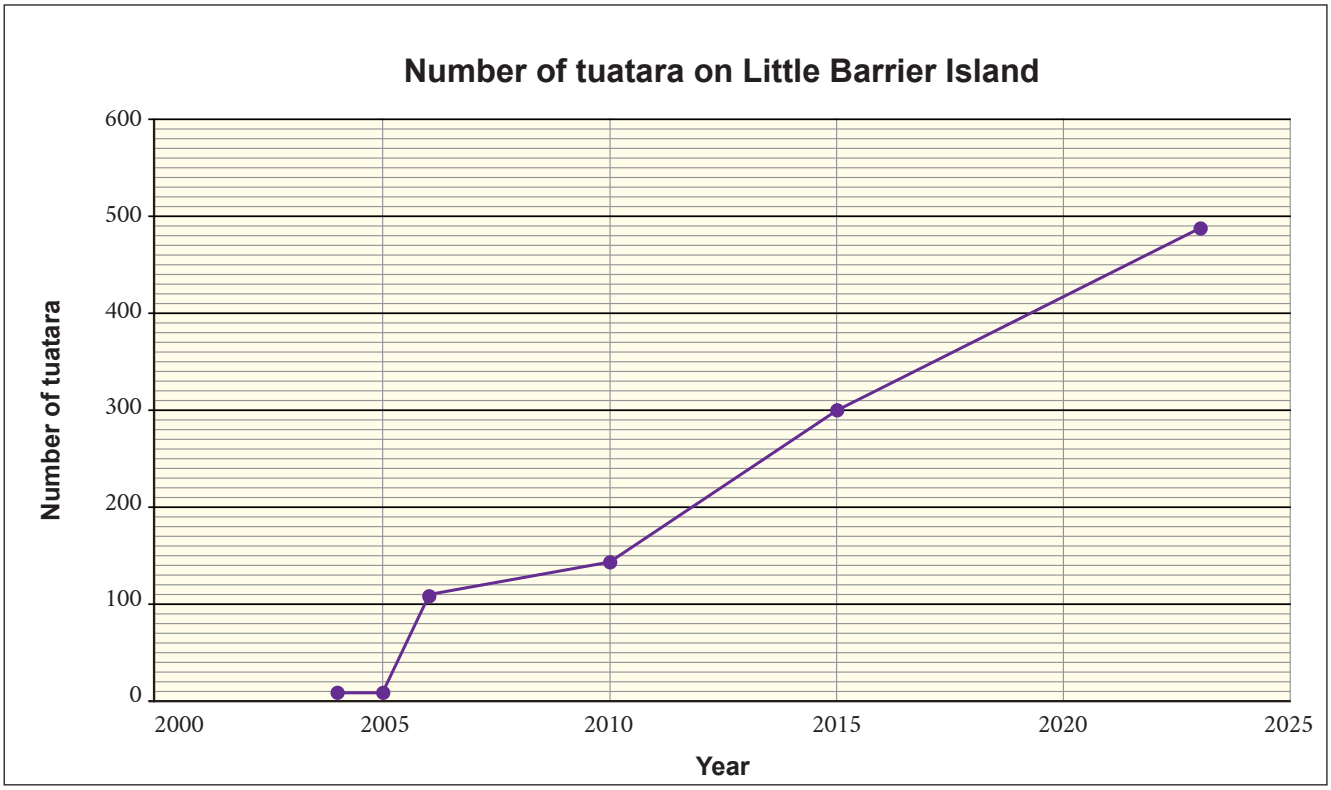
A breeding programme for tuatara has been set up.

A female tuatara lays 6–10 eggs every four years. The eggs take 11–16 months to hatch.

A tuatara hatching from an egg

(c) If all the eggs survive, about how many tuatara would you expect to get from **one** female in 10 years? Show the calculations you used to get your answer.

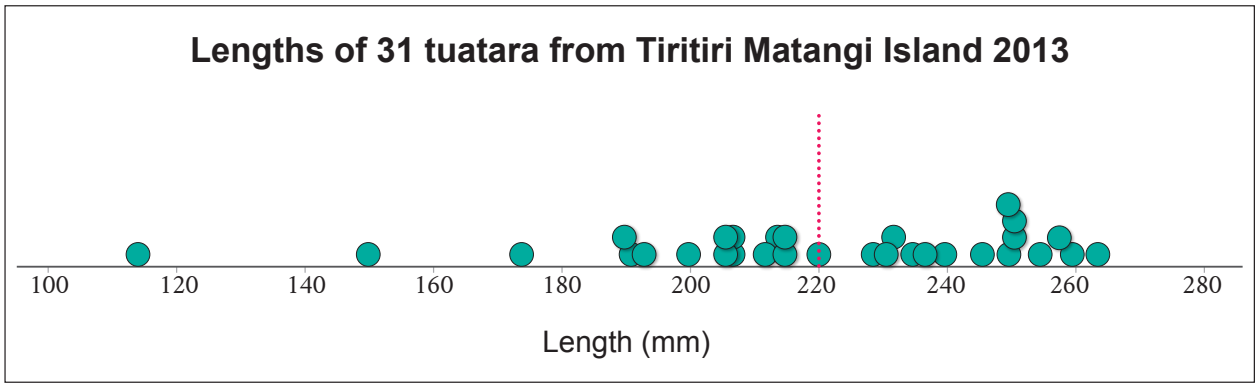
Only eight adult tuatara remained on Little Barrier Island in 2004. The island was made rat-free in 2006 and 100 adult tuatara were released on the island. This graph shows tuatara numbers over time.



(d) About how many tuatara were on Little Barrier Island in 2012?

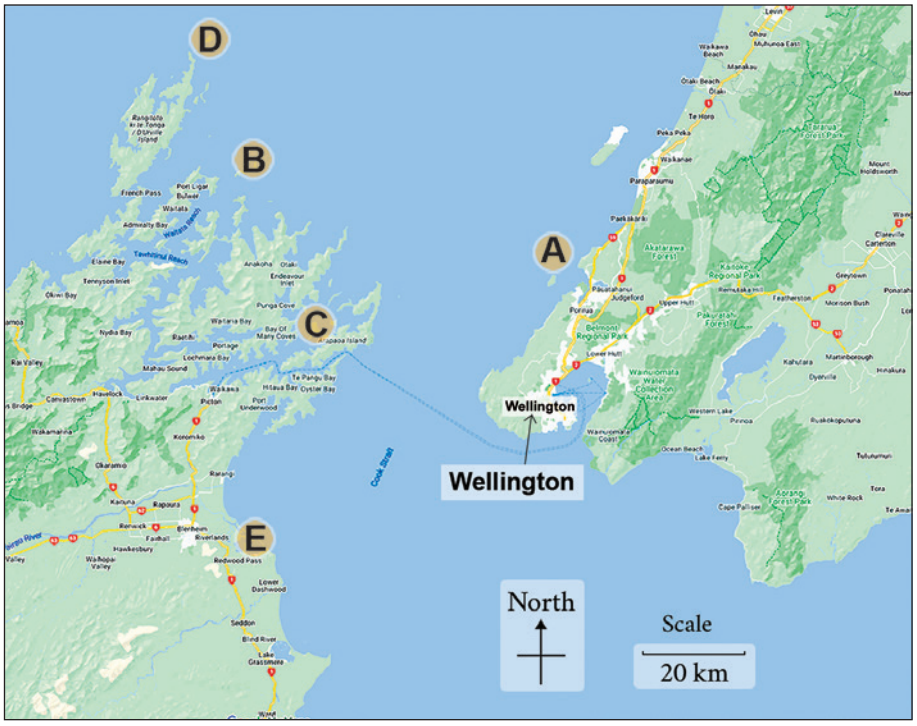
_____ tuatara

In 2003, 60 adult tuatara were released on Tiritiri Matangi Island. Ten years later, 31 tuatara were found, and their body lengths were measured. The dotted line is the median body length.



(e) Does the graph suggest that there are now young tuatara on the island?
Explain your answer using numbers from the graph.

Half of all the tuatara in New Zealand live on an island that is about 95 km northwest of Wellington.

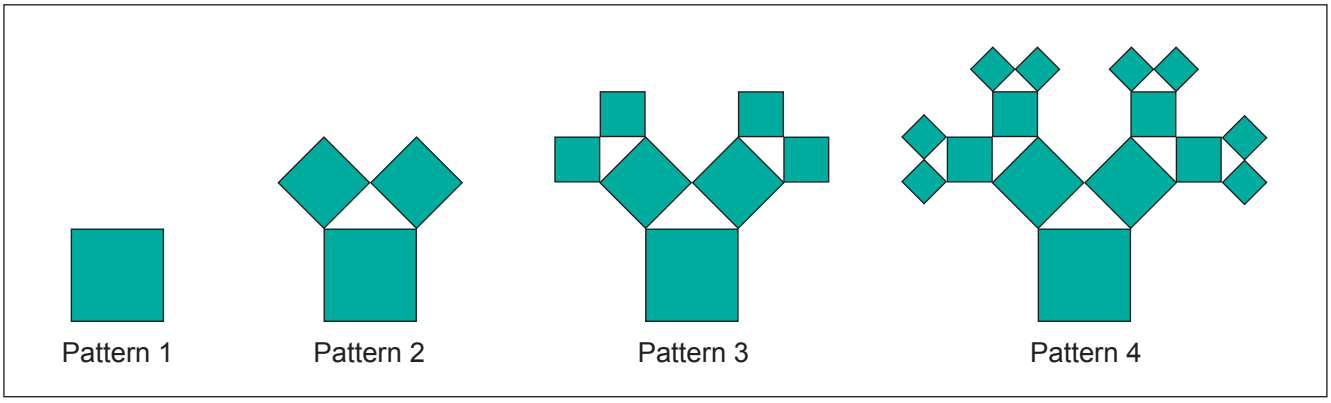


Map of New Zealand showing Wellington

(f) Write the letter that shows the location of the island. Use the scale on the map to help you.

QUESTION TWO: Art

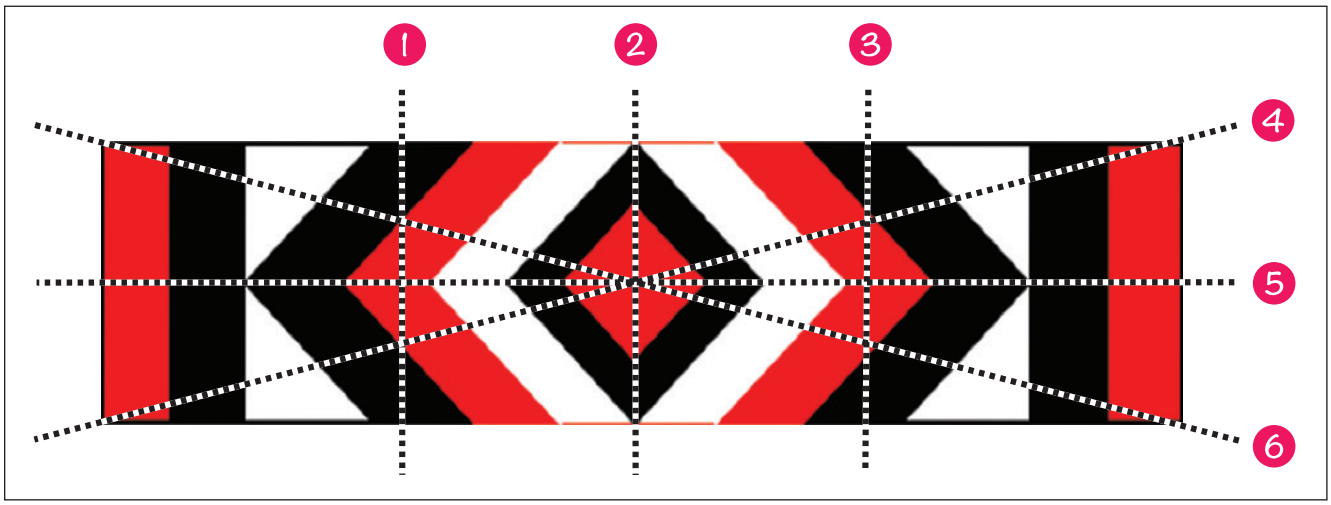
Nicole creates this growing tree design.



(a) To create **Pattern 5**, how many squares would Nicole need, in total?
Include all squares of different sizes.

Ariana is making a new tīpare or kōpare (headband) design for her kapa haka group.

Ariana's design is shown below.



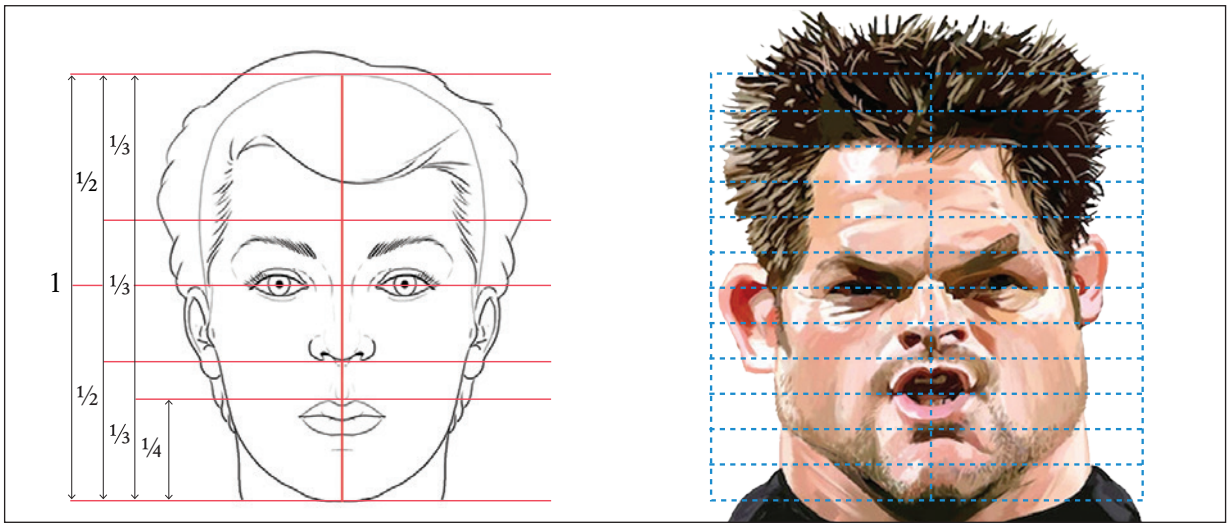
Tīpare or kōpare (headband)

(b) Which numbers show lines of **reflection** symmetry in Ariana's design?

Tick (✓) the circle next to the correct numbers below. There is more than one answer.

1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○

The diagram on the left shows fractions that are usually found in human faces.



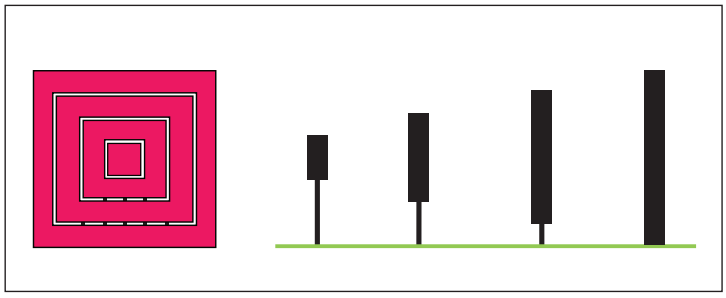
Usual fractions in a human face

Cartoon of Richie McCaw's face

(c) In the cartoon, is the bottom of Richie's nose in the right place?
Use fractions from both the diagram and cartoon to explain your answer.

Below is a photo of a sculpture at a park in Northland. The sculpture is made of red and black steel. On the right are the front and right-side views of the sculpture.

Sculpture *Untitled* by Richard Thompson

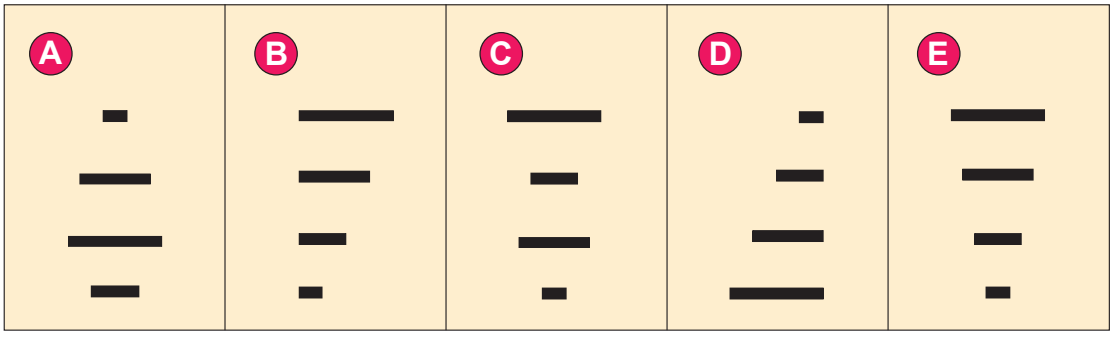


Front view

Right-side view

(d) Which letter below shows the correct top view of the sculpture?

Circle ◯ the correct **letter**.



Comic books are pieces of art that can be worth a lot of money. This is the cover of the first ever Superman comic.

In 1979, the comic sold for $US 1,000. In 2022, it sold for $US 2.6 million.

Cover of the first Superman comic

(e) How many $1,000 comics can you buy for $2.6 million?

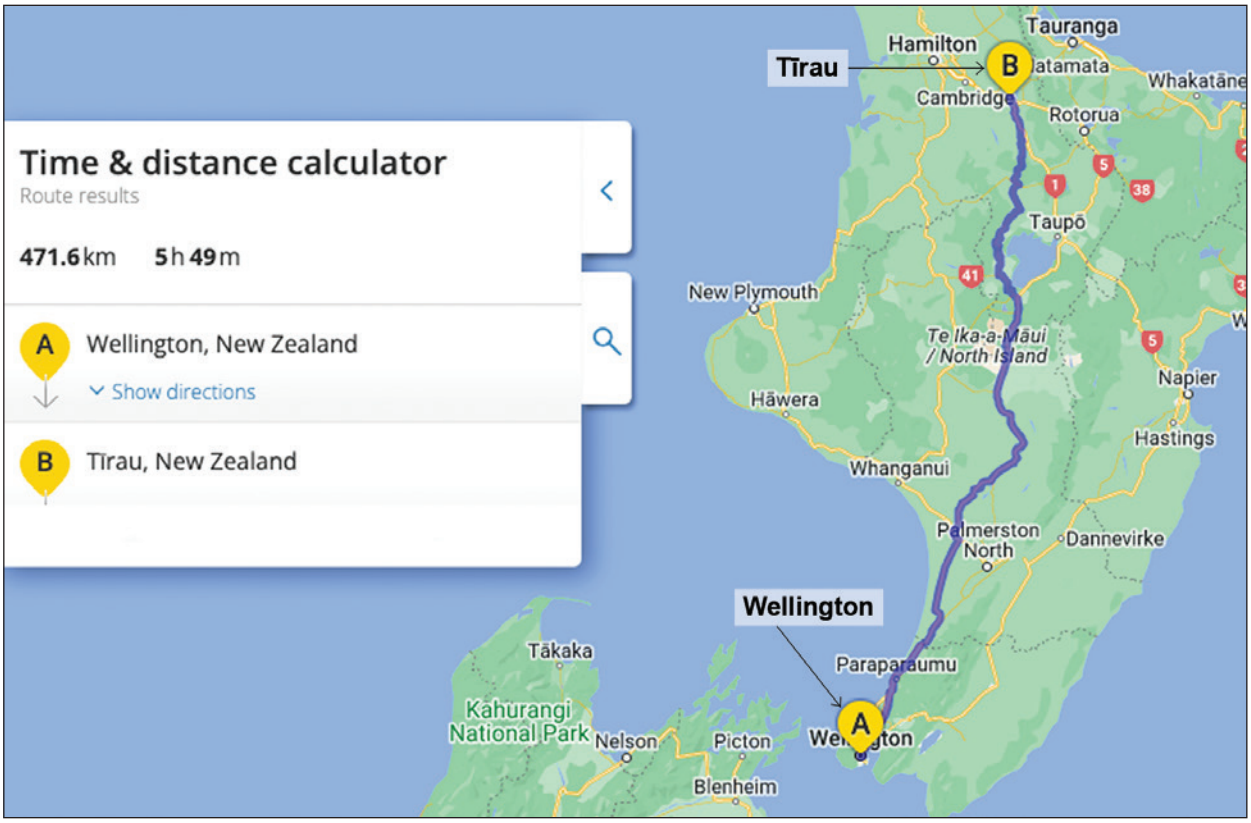
Tick (✓) the correct answer.

- 26 ◯
- 260 ◯
- 2,600 ◯
- 26,000 ◯
- 260,000 ◯

Tīrau, a town in the North Island, is famous for its visitor centre which is in the shape of a dog and two sheep.

Tīrau Visitor Centre

The map below shows that the drive from Wellington to Tīrau will take five hours and 49 minutes.



(f) How much time is that rounded to the **nearest hour**?

_____ hours

QUESTION THREE: Water

Large water bottle

The large water bottle holds 15 litres of water when it is full, and weighs 15.352 kilograms.

(a) How much does the **empty** water bottle weigh, in **grams**?
Note: One litre of water weighs one kilogram.

_____ g

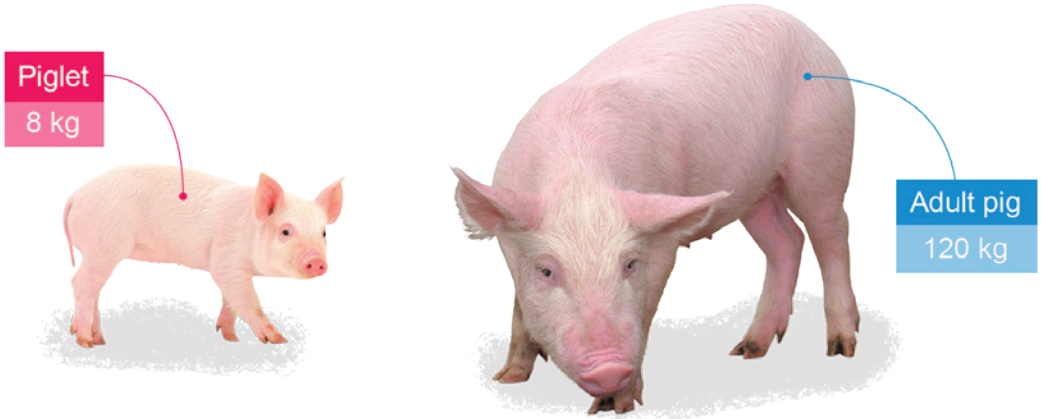
Each of the three bottles below holds 1.5 litres of water.

Three 1.5 L water bottles and a 300 mL glass

(b) How many 300 mL glasses can you fill from **all three** bottles?

_____ 300 mL glasses

Water makes up about 75% of a piglet's body weight. For adult pigs, the percentage is about 50%. This piglet weighs 8 kilograms, while the adult pig weighs 120 kilograms.



(c) How **much more water**, in kilograms, does the adult pig have in their body than the piglet has in their body?

_____ kg

In some cities, people pay for the amount of water they use.

Here is Cindy's water bill for **one month**.

Wai Mā Services		
Amount used (m^3)	**Rate ($/m^3$)**	**Charge ($)**
24.8	?	$35.96

(d) How much does Cindy pay for each cubic metre (m^3) of water used?
Note: $/m^3$ means dollars per cubic metre.

$ _____

Tala's whānau want to use less water. There are six people in Tala's whānau.

Tala has two ideas for saving water:

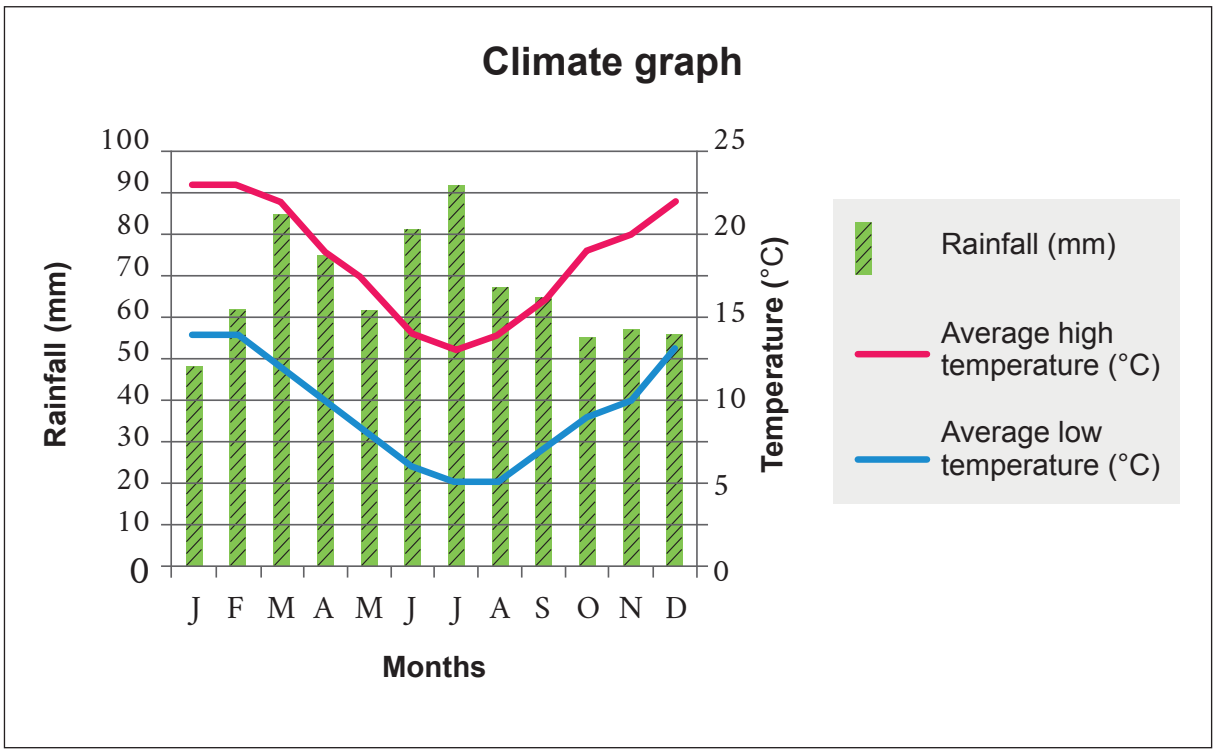
- Cutting the daily shower time to two minutes per person.
- Running the washing machine once every two days rather than every day.

	Activity	Estimated water use
	Using a hose for 10 minutes	150 litres
	Having a bath (half full)	80 litres
	Having a shower (4 minutes)	48 litres
	Having a shower (8 minutes)	96 litres
	Running a washing machine (6 kg front loader)	60 litres

(e) Which of Tala's two ideas would save the most water?

Explain your answer using information from the table.

This graph shows the average rainfall and temperature for each month of the year.



(f) Which **season** has the highest average rainfall? Use information from the graph.

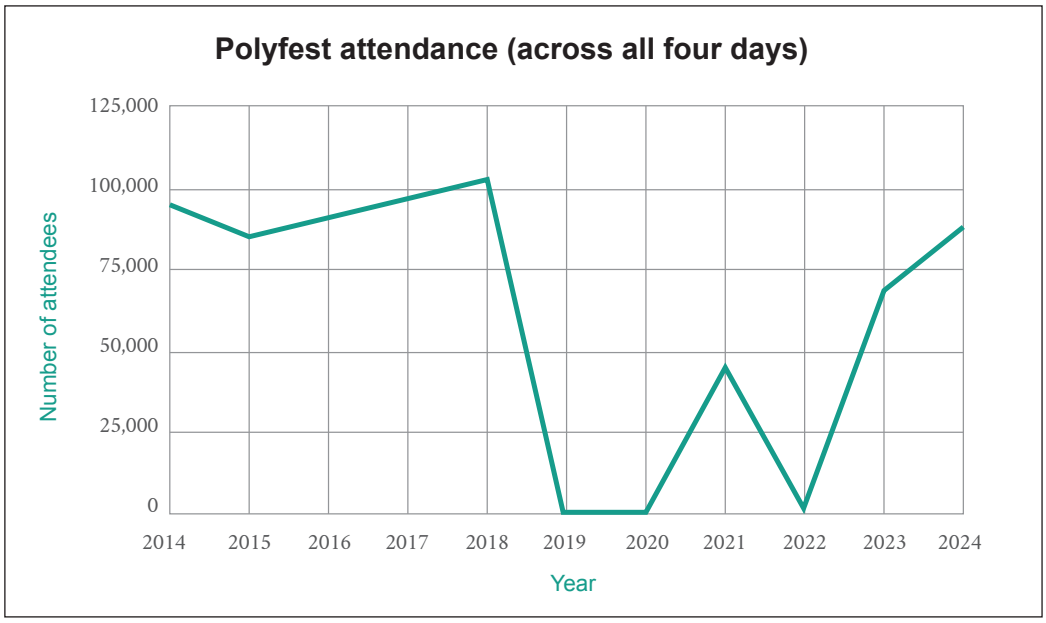
Tick (✓) the correct answer below.

- ◯ Summer (Dec, Jan, Feb)
- ◯ Autumn (Mar, Apr, May)
- ◯ Winter (Jun, Jul, Aug)
- ◯ Spring (Sep, Oct, Nov)

QUESTION FOUR: Polyfest

Polyfest is a festival. It has music, dances, costumes, and speeches from different Pacific cultures.

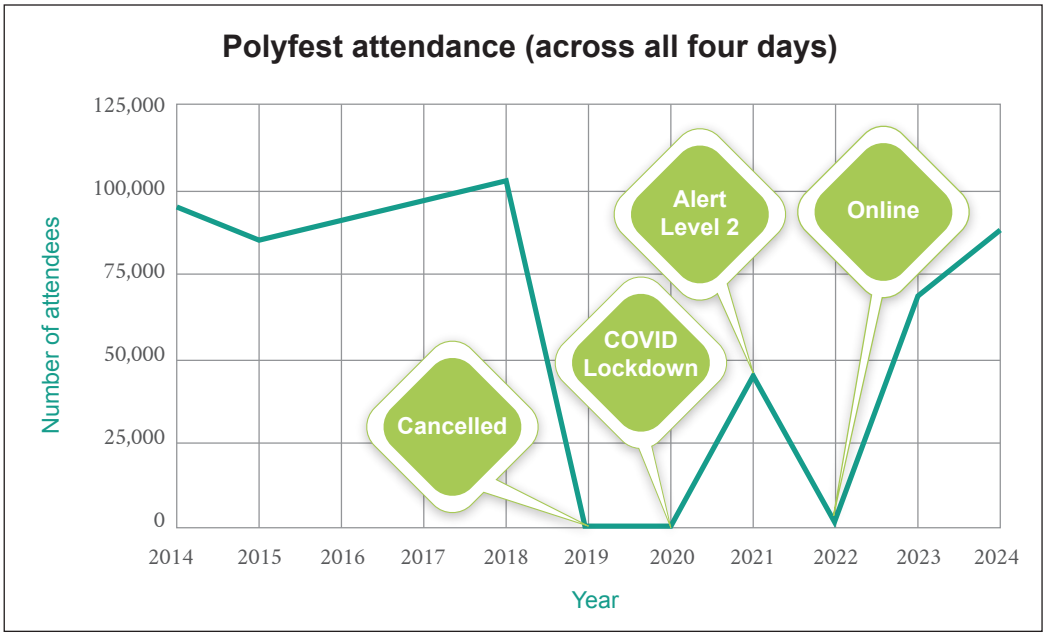
Here is a graph of people attending Polyfest over time.



(a) About how many **more** people attended Polyfest in 2015 than in 2021?

_____ people

Polyfest organisers think that the festival will have around 100,000 attendees in 2025.



(b) Do you agree or disagree with the organisers' comment? Explain your answer using information from the graph above.

Here are the ticket prices for Polyfest. If you buy **Single Day passes** for two days **online**, you get a 15% discount off the total price.

Ticket prices per person (Free entry for children under five)	
$6.00	Single Day (Online price – fixed day)
$7.00	Flexi Pass (Online price – any single day)
$8.50	Gate entry per day

(c) Six adults want to attend Polyfest on both Saturday and Sunday.

What will the total ticket cost be for the group?

$ _____

Here is the Saturday programme for the Māori stage.

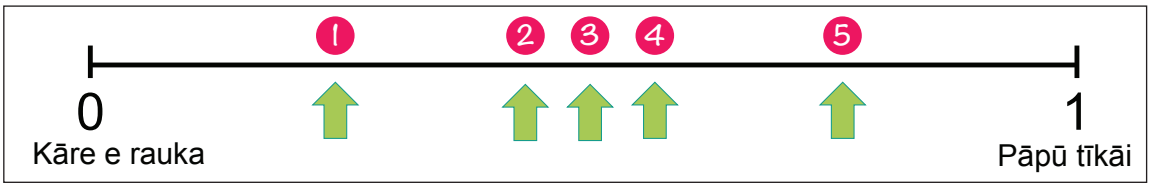
It gives the name of the school and the area students are from, i.e., CA, O, SA, or WA.

Each school has the **same chance** of winning.

Māori stage	
Name of school	**Area**
Moana College	(SA)
East Shores College	(O)
Kōwhai College	(SA)
Manukau Harbour HS	(SA)
Crestview College	(CA)
Break	
Maungakiekie College	(CA)
Tāne HS	(WA)
Southside HS	(SA)
Redwood College	(CA)
Lunch	
Kauri Park College	(SA)
Hauraki HS	(WA)

(d) What is the probability of a school from the SA area winning?

In the box below, circle ◯ the arrow that matches the probability.



Here is part of a morning's timetable for the Tongan and Samoan stages.

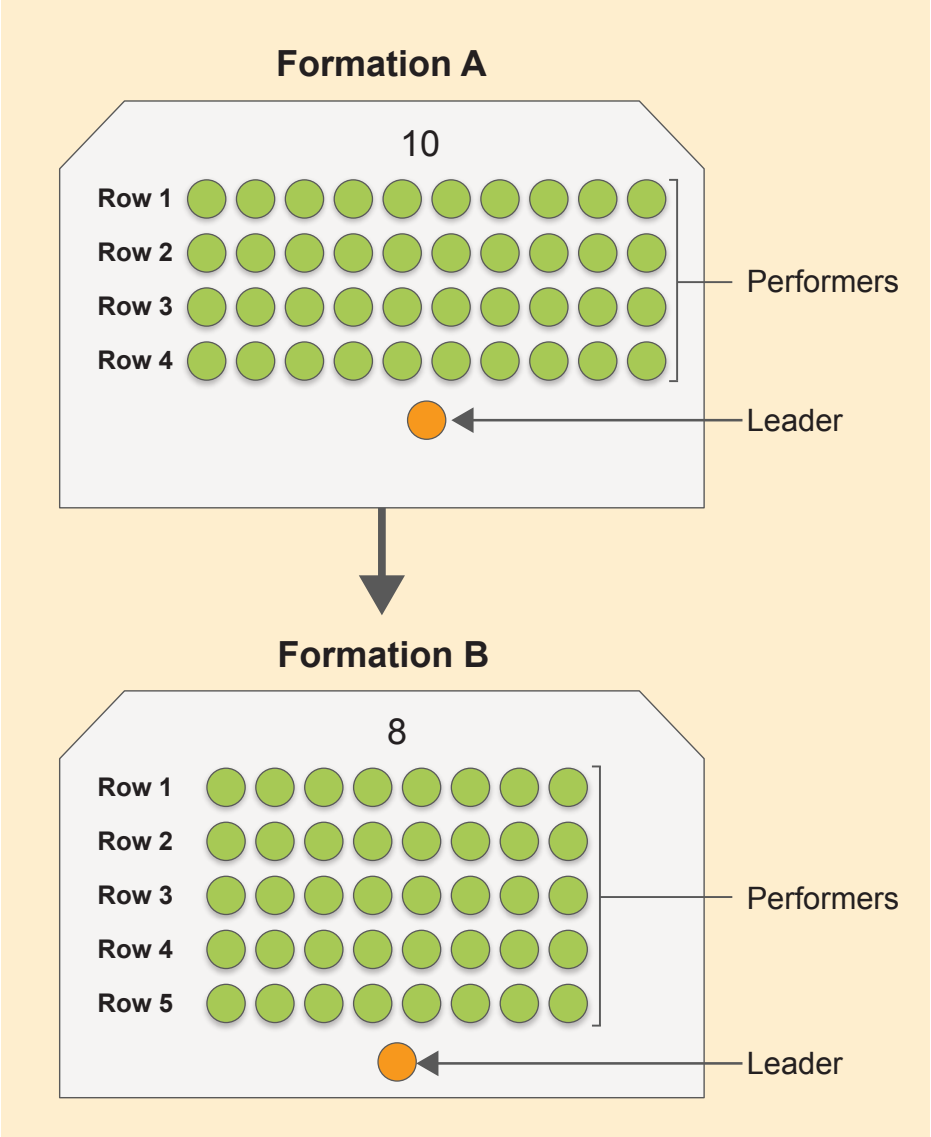
Each stage has a fixed time for performances and a **five-minute break between performances**.

Time	Tongan stage	Samoan stage
9:00 am	Redwood College (CA)	Manukau Harbour HS (SA)
9:15 am		Tāne HS (WA)
9:30 am	Southside HS (SA)	Kauri Park College (SA)
9:45 am	Tāne HS (WA)	Moana College (SA)
10:00 am		Maungakiekie College (CA)
10:15 am	Kowhai College (SA)	Southside HS (SA)
10:30 am	**Food break**	Hauraki HS (WA)
10:45 am		**Food break**
11:00 am	East Shores College (O)	North Sun College (SA)

(e) How much longer, in minutes, is each performance on the Tongan stage compared to each performance on the Samoan stage?

_____ minutes

A Niuean group starts off their performance in Formation A. There are 40 performers and a leader in the group. After a while, they move to Formation B.

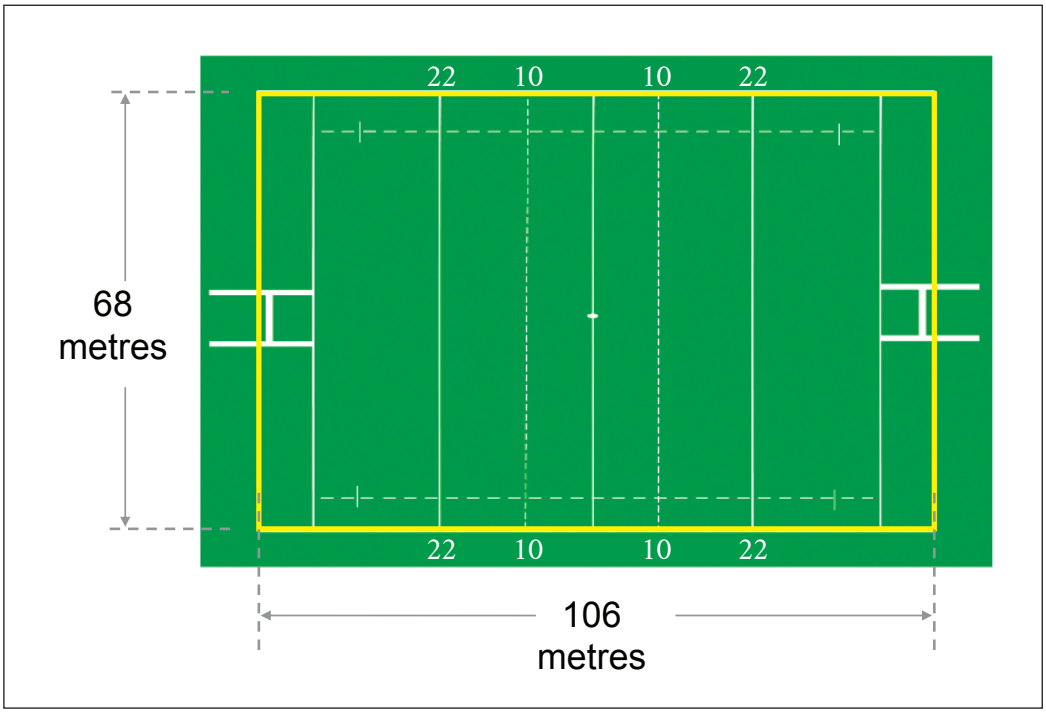


(f) What is the **smallest number** of performers from Formation A that need to move to make Formation B?

_____ performers

QUESTION FIVE: Rugby 7s

This rugby field is 106 metres long and 68 metres wide.



(a) What is the area of this rugby field in square metres?

_____ m^2

Here are all the players in a rugby 7s team. Their heights are given in metres.

Nikau 2 m	**Josh** 1.77 m	**Simoni** 1.85 m	**Chris** 1.81 m	**Hōne** 1.8 m	**Caleb** 1.9 m	**Nepo** 1.72 m

(b) Which two players need to swap places, so the heights are in order from **tallest to shortest**?

_____ and _____

Michaela played all **14 minutes** of a Rugby 7s game and ran a total of **1,540 metres**.

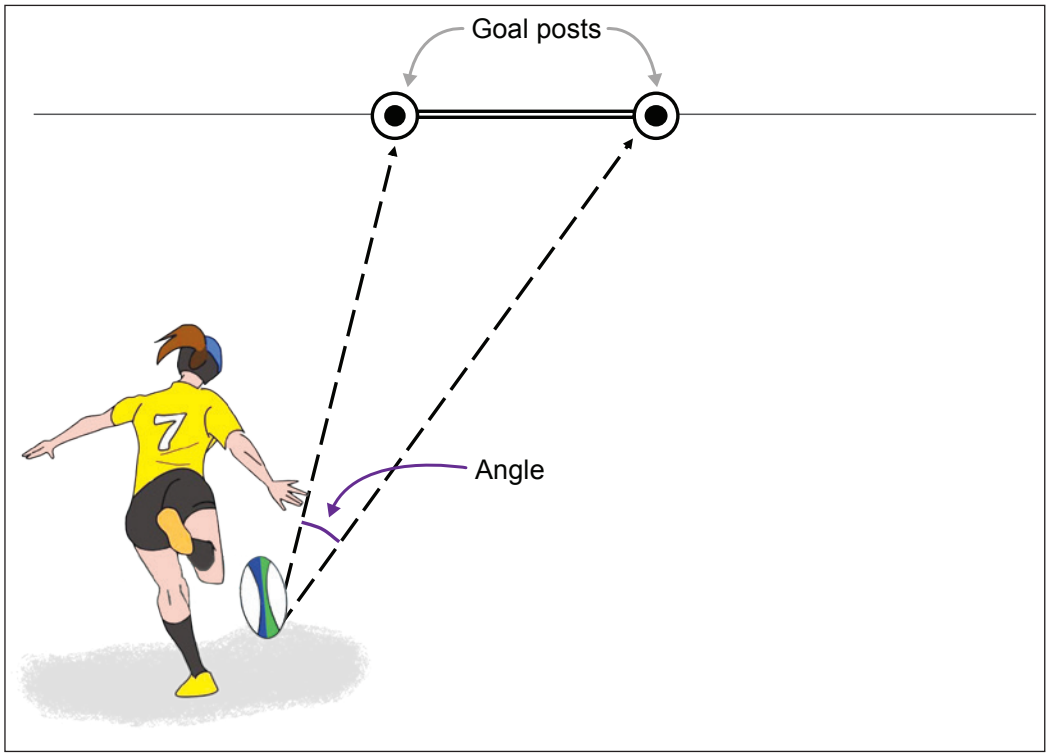
Ani says that, on average, Michaela ran over **100 metres** for every minute she played.

Michaela running

(c) Is Ani's claim reasonable?

Use the measurements provided to explain your answer.

In Rugby 7s, players can score extra points by drop-kicking a goal.



Rugby 7s player drop-kicking a goal between goal posts

(d) Estimate the angle this player must work with to get the ball between the goal posts.

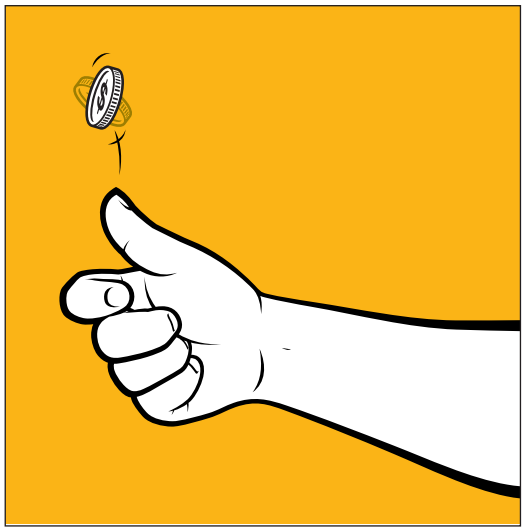
_____ °

In a coin toss, Sarah usually picks "heads".

But the last three tosses have all come up "tails".

(e) Should Sarah choose "heads" or "tails" for the fourth toss, or is either choice acceptable?

Explain your answer using ideas about probability.



Sarah tossing a coin

The first Rugby 7s World Cup for men was in 1993. This table shows the placing of men's teams in the World Cup since 1993.

	Team	1993	1997	2001	2005	2009	2013	2018	2022
	Argentina	9th	13th	3rd	5th	**2nd**	11th	5th	5th
	Australia	**2nd**	5th	**2nd**	3rd	10th	5th	10th	4th
	Canada	15th	21st	5th	18th	13th	9th	12th	13th
	England	**1st**	5th	5th	3rd	5th	**2nd**	**2nd**	9th
	Fiji	3rd	**1st**	3rd	**1st**	5th	3rd	4th	**1st**
	France	15th	5th	21st	5th	13th	5th	8th	6th
	Hong Kong	17th	10th	21st	21st	19th	21st	18th	19th
	New Zealand	7th	3rd	**1st**	**2nd**	5th	**1st**	**1st**	**2nd**
	South Africa	5th	**2nd**	5th	5th	5th	5th	3rd	7th
	United States	17th	18th	13th	13th	13th	13th	6th	11th
	Wales	11th	13th	11th		**1st**	5th	11th	15th

The first and second teams played in the final. The following statement was made.

"New Zealand has been in the men's final for over 60% of the Rugby 7s World Cups."

(f) Is this statement true? Explain your answer using information from the table.

Extra space if required.
Write the question number(s) if applicable.

QUESTION NUMBER	

Acknowledgements

Material from the following sources has been adapted for use in this assessment:

Question One

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Question Two

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Question Three

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Question Five

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