### Assessment Schedule – 2024

# Mathematics and Statistics: Interpret and apply mathematical and statistical information in context (91946)

### **Evidence Statement**

### Section A

Expected coverage					Achievement	Merit	Excellence
<ul> <li>non-linear trend.</li> <li>The growth of the data usage year on year has been steadily increasing, showing an exponential growth pattern.</li> <li>Therefore, the forecasted increase can be supported by the strong increasing trend.</li> <li>Reliable forecast justification suggestions:</li> <li>The average forecasted increase per year is <sup>12.2 - 6.5</sup>/<sub>5</sub> = 1.14 GB per month, which is similar to the average increase per year between 2021 and 2023: <sup>6.5 - 4.21</sup>/<sub>2</sub> = 1.145 GB.</li> <li>The percentage of increase has been steadily reducing since 2017 to about 28% in 2021. If the percentage of increase continues to reduce, it is reasonable to assume that the average increase rate will be about 10 to 20%, which gives a forecasted range for 2028 to be 6.5 × 1.1<sup>5</sup> = 10.5 GB or 6.5 × 1.2<sup>5</sup> = 16.2 GB.</li> <li>Unreliable forecast justification suggestions:</li> <li>The rate of change between 2021 and 2023 is about 24%: 4.21 × 1.24<sup>2</sup> = 6.5. If this rate continues, the forecasted data usage for 2028 would be 6.5 × 1.2<sup>45</sup> = 19 GB, so the figure in Resource 1A is much lower.</li> <li>Due to COVID-19 lockdowns in 2020 and 2021, the mobile date usage would be reduced, since many people were stuck at home using their Wi-Fi.</li> </ul>				• Describes a consistent and increasing trend to support the continuous growth in data usage forecast is valid.	<ul> <li>Clearly justifies the validity of forecasted growth with some numerical evidence. Possible numerical evidence include:         <ul> <li>linear growth rate; exponential growth rate; overall average percentage of change</li> <li>adjusted percentage of change with contextual reasoning. OR</li> <li>Candidate makes valid comments to express concern that the forecast is unreliable.</li> </ul> </li> </ul>		
	Year	Inc data usage from previous year	Increased % of change				
2	2017	0.53	74%				
2	2018	0.79	63%				
2	2019	0.71	35%				
2	2020	0.54	20%				
2	2021	0.92	28%	]			
• The percentage increa	ease from	year to year is decreasing	g, so maybe the data usage wi	ill flatten out.			

Carryover plans from 2degrees Advantages More options to choose from include the most affordable plan. \$35 / month for 3 GB. The \$45 and \$60 / month plans both offer 1 GB more max speed data, \$60 / month is also cheaper than the medium plan from one.nz. New Zealanders on average used 6.5 GB per month according to Resource 1A, so the \$45 / month with 6 GB data will be enough for the majority of us (assuming the average is measured by mean). Individual's data usage would vary each month depending on their access to WiFi. It is very common that people don't use all the available data. Having the flexibility to save the unused data for the future month allows consumers to maximise their data allowance. All carryover plans also allow customers to share their data with others. <i>Disadvantages:</i> If people exceed their data usage every month, they will have to pay extra for the additional data.	<ul> <li>Identifies one advantage from Carryover plans.</li> <li>AND</li> <li>One advantage from Endless plans.</li> </ul>	<ul> <li>Identified two advantages and / or disadvantages from Carryover plans. AND Two advantages and / or disadvantages from Endless Plans with reasons clearly communicated.</li> </ul>	<ul> <li>Comprehensively considers all three options offered by 2degrees.</li> <li>AND</li> <li>Clearly communicates the advantages / disadvantages.</li> <li>AND</li> <li>Uses the evidence in Resource 1A or 1B.</li> </ul>
Endless plans from one.nz			
Advantages			
There is no cap on data usage. At reduced speeds, people can still browse internet, use their apps etc. If a person uses a lot of data, but can't afford the unlimited plan, the cheaper "endless data" plan would still work for them.			
They offer one.nz rewards.			
\$65 / month plan offers 250 mins and 50 TXT to 20 international destinations.			
Disadvantages:			
Can't share any unused data with others.			
Any unused data will disappear after each month.			

<ul> <li>2degrees option</li> <li>\$60 / month plan is cheaper and offers a similar amount of data (only 1 GB less). There is also one hour free data available everyday, which Losefa can use.</li> <li>A lot of public places in New Zealand offer free WiFi, so Losefa will be likely to use less data in New Zealand than he did in Samoa.</li> <li>His wife and two sons can be added to his Group Plan for a cheaper price than one.nz if they are on a monthly plan. If his two sons are on pre-pay, Losefa can share his unused data with them.</li> <li>If Losefa doesn't use up all the monthly data he pays for, since he is new to the country, he can carry over the minutes to future months or share it with his sons. <i>Assumptions / limitations</i></li> <li>I have to assume that both his sons will choose 2degrees pre-pay so Losefa can share his unused data.</li> <li>I have to assume that Losefa will use the free hour of data each day to maximise his data allowance.</li> </ul>	<ul> <li>Makes a recommendation with clear reasoning to both pricing and data usage. (Accept comparisons made with reference to voice / SMS.)</li> </ul>	<ul> <li>Makes a recommendation with clear reasoning to both pricing and data usage. (Accept comparisons made with reference to voice / SMS.) AND Considered his family's needs in either international calling or family data usage.</li> </ul>	<ul> <li>Makes a recommendation with clear reasoning to both pricing and data usage. (Accept comparisons made with reference to voice / SMS.) AND Considers his family's needs in either international calling or family data usage. AND At least two clearly communicated assumptions / limitations.</li> </ul>
<ul> <li>Une.nz option</li> <li>Losefa had a 17 GB data plan, which suggests that he tends to use a lot of data. He should go with the Medium plan, which has a similar cost to his Red Plus plan. By choosing the Medium plan, he can have unlimited data with no extra cost.</li> <li>His old plan included some international minutes and texts, which he will likely to need in New Zealand as well, given that a lot of his family will be in Samoa and / or scattered in other countries.</li> <li>The one.nz Medium plan offers 250 minutes international minutes, which is 150 minutes more than his old plan.</li> <li>Assumptions / limitations</li> <li>By recommending one.nz, I have to assume that Losefa's data usage will be similar to his usage in Samoa. If Losefa has a better access to Wifi in NZ than in Samoa, he will be likely to use less mobile data.</li> <li>Assuming his wife and two sons will have their own monthly or prepaid plans, since the Companion plan from one.nz is more expensive.</li> <li>Losefa's monthly mobile budget stays approximately the same as when he was back in Samoa.</li> </ul>			

### Section B

Expected coverage	Achievement	Merit	Excellence
<ul> <li>There is a moderate (accept moderately strong or strong) negative non-linear trend that we can see in Resource 3 (or negative linear trend with some values not fitting the model).</li> <li>In general, the countries with higher mobile costs for an individual have less monthly mobile data usage (GB) because the graph shows a downward pattern.</li> <li>The majority of the countries are fairly close to the trend line, showing a moderate or moderately strong relationship.</li> <li>All the above confirms that the claim can be justified.</li> <li>However, countries with mobile service cost (lower prices) are vertically scattered with their mobile data usage ranging from 2 – 25 GB per month. Therefore, it's not entirely true to say that "lower prices drive high data consumption".</li> <li>Do not accept comments equivalent to "high prices cause low usage, e.g. as shown by Canada."</li> </ul>	• Uses the moderate negative trend to validate the claim.	<ul> <li>Describes strength and direction of the trend in context to validate the claim. OR</li> <li>Describes the trend but rejects the claim due to the vertical grouping.</li> </ul>	
The OECD average data usage in 2022 was 10.4 GB, which is about ¼ of Latvia's usage (42 GB). The gap between the top five OECD countries has widen to 18 GB in 2022, which is similar to the gap between the rest of OECD countries 19.7 GB (24–4.3). The data usage of the top country Latvia (42 GB) is 10 times of the bottom country usage (4.3 GB). The data mean usage of all OECD countries in 2022 has skewed by the data usage of the top five countries.	• Compares ONE feature.	Compares TWO or more features.	

<ul> <li>Factor 1: Although the populations of New Zealand and Finland are very similar, there are significantly more mobile phones owned in Finland (9.89 million) than in New Zealand (6.56 million). On average, every Kiwi owns 1.4 mobile phones in 2021 compared to 1.8 mobile phones owned by every Finnish person. More mobile phones lead to more data consumption.</li> <li>Factor 2: Internet speed between mobile and fixed broadband differs hugely between the two countries. In Finland, the mobile data speed has increased by 52.8% from 2020 to 2021, whereas their fixed broadband speed only improved by 34.9%. The difference between fixed broadband and mobile data is only about 23 Mbps.</li> <li>In contrast, New Zealand mobile speed has only improved by 17.2% to 46.77 Mbps, which is far slower than the fixed broadband (94.67 Mbps). Because of the much slower speed, Kiwis are more opted in to connect to Wifi instead of relying on their mobile data.</li> <li>Factor 3:</li> </ul>	• One factor identified.	<ul> <li>One factor identified with the relevant numerical evidence and clear explanation. OR Two factors identified but lack of reference to the evidence used.</li> </ul>	• Two factors identified with the relevant numerical evidence and clear explanation.
There are only 6.9% of Finnish people on pre-paid compared to 53.8% of Kiwis. Since 93.2% of them are on post-paid (monthly) plans, they have no reason to conserve data. Unlike the majority of Kiwis who are on pre-paid plans, the less mobile data they use, the less money they have to spend.			

# Grade Judgement

NØ	N1	N2	A3	A4	M5	M6	E7	E8
No response, no relevant response.	One point made incompletely.	1 of u	2 of u	3 of u	1 of r	2 of r	1 of t	2 of t

## Achievement Standard Criteria

Achievement	Achievement with Merit	Achievement with Excellence
<ul> <li>Interpret and apply mathematical and statistical information in context:</li> <li>making an informed judgement or decision using information extracted from mathematical and statistical media.</li> </ul>	<ul> <li>Interpret and apply mathematical and statistical information in context using relational thinking:</li> <li>explaining variation in extracted information</li> <li>explaining how an informed judgement or decision was reached using information extracted from mathematical and statistical media.</li> </ul>	<ul> <li>Interpret and apply mathematical and statistical information in context using extended abstract thinking:</li> <li>evaluating the effects of variation in extracted information, considering assumptions and limitations</li> <li>evaluating the validity of an informed judgement or decision using information extracted from mathematical and statistical media.</li> </ul>

#### **Cut Scores**

Not Achieved	Achievement	Achievement with Merit	Achievement with Excellence
0-2	3 - 4	5-6	7 – 8

#### Appendix: Authenticity of candidate work.

To assess whether a candidate's evidence is genuine, the marker uses their professional judgement, considering all the evidence provided. Where the marker believes there is a possibility the work is inauthentic, they must raise a 'malpractice exception', flagging the issue for further review.

#### Evidence might be considered inauthentic if:

- large portions of the text are identical to other candidates' work
- the evidence does not match the assessment prompt or task
- the response shows evidence of someone else's input other than the candidate's (e.g., teacher feedback)
- the style or voice of the writing is inconsistent with the rest of the candidate's work
- complex pieces of evidence are copied from other sources but are presented as the candidate's own work, or the evidence is deemed significantly unnatural.

Properly referenced, relevant, and integrated information is acceptable. Uncertainty about the authenticity of evidence should be resolved in favour of the candidate.