To be completed by candidate

Name: _____

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

School Code | | | | |

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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

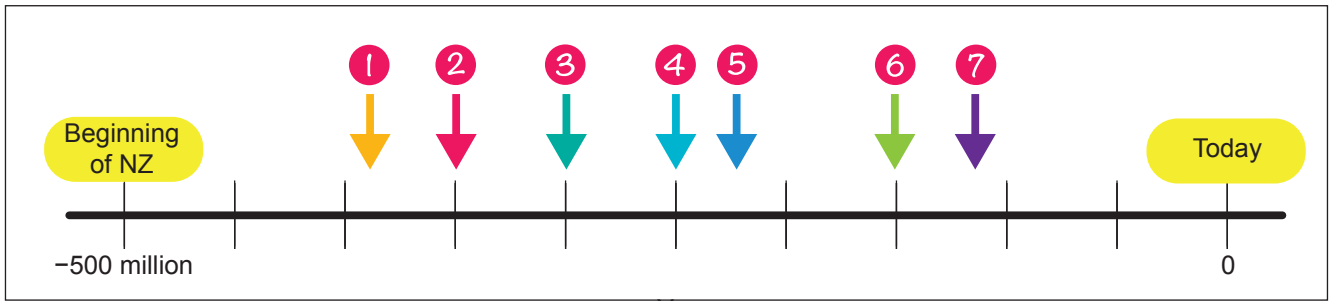
New Zealand is home to the last surviving dinosaur – the tuatara.

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.

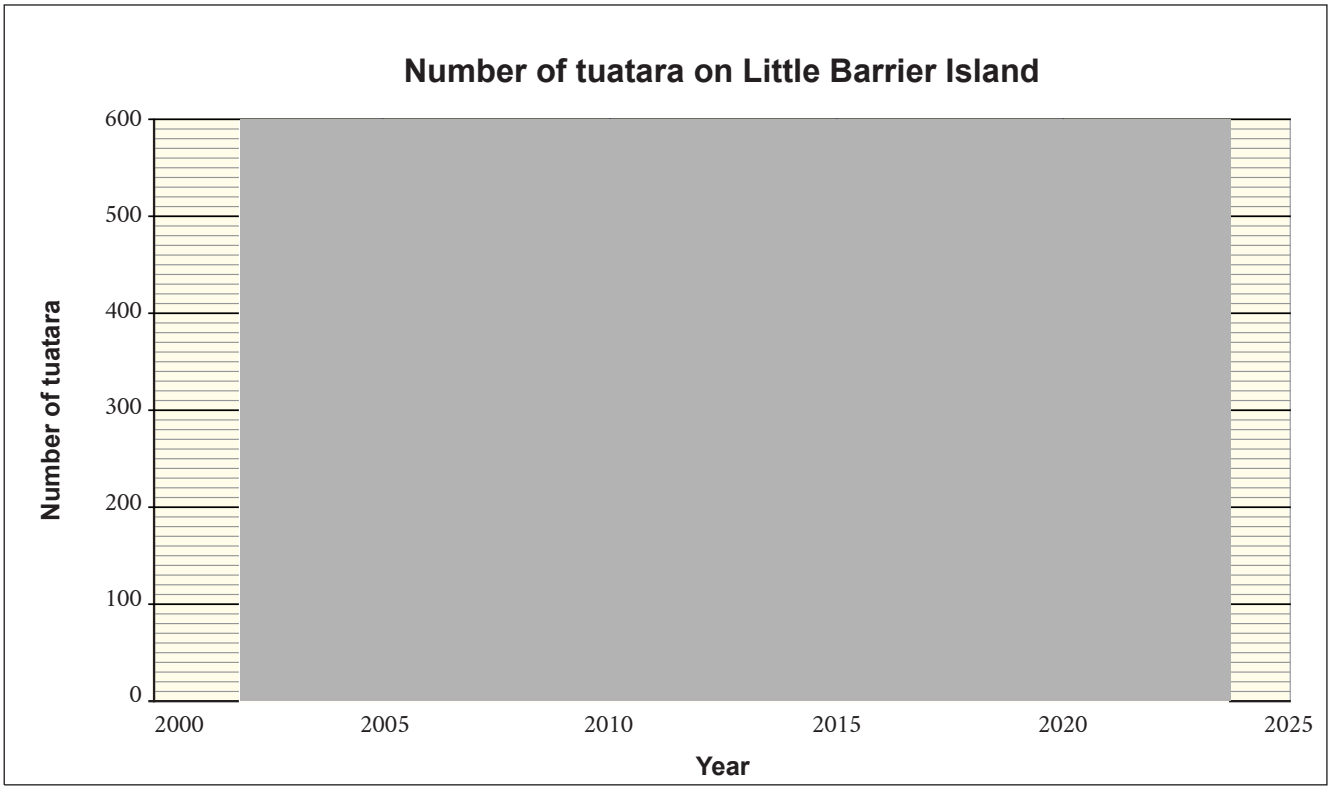
A breeding programme for tuatara has been set up.

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.

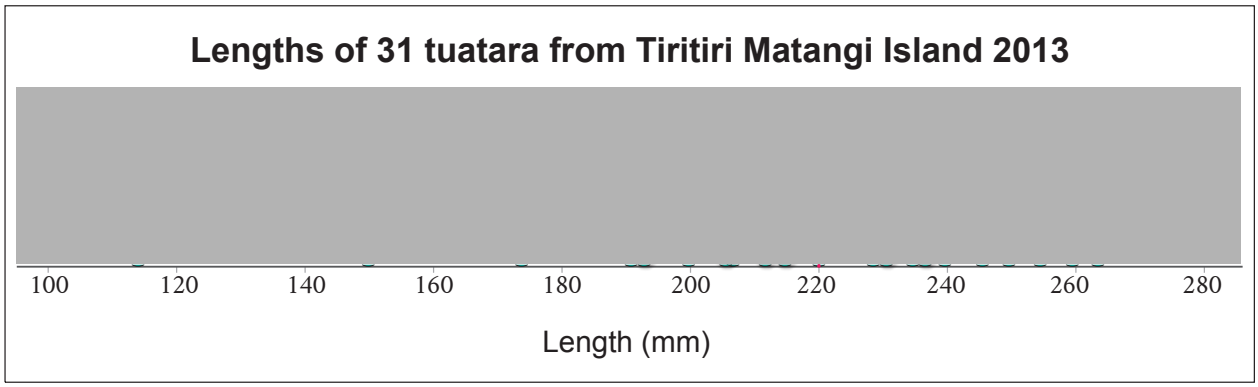
Only eight adult tuatara remained on Little Barrier Island in 2004. The island was made rat-free in 2006 and 100 adult tuatara were released on the island. This graph shows tuatara numbers over time.



(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.

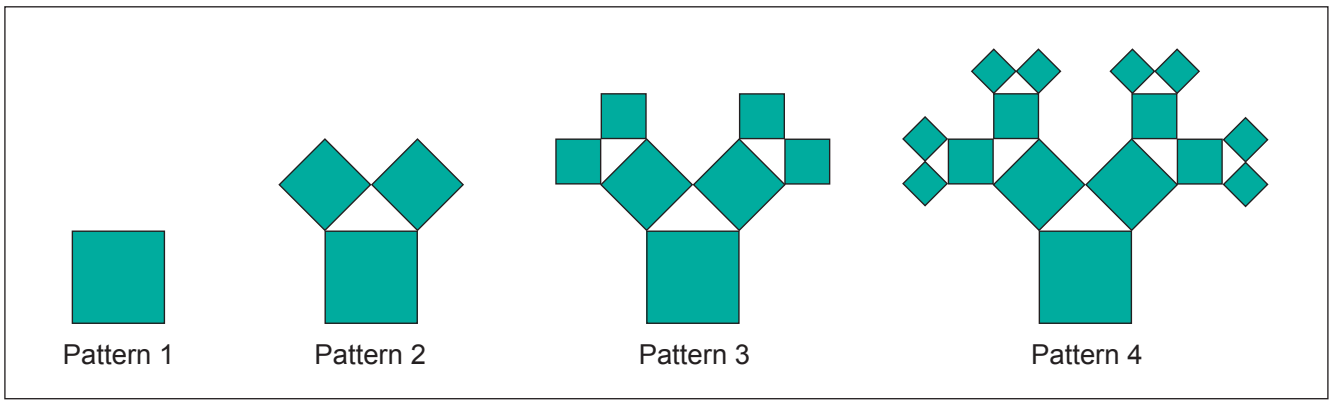
Half of all the tuatara in New Zealand live on an island that is about 95 km northwest of Wellington.

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

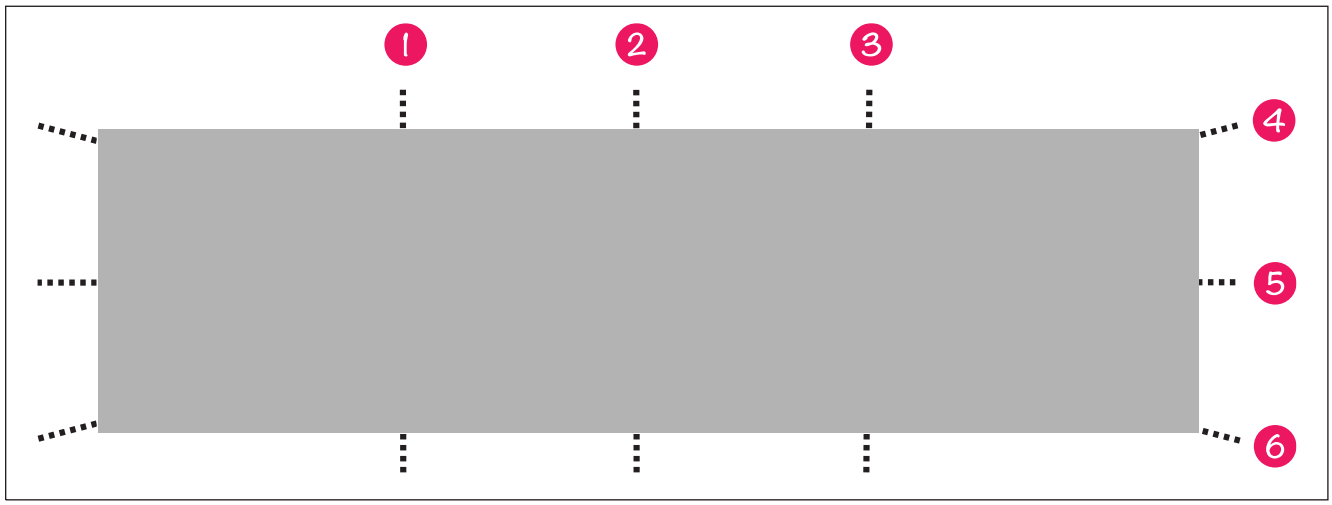
Nicole creates this growing tree design.



(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.

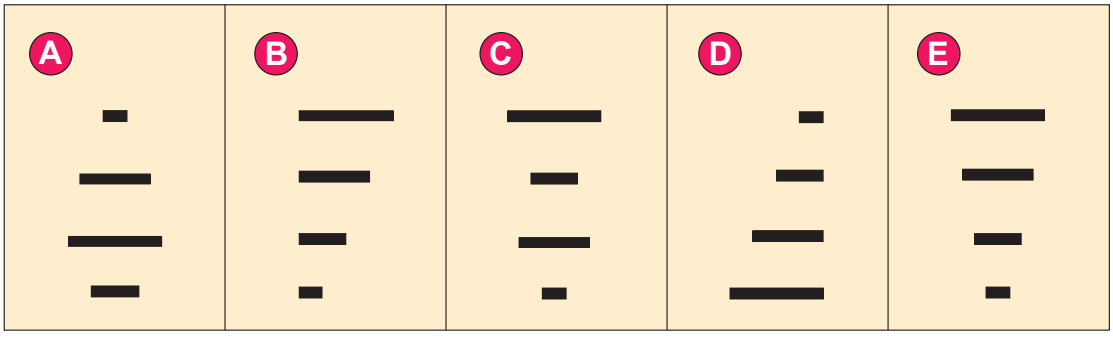
Sculpture *Untitled* by Richard Thompson

Front view

Right-side view

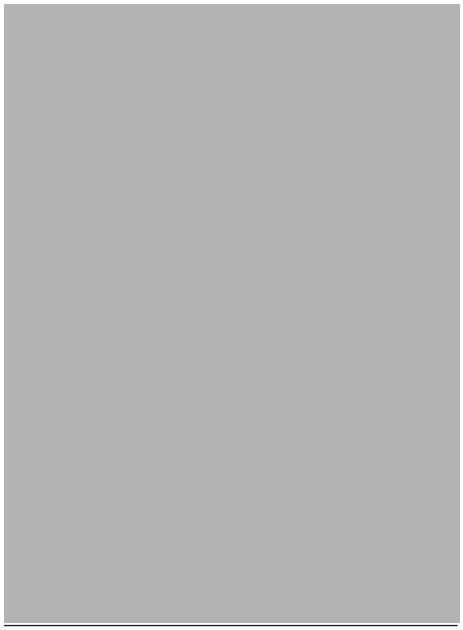
(d) Which letter below shows the correct top view of the sculpture?

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.

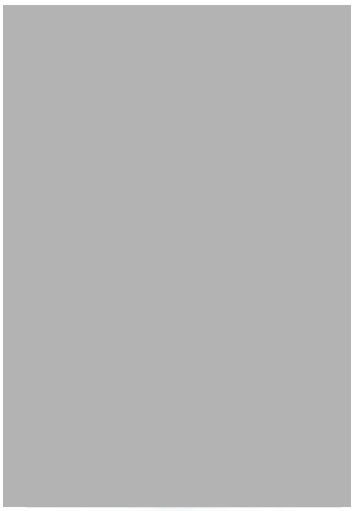
Tīrau Visitor Centre

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:

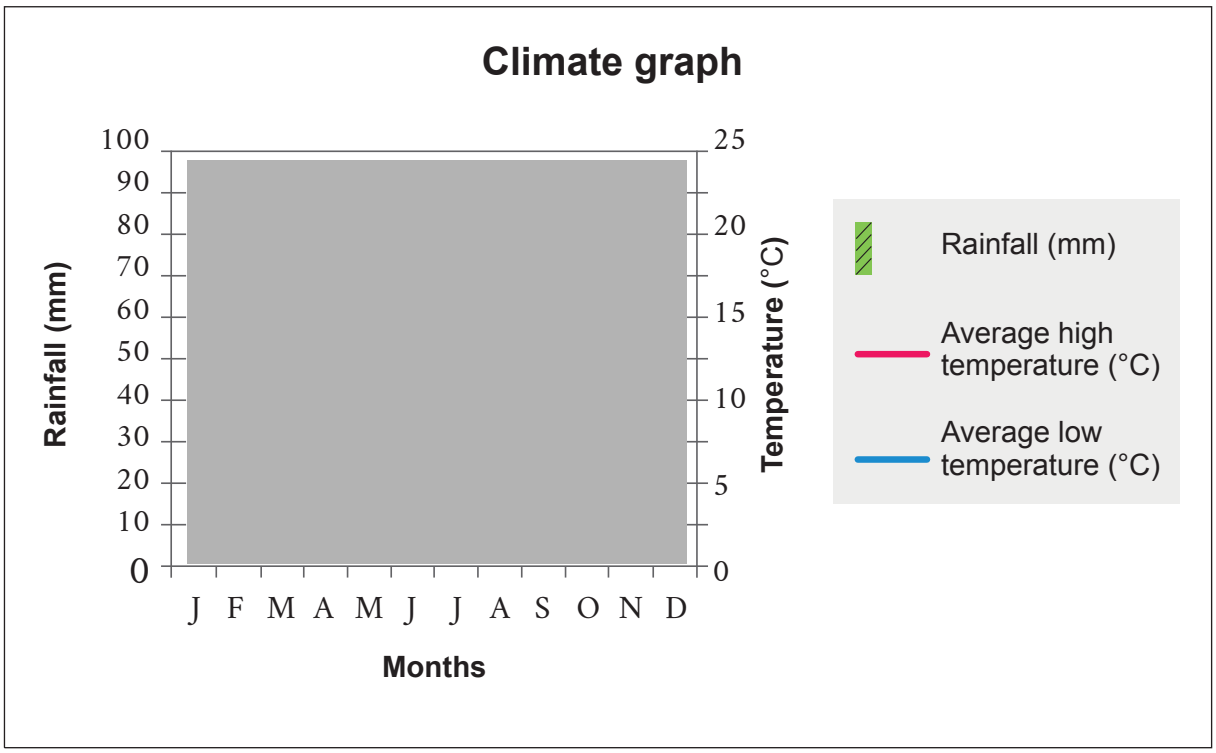
- Cutting the daily shower time to two minutes per person.
- Running the washing machine once every two days rather than every day.

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.

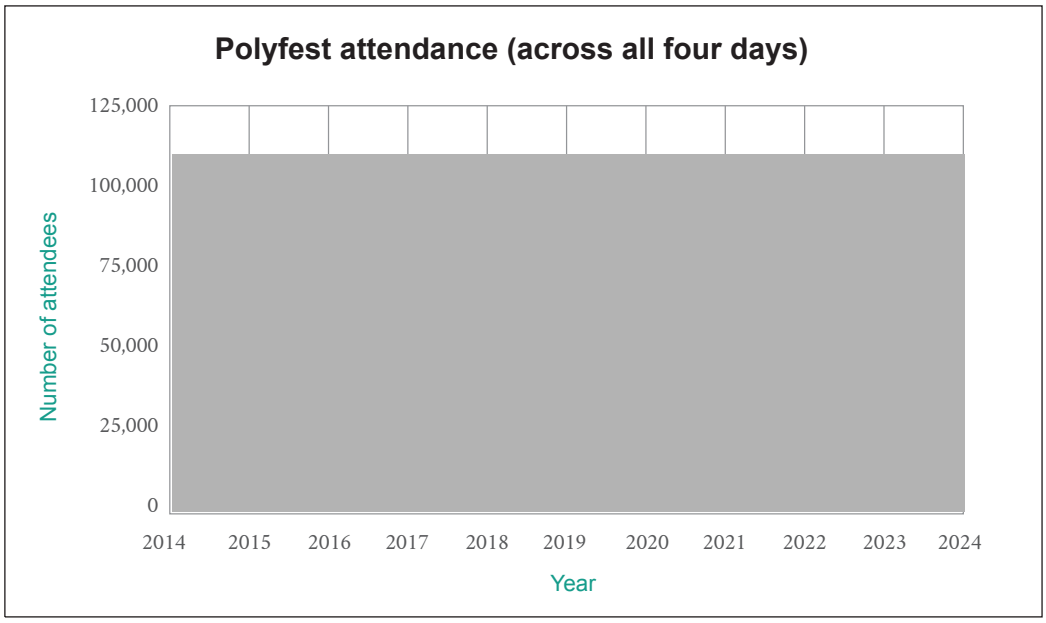
Tick (✓) the correct answer below.

- ◯ 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.

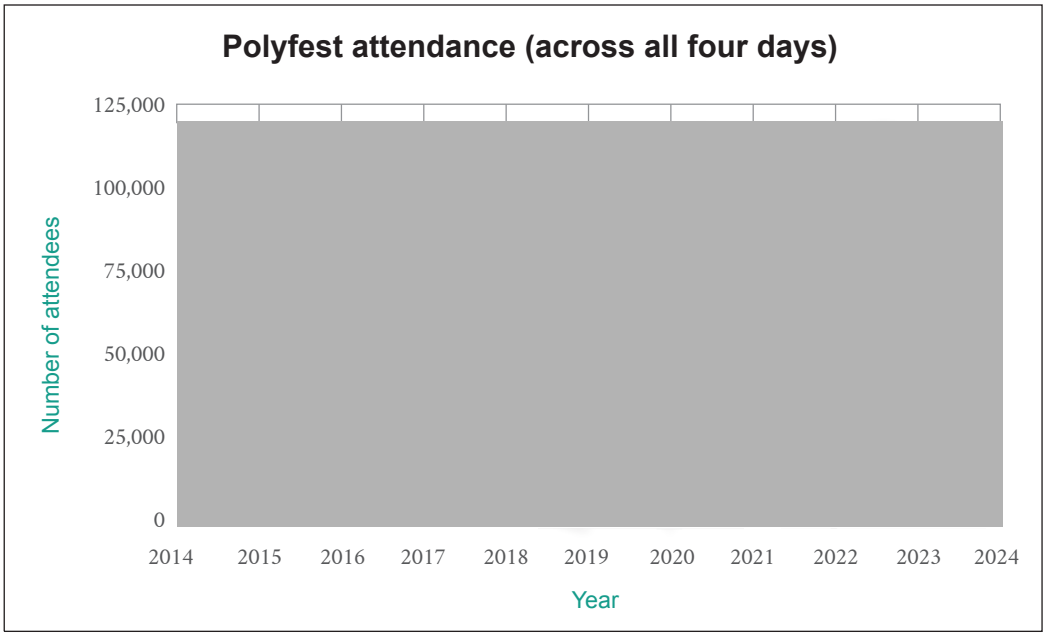
Here is a graph of people attending Polyfest over time.



(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.

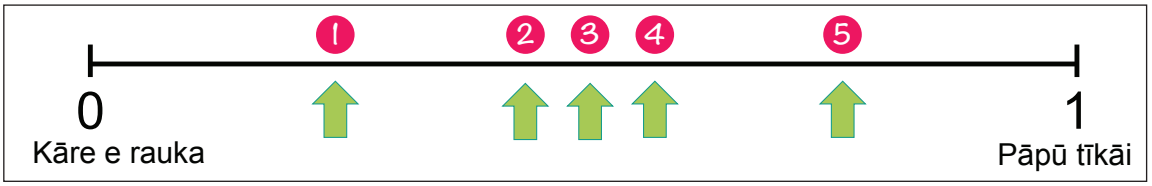
It gives the name of the school and the area students are from, i.e., CA, O, SA, or WA.

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)

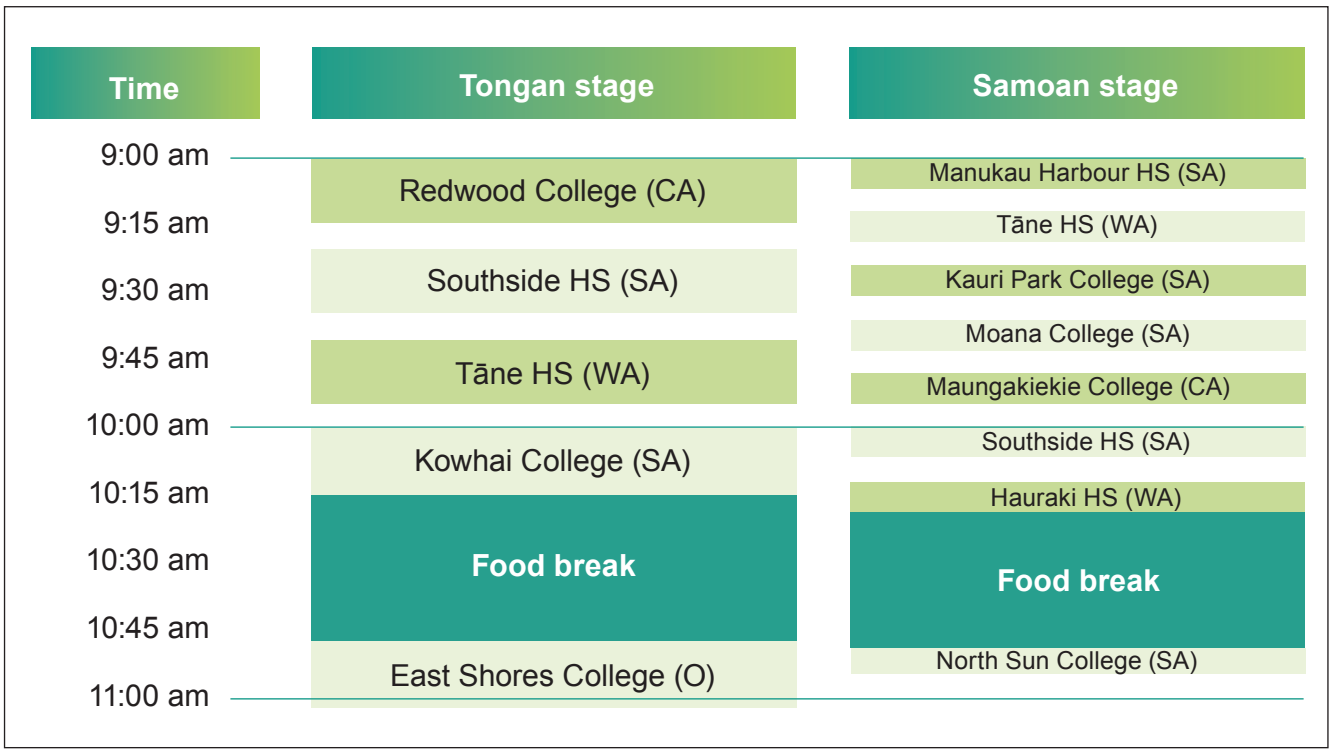
(d) What is the probability of a school from the SA area winning?

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.

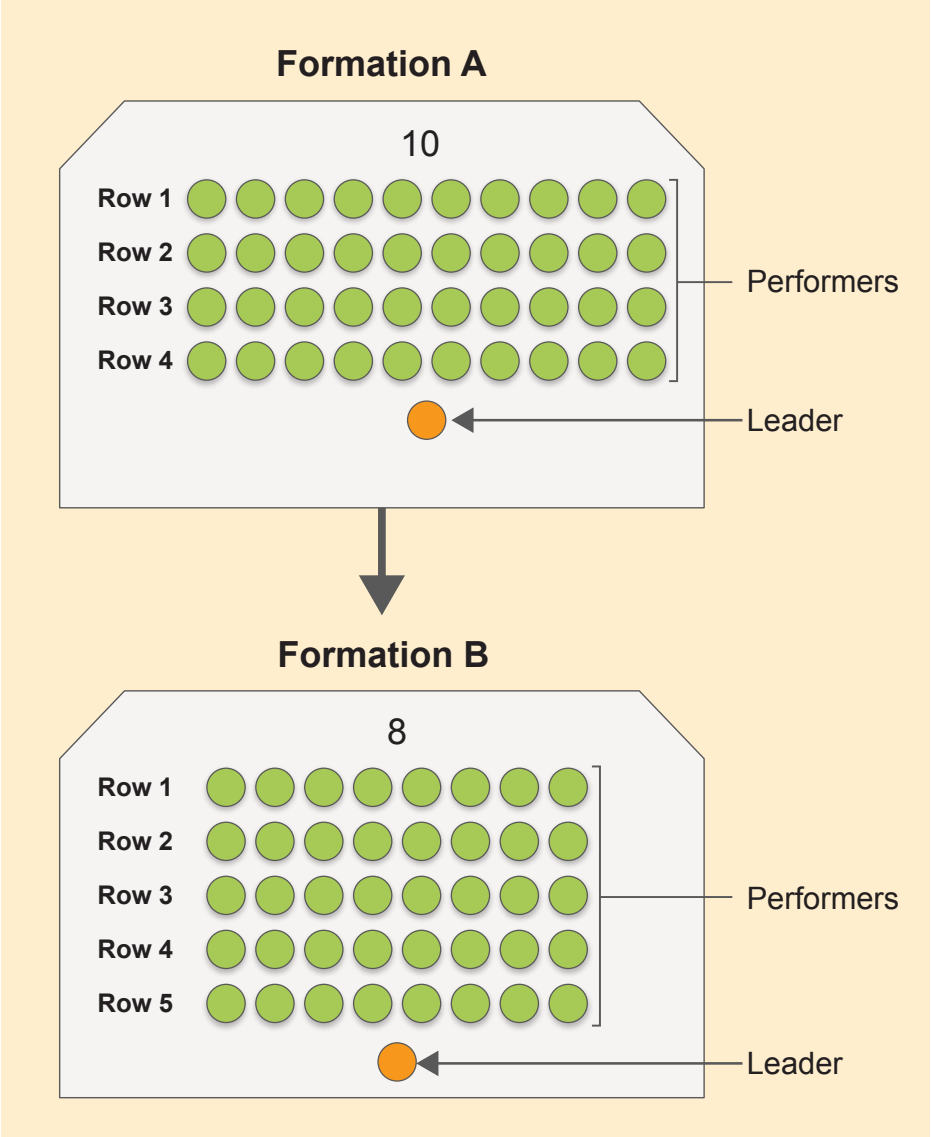
Each stage has a fixed time for performances and a **five-minute break between performances**.



(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.

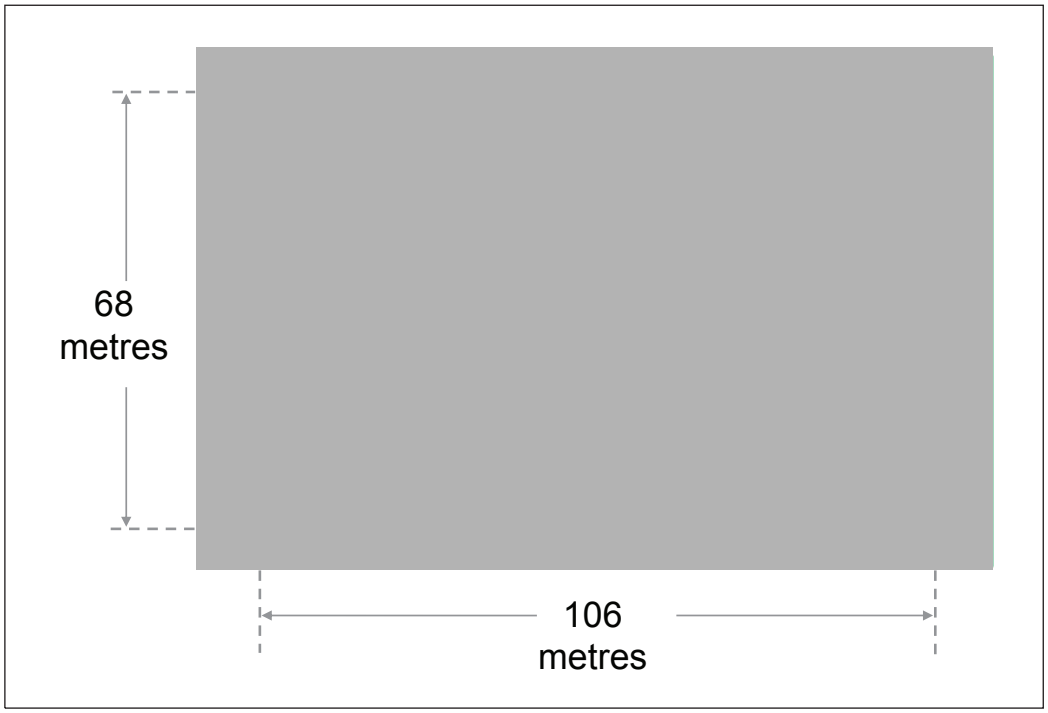


(f) What is the **smallest number** of performers from Formation A that need to move to make Formation B?

_____ 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	Josh	Simoni	Chris	Hōne	Caleb	Nepo
2 m	1.77 m	1.85 m	1.81 m	1.8 m	1.9 m	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**.

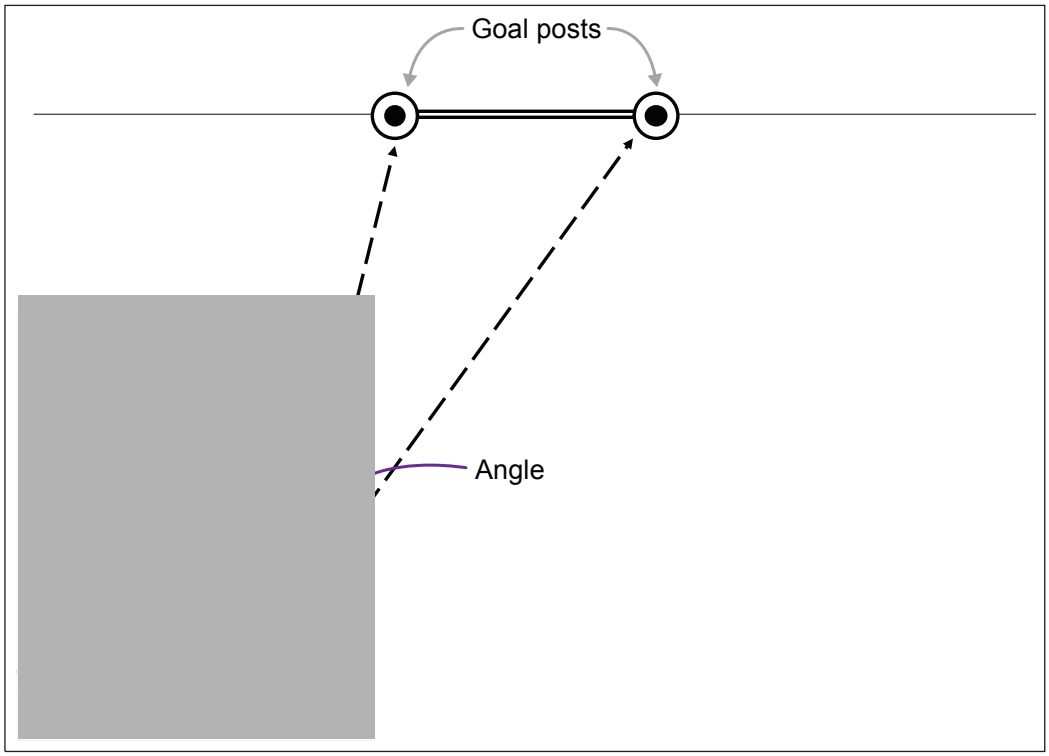
Ani says that, on average, Michaela ran over **100 metres** for every minute she played.

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

Tuatara, https://www.kayak-newzealand.com/wp-content/uploads/2017/09/kayak-nature-tour-tuatara-reptile.jpg
Tuatara, wētā, https://www.ryanphotographic.com/tuatara.htm
Tuatara hatchling, https://www.bbc.co.uk/programmes/articles/2hjZs1Yq7xK0WCgjMRck0Cb/filming-tiny-time-travell
Tuatara Lengths graph, https://tiritirimatangi.org.nz/wp-content/uploads/2020/11/Tiritiri-10-year-Tuatara-Survey-20150217-Final-Version.pdf
Map, https://www.google.com/maps/

Question Two

Richie McCaw. 9 September, 2007. Webb, Murray, 1947- :Digital caricatures. Ref: DCDL-0003904. Alexander Turnbull Library, Wellington, New Zealand, https://www.natlib.govt/records/22669945
Head proportions, https://mammothmemory.net/art/techniques/painting-and-drawing-techniques/proportions-of-a-face.html
Sculpture, https://www.gibbsfarm.org.nz/images/thompson/thompson_05.jpg
Superman comic cover, https://news.artnet.com/market/top-10-comic-book-auction-records-2180493
Tīrau Visitor Centre – Dog, https://places.nz/13825
Tīrau Visitor Centre – Sheep, https://www.nzherald.co.nz/travel/road-trip-must-dos-an-ironclad-pit-stop-in-tirau/QIGPDODM6LXUHZ5ZBRRJCCBWGU/
Map – Wellington to Tīrau, https://www.aa.co.nz/travel/time-and-distance-calculator/

Question Three

Large water bottle, https://springnz.co.nz/wp-content/uploads/2021/11/water-bottle-600x700-2.jpg
Three 1-litre water bottles, https://www.annaricco.com/products/mineral-water-1-5-liter
Pig, https://www.pinterest.nz/pin/pig-png-image--584482857867545266/
Piglet, https://kids.nationalgeographic.com/animals/mammals/facts/pig
Water use table icons, https://www.nzherald.co.nz/nz/watercare-to-increase-auckland-water-bills-by-7-per-cent-from-july/JUXW5IREDRG7BQ6VF77HAAQDOQ/
Climate graph, https://viticulture.weebly.com/graphs--maps.html

Question Five

Rugby player sillouhettes, https://stock.adobe.com
Rugby player, https://www.cbc.ca/sports/olympics/summer/rugby/rugby-sevens-women-gold-1.6125318
Drop-kick, https://www.istockphoto.com/vector/a-woman-kicking-a-rugby-ball-gm1528107920-524973341
Coin toss, https://t4.ftcdn.net/jpg/01/12/32/65/240_F_112326523_2obxVUfbRCvvrZO1FSP1lR10s0jMDB96.jpg
Flags, https://stock.adobe.com