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NZQA

Mana Tohu Mātauranga o Aotearoa
New Zealand Qualifications Authority

Level 1 Mathematics and Statistics 2025

91946 Interpret and apply mathematical and statistical information in context

Credits: Five

Achievement	Achievement with Merit	Achievement with Excellence
Interpret and apply mathematical and statistical information in context.	Interpret and apply mathematical and statistical information in context using relational thinking.	Interpret and apply mathematical and statistical information in context using extended abstract thinking.

Check that the National Student Number (NSN) on your admission slip is the same as the number at the top of this page.

You should attempt ALL the questions in this booklet.

Pull out Resource Booklet 91946R from the centre of this booklet.

Show ALL working.

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 2–12 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.

Merit TOTAL **17**

QUESTION ONE

Use the information provided in Resource 1A and Resource 1B in the resource booklet to answer these questions.

(a)   Using Resource 1A, what percentage of Nike sports shoes cost more than $500?

The percentage of Nike shoes that cost more than $500 is around 4.76%

(b)   **Compare** the distributions of the cost of Adidas and Nike sports shoes shown in Resource 1A.
  • Discuss similarities and differences considering **centre**, **shift**, **shape**, and **spread**.
  • Provide numerical evidence where appropriate.
  • In your answer, describe at least TWO different features, in context.
  • **What conclusion about Adidas and Nike sports shoes can you make about which brand of shoe is more expensive, based on this sample?**
  • Use evidence from the graph to support your answer.

From resource 1A I can see that the price of shoes between Adidas and Nike are a bit different. Using $\frac{DBM}{OVS}$ I can see that the DBM is $\frac{234-131}{}$ and OVS is $\frac{298-94}{}$ $\frac{103}{204}$ = 50.5%. The sample size is closer to 100 which means there is a difference between the two companies. Nike shoes looks to be more expensive because the cheapest pairs of shoes in this sample is around $~~90~~$ the cheapest ~~$190~~$, whereas Adidas shoes is around $63. The mean price is $97.51 apart and the lower quartile for Nike is not ($183.00) overlapping the upper quartile for Adidas which is $171.00. From this graph I can conclude that Nike sports shoes is more expensive that Adidas sports shoes with ~~proble~~ clear evidence ~~~~~~ that say Nike prices are higher.

(c) Give at least one justified reason why Resource 1A may not be reliable for comparing the cost of Adidas and Nike sports shoes.

A reason could be because the sample may be inaccurate or incorrect because the sample is from a New Zealand website that sells shoes. There could be factors why they sell the shoes of different brands at different prices. We do not know the ~~factors~~ ~~why~~ exact source of the website so we can not believe this is exact or reliable.

Resource 1B shows the amount of spending on clothing and footwear in New Zealand between the years 2010 and 2024, in millions of New Zealand dollars.

(d) What trends, repeating patterns, and unusual features do you notice in the spending shown in the graph?

• Support your statements with evidence from the graph.

• Give at least two reasons to support and explain your answer.

There looks like there is an overall increasing trend from 2010-2024. The overall trend starts at around 800 in 2010 and increased to 1100 in 2024. There seems to be ~~an~~ a repeating yearly pattern starting off low, increasing till the end of Q1, decreasing ~~to then~~ in Q2 and a massive spike at the end of Q3 and down again in Q4. The reason why is would have spiked could be because of colder weather in Q3 when it is winter time. The trend looks to be constant until 2014 when a lot more money was spent on clothing and footwear. There is more of a vertical variation starting from 2014 to 2024 without an obvious repeating pattern. The trend has been fluctuating going up to 1100 in 2017, decreasing to 920 in 2021 Q2 and peaking at 12500 in Q2 of 2023 and decreasing a bit in 2024. We are not sure if this will increase or decrease after this but the unusual features are usually due to intense weather, outbreaks in viruses, trending clothes and many more.

(e) Using Resource 1B, make a prediction about future spending on clothing and footwear in New Zealand.

Explain your prediction, and discuss how confident you are in it.

I predict the future spending of clothing and footwear will increase as many people like to wear trending clothes and prices of clothes tend to increase. I am not sure if the trend will stay constant but spending should increase. If an unexpected event happens the trend like could change rapidly but I am sure many more families or citizens can afford clothing so future spending is not a problem.

QUESTION TWO

Use the information provided in Resource 2A and Resource 2B in the resource booklet to answer these questions.

The graph in Resource 2A shows the relationship between the price of sports shoes and the size of the shoes.

(a) Describe and interpret TWO different features of the relationship shown in Resource 2A.

Feature 1: The looks like there is a positive relationship between the size and the price of shoes. The trend line shows each time the sizes increase, the prices climb as well. For example a shoe size of 1 has a price of around $30 dollars (NZD) and size 13 shoes normally cost $115 dollars (NZD)

Feature 2: While most points are near the trend line, we can also spot some outliers. One obvious one is a size 6 shoe, and the price is $150 dollars (NZD). There are some cheaper pairs of shoes that don't follow the trend line with one 13 sized shoe with a price of $70 dollars. We know some outliers could be caused by popularity of a certain pair of shoes or colour and other features.

(b) Adina needs to buy a new pair of size 6 sports shoes.

Using the graph in Resource 2A, what price should Adina expect to pay?
- How confident can you be in using this graph to predict shoe price?
- Support your answer with statistical reasoning.

Shoe prices for size 6 sports shoes are usually around $65 (NZD) I would expect it to be close or a bit cheaper. You may also expect expensive ones. We cannot always ~~trend~~ expect the price ~~you~~ to be close to a trend line as it is a random sample. The range of the price would be around $40 dollars to $90 dollars.

(c) Resource 2B summarises three different sports shoe companies' prices and their special offers.

Ricky wants to buy new size 7 football (soccer) sports shoes, and will choose from these companies.

Ricky wonders whether he should buy one or two pairs of sports shoes.

Which company should Ricky choose?

Make your recommendations, with reasons and considerations, using the information provided in Resource 2B, **as well as including your own personal world views**.

I would recommend to Ricky to choose the company "Kick off". It's price does not include GST which means the is an additional 15% GST. There is not shipping cost if it is collected from the factory and if he buys to pairs of shoes, he will get a half price discount on his second one. The size 7 sports shoes are included in the special offers and if he doesn't need the second pair of shoes, he can sell it or give it away and he can still make some money, Footy Fields is the only company with its price GST included but it is quite expensive and the discounts aren't really worth it. Football direct is the cheapest original price but the shipping cost is the most expensive. In my opinion, I would choose "Kick off" and buy two pairs of shoes so I can get a discount.

(d) Ricky is currently wearing size 7 sports shoes, but he is growing quickly. His mother thinks that he will need larger size sports shoes next season.

Using **both** Resource 2A and Resource 2B, recommend the best option for Ricky when buying his sports shoes for next season.

If he gets size 8 shoes for next season, then there is no special offers for the product. Kick off also has the cheapest option with a low price and shipping cost. He might be able to buy a bigger size that he can wear for longer that results in saving more money, but for sports, snug. fit shoes are more practical to ensure the best performance and comfort. To conclude, my recommendation is to buy shoes closer to the season so he can estimate what size is suitable.

QUESTION THREE

Use the information provided in Resource 3 in the resource booklet to answer these questions.

(a) The survey was completed by 2571 people who visited the *Running Shoes Guru* website.

Approximately how many of the people who completed this survey, would be expected to run in the morning?

It says 53% of the people run in the morning which is around 1363 people.

(b) According to the survey, which brand of running shoe is the most preferred?
- Discuss how confident you would be in concluding that this brand is the most popular running shoe.
- Justify your answer.

The most preferred running shoes brand is Asics where 22% of the people prefer it. They prefer this brand when they are running usually with a higher percentage than Nike. Athletes under the age of 20 prefer Nike with 46% compared to 8% for Asics. Some people have different preferences but according to the overall preference it is Asics winning by 2% to Nike.

(c) Discuss two similarities or differences in the running shoe **preference by age**.

Use this information to make suggestions of what brand of shoe you think will be bought by Quinn, who is 31 years old.

Similarity or difference 1: A similarity across running shoes by age is A a higher percentage by Nike. Nike has percentages of 46% as its highest and 24% as it lowest. It looks like younger people prefer Nike a lot more its been topping the charts for all but one of them.

Similarity or difference 2: Something quite different is over 60 year old people have more of an even diversity of shoe brands. A reason could be because they all have their own preferences without following the trend too closely or not really choosing the more expensive brands.

Suggestions for Quinn: If Quinn is 31 years old, he would fit under the 31-40 year category. The two highest preferred shoe brands are the same percentage. (Nike and Asics both 24%). It would be up to his choice which one he prefers but a big factor could be a brand he has previously bought and had good experience with. It also depends what behaviour he is and how much he runs. I think most likely he will choose between Nike or Asics.

(d)   Axel is 45 years old and runs approximately 50 km per week.

He needs to buy a new pair of running shoes.

Using any of the Resources 1–3, recommend which brand of shoe Axel should consider buying and estimate the cost of the shoes.

Include evidence from at least two sections of Resource 3 to justify your answer.

People in the 41-50 years old category tend to go for Nike shoes. However, If Axel runs approximately 50 kms, the highest is Asics with 24% and Nike with 22%. There isn't much of a difference but from Resource 1, Nike shoes are quite expensive. That didn't include Asics shoes though but it looks like overall Asics top most graphs. It is hard to estimate the cost due to many factors like shoe size, popularity, experience and comfort. I would recommend Asics as that is the most prefered shoe brand and the price may not be as high as Nike.

(e)   How confident would you be using information from this survey to make recommendations about running shoes?

I would be quite confident as this is a large sample with different age groups and shoe sizes so any recommendations or predictions would be quite close and accurate. With some makes standing out quite a lot it would be safe to say the top brands that include Asics, Nike and Adidas would all be popular and reliable and those would be the first ones I would recommend to people.

QUESTION
NUMBER

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

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Merit

Subject: L1 Mathematics and Statistics

Standard: 91946

Total score: 17

Q	Grade score	Marker commentary
One	M6	The candidate demonstrates knowledge of the key features of the displays. They have described and interpreted the features in context with appropriate numerical evidence.
Two	M5	In Q 2(a) the candidate has clearly described and interpreted features of the display.
Three	M6	The response demonstrates understanding of the information in the resource. They have described specific attributes of the displays and used the information to make justified recommendations.