General Mathematics Unit 3 & 4 — Examination 1 (Practice 1) — Answers & Explanations

Answers to the 20 questions in the free preview.

Data analysis

1. C. 50.5

The interquartile range is 31 − 18 = 13. The upper fence is Q3 + 1.5 × IQR = 31 + 19.5 = 50.5, so any value above 50.5 is an outlier.

2. A. 14

For Store B the interquartile range is Q3 − Q1 = 38 − 24 = 14. Store A has the smaller interquartile range, 40 − 28 = 12, so the middle 50% of Store A's sales is less spread out.

3. E. categorical and nominal

A postcode is written with digits, but the digits label an area rather than measure anything — postcode 3000 is not "less than" postcode 3121 in any useful sense, and averaging postcodes is meaningless. Because the categories have no natural order, the variable is nominal.

4. B. 95%

The values 62 and 78 are each two standard deviations from the mean, because 70 − 2 × 4 = 62 and 70 + 2 × 4 = 78. By the 68–95–99.7% rule, 95% of values lie within two standard deviations of the mean.

5. D. −1.5

The standardised score is z = (x − mean) ÷ standard deviation = (60 − 72) ÷ 8 = −1.5. The score is negative because 60 is below the mean.

6. B. 79

Rearranging z = (x − mean) ÷ standard deviation gives x = mean + z × standard deviation = 64 + 1.25 × 12 = 79.

7. C. 5

With 13 values, the median is the 7th value when they are ordered. Counting along the dot plot, the 7th value is 5. The mode is 6, which occurs four times, but the question asks for the median.

8. A. 43.8%

There are 35 + 45 = 80 females, of whom 35 answered Yes. The percentage is 35 ÷ 80 = 0.4375, which is 43.8%. The value 45.5% is the percentage of Yes responses that came from females, a different question.

9. E. 46%

The coefficient of determination is $r^2 = (-0.68)^2 = 0.4624$, which is 46% correct to the nearest per cent. The sign of r says the association is negative but does not affect r^2.

10. C. each extra kilometre adds $3.20 to the cost

The slope is the change in the response variable for a one-unit increase in the explanatory variable. Here a one-kilometre increase in distance is associated with a $3.20 increase in cost, on average. The intercept, $12.50, is the fixed cost of a delivery of zero distance.

11. A. −2.5

The predicted value is y = 8.4 + 1.6 × 12 = 27.6. The residual is the actual value minus the predicted value: 25.1 − 27.6 = −2.5. The residual is negative because the line overpredicts at this point.

12. C. the association is not linear, so a linear model is not appropriate

A residual plot is used to check the assumption of linearity. Random scatter about zero supports a linear model; a clear pattern such as a curve means the relationship is non-linear, and the data should be transformed or a different model used.

13. B. a $\log_{10}(x)$ transformation

The pattern rises but flattens, so the x-values need to be stretched at the low end and compressed at the high end. A $\log_{10}(x)$ transformation does exactly that. An x^2 transformation would exaggerate the curve rather than remove it.

14. D. 30

The three-point moving average for month 4 uses months 3, 4 and 5: (26 + 30 + 34) ÷ 3 = 90 ÷ 3 = 30. Only the value either side of the month is used, not the whole series.

15. E. $6400

Deseasonalised figure = actual figure ÷ seasonal index = 8000 ÷ 1.25 = 6400. An index above 1 means winter is a busier-than-average season, so the deseasonalised value is lower than the actual value.

16. A. 0.85

Seasonal indices for a year must average 1, so for four seasons they sum to 4. The three given indices sum to 1.15 + 0.92 + 1.08 = 3.15, so the spring index is 4 − 3.15 = 0.85.

Recursion and financial modelling

17. D. 76

Applying the rule twice: $A_1 = 3 \times 12 - 8 = 28$, then $A_2 = 3 \times 28 - 8 = 76$. The value 28 is A_1, one step short.

18. B. $9600

Flat rate depreciation is a fixed amount each year, 0.15 × 24 000 = $3600. Over four years the machine loses 4 × 3600 = $14 400, leaving 24 000 − 14 400 = $9600. Reducing balance depreciation at the same rate would instead leave about $12 528.

19. E. $V_0 = 32\,000$, $V_{n+1} = 0.88V_n$

Losing 12% of its value each year leaves 88% of the previous year's value, so $V_{n+1} = 0.88V_n$. This is reducing balance depreciation. Subtracting a fixed $3840 each year would be flat rate depreciation instead.

20. D. $30 000

Unit cost depreciation charges a fixed amount per unit of use: 0.25 × 60 000 = $15 000 of depreciation. The value is 45 000 − 15 000 = $30 000.

PrepNest

PREVIEW

That’s the end of the preview answers

These are the answers to the 20 preview questions. The full answer key covers all 40 questions in General Mathematics Unit 3 & 4 — Examination 1 (Practice 1), with the working behind every mark.

STILL TO COME	QUESTIONS	MARKS
Recursion and financial modelling	4	4
Matrices	8	8
Networks and decision mathematics	8	8

The full paper comes with

- Every question, printed exactly like the ones in this preview
- The complete answer key, with the working behind every mark
- A topic report after marking, showing what to practice next

Get the full paper at
prepnest.com.au/practice/exams/general_maths-year_12-1-exam1