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Mana Tohu Mātauranga o Aotearoa  
New Zealand Qualifications Authority

## Review of Achievement Standards (RAS) Exemplar

**Level 1 Mathematics and Statistics**

**Achievement Standard 91946**

**Interpret and apply mathematical  
and statistical information in context**

**Excellence**

**TOTAL E**

HIGHLIGHT AND NOTES

## Page 1

Make sure you have the paper Resource Booklet 91946R

### SECTION A

The Rotomarino Cycle Club is a local biking group in Tāmaki Makaurau / Auckland whose members get together to explore the maunga in and around the city. If it is wet, they go to a local school hall and use special stands for their bikes to do fitness training.

(a)

In 2021, The Rotomarino Cycle Club offered two types of activities, which are either “indoor cycling” or “outdoor cycling” – exploring the maunga around Tamaki Makaurau / Auckland.

Based on the random sample of cyclists represented in the resource booklet, shown in Figure 2, at least how many sessions did the highest 25% of the cyclists attend in each of the two types of biking activity (indoor or outdoor) in 2021?

#### Spell Check

I can see from the graph that there were 32 sessions overall (indoor and outdoor).

- I worked this out by looking at the graph and seeing the maximum amount of sessions was 100. I could work out that the top 25% were going to be in the 75-100% part of the graph. I then counted how many sessions there were for both indoor and outdoor and that is how I managed to get an answer of 32 sessions over.
- I can also see that there was a larger population at the indoor sessions. 23 people attended the indoor session compared to the 9 that attended the outdoor sessions.
- The reason there were 14 more cyclists attending, may be because of the weather and there might have been more rainy and stormy days in Auckland in August 2021, which is when this data was recorded

(b)

Auckland City Council monitors the number of cycle journeys in Tāmaki Makaurau / Auckland. The data is collected monthly at various sites across the region using reliable equipment.

Cycle journeys include students biking to school, people out for exercise, commuters, and mountain bikers travelling to local tracks.

The Rotomarino Cycle Club is concerned that there have been fewer cycle journeys around Tāmaki Makaurau / Auckland recently, and that this may affect their membership numbers.

(i)

Discuss any trends, regular patterns, and unusual features that you notice in the graph of the data of the Auckland cycle journeys shown in Figure 1 of the resource booklet.

Provide evidence from the graph to back up your statements, giving at least two different statements.

Justify your answer using statistical reasons.

#### Spell Check

- I can see from the graph show that there was a decrease in people cycling in Auckland from May 2020 until June 2021. This is unusual compared to the rest of the data on the graph. The reason why there was such a dip is that Auckland was in lock down due to the COVID 19 pandemic and were only aloud to leave their houses to access essential items such as groceries and medicines. There were an average of around 250,000 movements over the 13 months but that still shows a decreasing trend compared to the peaks in December 2019 and February 2018.
  
- There was another pattern in the graph and shows the peaks and troughs throughout the map. The peaks tend to happen in December, January, February and March which is when the conditions are the warmest and driest. The troughs in the graph happen in June, July, August and October when the months tend to be colder and more wet, making cycling seem less appealing to Auckland residents.
  
- The overall trend of the graph is shown by the dotted line on the graph which is the 12 month rolling average. The trend is stable throughout the graph with some small increases. The overall time frame from the graph is from December 2015 to June 2021, meaning the data covers 6 years of Auckland cycle movements so the data becomes really useful for the Auckland council who may think they might need or not need any more cycle trails throughout the city.

(ii)

The Rotomarino Cycle Club is concerned about the number of cycle movements.

Provide evidence shown in the graph, in Figure 1, to support your decision.

Explain whether or not you think this concern is justified.

#### Spell Check

- I think that the Rotomarino Cycle Club's concern is not justified as some bias from recent times which may apply to their concern. There was a drop in June 2020 but that is due to a government lockdown to stop the COVID 19 pandemic. When lockdown first started there was a 100,000 movement decrease but as lockdown restrictions eased more people got back cycling for many reasons such as cycling to work as an essential worker and many other reasons. At one point in around January 2020 400,000 movements were tracked which was the peak. 350,000 movements were recorded in February 2018, 375,000 were recorded in March 2019 so there has been a lot of movements which does not warrant a concern from the cycling club.

## SECTION B

Some members of the Rotomarino Cycle Club are interested in attending a Fitness Club in the winter months. The frequency of their estimated attendance is about 2–3 times per week.

Using the information provided in Figure 3 in the resource booklet, what membership option would you recommend?

Note that a cycle club member can purchase only one of the three options available.

Justify your answer clearly, and explain any potential effects or limitations of their choices or the source of information.

#### Spell Check

- I strongly believe option A is the best option, because if the Cycling club is aiming for 2-3 sessions a week there would be no point of paying for option C which is \$420 for unlimited classes whereas to go to every session, every week for the three winter months you would only be paying \$384, I worked this out by saying there are 12 weeks in 3 months and calculation 32 dollars a week times 12 weeks which equals \$384.
- Option B features unlimited classes every week for \$3 more. Just like option C, the Cycling club aims for 2-3 sessions every week making the unlimited classes pointless for someone looking for a fitness class to only do 2-3 times per week. If you were a competitive rider looking for as much time on the bike as possible option C may be worth it as you can go whenever you want for as long as you want (considering opening hours).

- I can conclude that Option A would be the best value for someone looking to only to 1-3 classes per week as you only pay \$32 per week for 12 weeks, this means you would pay \$384 in those 3 winter months compared to the \$420 you would pay for option B and the \$420 price tag for option C. Option C may suit someone looking for as much time on the bike as possible for the fact you get unlimited classes per week. But Option A is the cheapest option with the most value due to the Cycling club aiming for 2-3 classes per week and Option A includes access to the 1-3 classes per week being held for \$36 cheaper.



**QUALIFICATIONS**

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**QUALIFY**

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**Blank screenHelp guide**

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## Excellence Exemplar 2022

Subject	Mathematics and Statistics	Standard	91946	Total score	E
Q	Grade score	Annotation			
	E	<p>In Section A, the candidate was able to describe and correctly interpret three features in time series data. They have used data from the resource material in their answer and have explained how the answer was derived.</p> <p>In Section B, three pricing options have been compared, using relevant and accurate calculations. One option is recommended with concise reasoning and supported by calculations performed from data in the resource material. The candidate has shown a limitation of the data by having to assume that in any three-month period, it equates to 12 weeks. The candidate has also mentioned the need to consider opening hours.</p>			