EXAM PAPER

General Mathematics Unit 3 & 4 — Examination 1 (Practice 2)

PREVIEW
This file has the first 20 of the 40 questions in this paper. The rest is locked: it comes with a PrepNest plan, or with the paper itself for VCE.

Reading time: 15 minutes (no writing)
Writing time: 90 minutes
Total time: 105 minutes

SECTIONS IN THIS PAPER

- Data analysis — 36 min (calculator allowed)
- Recursion and financial modelling — 18 min (calculator allowed)
- Matrices — 18 min (calculator allowed)
- Networks and decision mathematics — 18 min (calculator allowed)

INSTRUCTIONS

You are not permitted to write during reading time — you may only read the paper and plan your approach. Answer every question you can. Write your working in the space provided for long-answer questions. Marking guidance and full explanations are provided in the separate answer key.

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Data analysis

36 minutes • Calculator allowed

1. In a survey, students were asked how many siblings they have. The variable number of siblings is

A. categorical and nominal

B. categorical and ordinal

C. numerical and discrete

D. numerical and continuous

E. numerical and ordinal

2. The stem plot below shows the ages, in years, of the 16 members of a walking club. The median age, in years, is

Ages of members of a walking club

Stem	Leaf
1	5 8
2	1 3 3 7
3	0 2 4 4 6 9
4	1 5 8
5	2

Key: 2 | 3 means 23

A. 32

B. 33

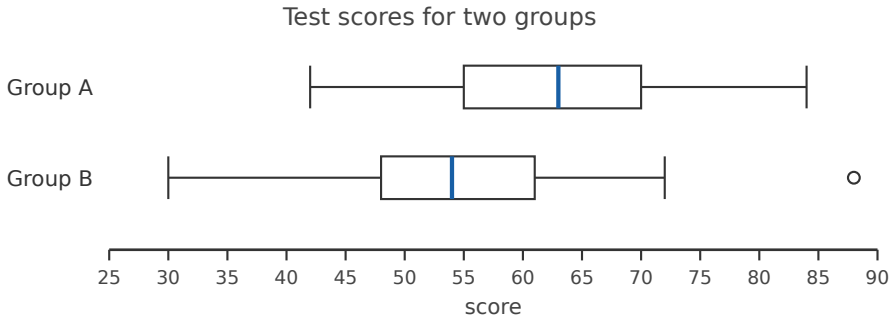
C. 34

D. 35

E. 36

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3. The parallel box plots below show the scores of two groups of students on the same test. Which one of the following statements is true?



A. The median for group A is greater than the upper quartile for group B.

B. The interquartile range for group A is less than the interquartile range for group B.

C. The range of scores for group B is less than the range for group A.

D. Half of the scores for group B are greater than 61.

E. The scores for group A include an outlier.

4. The lifetimes of a brand of battery are approximately normally distributed with a mean of 20 hours and a standard deviation of 1.5 hours. Using the 68–95–99.7% rule, the percentage of these batteries that last between 18.5 and 23 hours is

A. 68%

B. 81.5%

C. 83.85%

D. 95%

E. 97.35%

5. Ana scored 78 on an English test, where the mean was 70 and the standard deviation was 5. On a Mathematics test the mean was 75 and the standard deviation was 4. The Mathematics mark that would give Ana the same standardised score as her English mark is

A. 78

B. 80.6

C. 81

D. 81.4

E. 83

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6. The two-way frequency table below shows how 180 people usually travel to work, by age group. The percentage of people aged under 25 who usually travel by bicycle is

Usual way of travelling to work

Transport	Under 25	25 and over
Car	24	66
Public transport	36	30
Bicycle	20	4
Total	**80**	**100**

A. 11.1%

B. 20%

C. 25%

D. 30%

E. 83.3%

7. The coefficient of determination for a set of bivariate data is 0.64, and the least squares line fitted to the data has a negative slope. The value of the correlation coefficient r is

A. -0.8

B. -0.64

C. -0.41

D. 0.64

E. 0.8

8. For a set of bivariate data, the mean and standard deviation of x are 20 and 4, the mean and standard deviation of y are 50 and 8, and the correlation coefficient is r = 0.75. The equation of the least squares line of y on x is

A. $y = 10 + 2x$

B. $y = 35 + 0.75x$

C. $y = 42.5 + 0.375x$

D. $y = 20 + 1.5x$

E. $y = 50 + 1.5x$

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9. The least squares line relating weekly rent, in dollars, to distance from the city centre, in kilometres, for a sample of apartments is rent = 620 − 12.5 × distance. Which one of the following is a correct interpretation of the slope?

A. Rent increases by $12.50 per week for each additional kilometre from the city centre.

B. Rent decreases by $620 per week for each additional kilometre from the city centre.

C. Distance from the city centre decreases by 12.5 km for each $1 increase in rent.

D. Every apartment 1 km from the city centre has a rent of $607.50 per week.

E. On average, rent decreases by $12.50 per week for each additional kilometre from the city centre.

10. A least squares line relating weekly rent to distance from the city centre was fitted to apartments between 2 km and 25 km from the city centre. Using this line to predict the rent of an apartment 60 km from the city centre is an example of

A. interpolation

B. a residual

C. causation

D. the coefficient of determination

E. extrapolation

11. A scatterplot shows a positive association between y and x, in which y increases at an increasing rate as x increases. Which one of the following transformations is most likely to linearise the association?

A. log(x)

B. 1/x

C. y^2

D. x^2

E. no transformation is needed

12. A least squares line fitted to transformed data has the equation $y = 4.2 + 0.8 \log_{10}(x)$. The value of y predicted by this line when x = 1000 is

A. 6.6

B. 7.4

C. 9.73

D. 28.2

E. 804.2

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13. The table below shows the weekly sales of a product over six weeks. The four-point moving average with centring for week 3 is

Weekly sales (units)

Week	1	2	3	4	5	6
Sales	12	18	16	10	14	20

A. 14.0

B. 14.25

C. 14.5

D. 15.0

E. 16.0

14. The seasonal index for autumn sales at a garden centre is 0.85. This means that autumn sales are

A. 85% higher than the seasonal average

B. 0.85% below the seasonal average

C. typically 15% below the seasonal average

D. typically 85% below the seasonal average

E. typically 15% above the seasonal average

15. A least squares line fitted to deseasonalised quarterly sales is deseasonalised sales = 240 + 6t, where t = 1 is the first quarter of 2024. The seasonal index for the fourth quarter is 1.2. The forecast actual sales for the fourth quarter of 2026 is

A. 260

B. 288

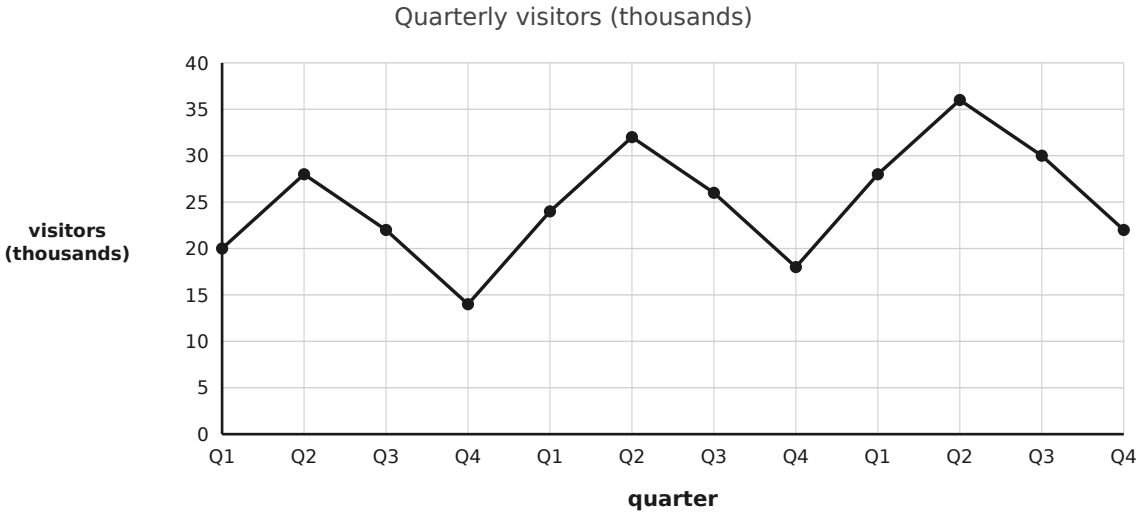
C. 312

D. 360

E. 374.4

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16. The time series plot below shows the number of visitors to a tourist attraction each quarter over three years. The plot shows



A. irregular fluctuations only

B. an increasing trend only

C. seasonality only

D. an increasing trend and seasonality

E. a decreasing trend and seasonality

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Recursion and financial modelling

18 minutes • Calculator allowed

17. A sequence is generated by the recurrence relation $V_0 = 5000$, $V_{n+1} = 1.02V_n + 100$. The value of V_3 is

A. 5306.04

B. 5404.00

C. 5612.08

D. 5624.32

E. 5812.08

18. A tractor bought for $85 000 is depreciated by $6800 each year using flat rate depreciation. The annual rate of depreciation, as a percentage of the purchase price, is

A. 8%

B. 12.5%

C. 68%

D. 80%

E. 92%

19. An investment earns interest at 6% per annum, compounding monthly. The effective annual interest rate, correct to two decimal places, is

A. 6.00%

B. 6.09%

C. 6.14%

D. 6.17%

E. 6.18%

20. An amount of $10 000 is invested at 4.2% per annum, compounding quarterly. The number of quarters until the investment first exceeds $12 000 is

A. 4

B. 5

C. 16

D. 17

E. 18

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40.

20 questions locked, up to question 40.

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PREVIEW

That’s the end of the preview

You’ve seen the first 20 of the 40 questions in General Mathematics Unit 3 & 4 — Examination 1 (Practice 2). The full paper is worth 40 marks.

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_12-2-exam1

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