Level 1 Mathematics and Statistics: practice paper 2026

AS 91946 Interpret and apply mathematical and statistical information in context · Vertex Academy practice paper, not an NZQA paper

Attempt ALL the questions. Show ALL working. Use NZQA's Level 1 formulae sheet. Write your answers on lined paper, or in the space under each question.

QUESTION ONE

(a) Resource 1A: a random sample of 30 commuter e-bikes was taken from one New Zealand online bike shop. The table shows how many of them fall in each price band.
What percentage of the commuter e-bikes in the sample cost $4,000 or more?

Price of commuter e-bike	Number of e-bikes
$1,000 to $1,999	2
$2,000 to $2,999	14
$3,000 to $3,999	8
$4,000 to $4,999	3
$5,000 to $5,999	1
$6,000 to $6,999	2
Total	30

(b) Resource 1A: a random sample of 30 commuter e-bikes and 30 mountain e-bikes was taken from one New Zealand online bike shop in March 2026. The table summarises their listed prices in $NZ. On the dot plots, both types have most prices bunched at the lower end with a long tail of a few very expensive e-bikes to the right; the mountain e-bike at $12,999 sits well away from the rest.
Compare the distributions of the prices of commuter and mountain e-bikes.
• Discuss similarities and differences considering centre, shift, shape and spread.
• Give numerical evidence where appropriate, and describe at least TWO different features, in context.
• What conclusion can you make about which type of e-bike tends to cost more, based on this sample? Use evidence from the table to support your answer.

Type of e-bike	Minimum	Lower quartile	Median	Mean	Upper quartile	Maximum	Number of e-bikes
Commuter	$1,599	$2,499	$2,999	$3,412.33	$3,799	$6,999	30
Mountain	$3,499	$4,999	$5,899	$6,525.67	$7,499	$12,999	30

(c) Resource 1A: a random sample of 30 commuter e-bikes and 30 mountain e-bikes was taken from one New Zealand online bike shop in March 2026. The table summarises their listed prices in $NZ. On the dot plots, both types have most prices bunched at the lower end with a long tail of a few very expensive e-bikes to the right; the mountain e-bike at $12,999 sits well away from the rest.
Give at least one justified reason why Resource 1A may not be reliable for comparing the prices of commuter and mountain e-bikes in New Zealand.

Type of e-bike	Minimum	Lower quartile	Median	Mean	Upper quartile	Maximum	Number of e-bikes
Commuter	$1,599	$2,499	$2,999	$3,412.33	$3,799	$6,999	30
Mountain	$3,499	$4,999	$5,899	$6,525.67	$7,499	$12,999	30

(d) Resource 1B: the table shows the total amount spent at New Zealand bike shops each quarter from 2019 to 2025, in millions of $NZ. Each quarter is 3 months. On the graph of this data, a long-term trend line rises from about $58 million a quarter in 2019 to about $89 million in 2021, then falls slowly to about $72 million in 2025.

What trends, repeating patterns and unusual features do you notice in the spending shown in the data?

• Support your statements with evidence from the table.

• Give at least two reasons to explain what you see.

Year	Q1 (Jan to Mar)	Q2 (Apr to Jun)	Q3 (Jul to Sep)	Q4 (Oct to Dec)
2019	62	48	44	78
2020	66	22	70	112
2021	96	84	58	118
2022	92	74	70	108
2023	84	66	62	98
2024	80	62	58	94
2025	78	60	56	92

(e) Resource 1B: the table shows the total amount spent at New Zealand bike shops each quarter from 2019 to 2025, in millions of $NZ. Each quarter is 3 months. On the graph of this data, a long-term trend line rises from about $58 million a quarter in 2019 to about $89 million in 2021, then falls slowly to about $72 million in 2025.

Use the data to predict the amount that will be spent at New Zealand bike shops in Quarter 4 (October to December) of 2026. Explain your prediction, and discuss how confident you are in it.

Year	Q1 (Jan to Mar)	Q2 (Apr to Jun)	Q3 (Jul to Sep)	Q4 (Oct to Dec)
2019	62	48	44	78
2020	66	22	70	112
2021	96	84	58	118
2022	92	74	70	108
2023	84	66	62	98
2024	80	62	58	94
2025	78	60	56	92

QUESTION TWO

(a) Resource 2A: a scatter plot shows the claimed range on one full battery (km) and the price ($NZ) of 60 randomly selected e-bikes sold in New Zealand. The table summarises the points in groups. The trend line drawn on the scatter plot is: price = 50 × range + 500. The points spread further from the trend line as the range gets longer. One e-bike with a range of 55 km costs $8,500, far above the others near it.

Describe and interpret TWO different features of the relationship between range and price.

Claimed range (km)	Number of e-bikes	Lowest price	Median price	Highest price
40 to 59	14	$1,600	$3,000	$4,200 (plus one at $8,500)
60 to 79	18	$2,400	$4,000	$5,800
80 to 99	15	$3,200	$5,000	$7,000
100 to 119	9	$3,900	$5,900	$8,200
120 to 150	4	$5,500	$7,200	$9,000

(b) Resource 2A: a scatter plot shows the claimed range on one full battery (km) and the price ($NZ) of 60 randomly selected e-bikes sold in New Zealand. The table summarises the points in groups. The trend line drawn on the scatter plot is: price = 50 × range + 500. The points spread further from the trend line as the range gets longer. One e-bike with a range of 55 km costs $8,500, far above the others near it.

Alex wants an e-bike with a claimed range of 80 km.

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

Claimed range (km)	Number of e-bikes	Lowest price	Median price	Highest price
40 to 59	14	$1,600	$3,000	$4,200 (plus one at $8,500)
60 to 79	18	$2,400	$4,000	$5,800
80 to 99	15	$3,200	$5,000	$7,000
100 to 119	9	$3,900	$5,900	$8,200
120 to 150	4	$5,500	$7,200	$9,000

(c) Resource 2B: three shops sell the same Urban 70 commuter e-bike (claimed range 70 km). GST is 15%. A helmet and a lock are needed; where a shop does not include them, they cost $150 (including GST). The special offers apply only to e-bikes priced at $4,000 or less, including GST.
Sam lives in Hamilton and wants to buy the Urban 70 e-bike, plus a helmet and a lock. Sam has an old bike that could be traded in.
Which shop should Sam choose? Work out the total cost at each shop, then make your recommendation with reasons and considerations, using the information in Resource 2B as well as your own personal worldviews.

Shop	Price of the Urban 70 e-bike	Special offer	Delivery	Other
Pedal Power	$3,180 excluding GST	10% off the e-bike	$59, or free for orders over $3,500 including GST	1-year warranty
Kiwi E-Ride	$3,699 including GST	Free helmet and lock. $200 off if you trade in an old bike	Free	2-year warranty and a free first service (worth $90)
Spoke & Charge	$3,450 including GST	Pay no GST	$35, or free if collected from the Hamilton store	1-year warranty

(d) Resource 2A: for 60 e-bikes, the trend line between claimed range (km) and price ($NZ) is price = 50 × range + 500. Only 4 of the 60 e-bikes have a range of 120 km or more; their prices go from $5,500 to $9,000.

Resource 2B: three shops sell the Urban 70 e-bike (range 70 km). Their special offers apply only to e-bikes priced at $4,000 or less, including GST. The cheapest total for the Urban 70 with a helmet and lock is $3,150.

Tama rides 22 km each way to work, 5 days a week, and now pays $4.20 each way on the bus. Tama wants to charge an e-bike only twice a week, so the longest stretch between charges is 3 working days. An e-bike uses about 1 kWh of electricity for every 50 km, and power costs 36 cents per kWh.

Using Resources 2A and 2B and this information, recommend the best option for Tama. Include an estimate of how long it would take for the e-bike to pay for itself compared with the bus (assume 46 working weeks a year).

Information	Value
Trend line (Resource 2A)	price = 50 × range + 500
E-bikes with range 120 km or more	4 of 60, priced $5,500 to $9,000
Offers in Resource 2B	only for e-bikes up to $4,000 including GST
Cheapest Urban 70 total (range 70 km)	$3,150
Tama's ride	22 km each way, 5 days a week
Bus fare	$4.20 each way
Electricity	1 kWh per 50 km, 36 cents per kWh

QUESTION THREE

(a) Resource 3: an online survey, "How we get to work 2025", was completed by 1840 people who visited the website of a cycling group, BikeAhead NZ. Results: 35% cycle to work at least once a week; 12% own an e-bike; 58% say traffic is their biggest worry about cycling; 41% would cycle more if there were separated bike lanes. Average weekly cost of getting to work reported: car $78, bus or train $35, bike or e-bike $6.

Approximately how many of the people who completed this survey would be expected to cycle to work at least once a week?

(b) Resource 3: an online survey, "How we get to work 2025", was completed by 1840 people who visited the website of a cycling group, BikeAhead NZ. Results: 35% cycle to work at least once a week; 12% own an e-bike; 58% say traffic is their biggest worry about cycling; 41% would cycle more if there were separated bike lanes. Average weekly cost of getting to work reported: car $78, bus or train $35, bike or e-bike $6.

The table shows the main way to work for all 1840 people.

A news website reports the survey with the headline: "One in five Kiwis now bike to work."

Does the survey support this headline? Discuss how confident you would be in this claim, and justify your answer.

Main way to work	Car (driver)	Bus or train	Bike or e-bike	Walk	Other
All 1840 people	46%	18%	21%	9%	6%

(c) Resource 3: an online survey, "How we get to work 2025", was completed by 1840 people who visited the website of a cycling group, BikeAhead NZ. Results: 35% cycle to work at least once a week; 12% own an e-bike; 58% say traffic is their biggest worry about cycling; 41% would cycle more if there were separated bike lanes. Average weekly cost of getting to work reported: car $78, bus or train $35, bike or e-bike $6.

The table shows the main way to work, by age group.

Discuss two similarities or differences in the main way to work by age. Then use this information to suggest how Hana, who is 26 years old, is likely to get to work.

Main way to work, by age	Car (driver)	Bus or train	Bike or e-bike	Walk	Other
Under 25	31%	29%	22%	14%	4%
25 to 39	44%	18%	24%	9%	5%
40 to 54	52%	14%	21%	7%	6%
55 and over	55%	15%	15%	8%	7%

(d) Resource 3: an online survey, "How we get to work 2025", was completed by 1840 people who visited the website of a cycling group, BikeAhead NZ. Results: 35% cycle to work at least once a week; 12% own an e-bike; 58% say traffic is their biggest worry about cycling; 41% would cycle more if there were separated bike lanes. Average weekly cost of getting to work reported: car $78, bus or train $35, bike or e-bike $6.

The table shows the main way to work by age group and by distance to work.

Wiremu is 47 years old and lives 8 km from work. Wiremu drives to work now and is thinking about changing.

Using Resource 3, recommend how Wiremu could get to work, and estimate how much Wiremu could save each week. Include evidence from at least two sections of Resource 3. (In Resource 1A, the median price of a commuter e-bike was $2,999.)

Main way to work	Car (driver)	Bus or train	Bike or e-bike	Walk	Other
Age under 25	31%	29%	22%	14%	4%
Age 25 to 39	44%	18%	24%	9%	5%
Age 40 to 54	52%	14%	21%	7%	6%
Age 55 and over	55%	15%	15%	8%	7%
Distance under 5 km	24%	12%	30%	30%	4%
Distance 5 to 10 km	41%	20%	28%	4%	7%
Distance 11 to 20 km	55%	22%	18%	0%	5%
Distance over 20 km	72%	18%	6%	0%	4%

(e) Resource 3: an online survey, "How we get to work 2025", was completed by 1840 people who visited the website of a cycling group, BikeAhead NZ. Results: 35% cycle to work at least once a week; 12% own an e-bike; 58% say traffic is their biggest worry about cycling; 41% would cycle more if there were separated bike lanes. Average weekly cost of getting to work reported: car $78, bus or train $35, bike or e-bike $6.
How confident would you be using information from this survey to make recommendations about how people should get to work?

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