EXAM PAPER

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

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. The numbers on the jerseys worn by the players in a football team are an example of

A. a categorical nominal variable

B. a categorical ordinal variable

C. a numerical discrete variable

D. a numerical continuous variable

E. a bivariate numerical variable

2. The stem plot below shows the scores of 15 students on a quiz marked out of 50. The interquartile range of the scores is

Quiz scores

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

Key: 1 | 5 means 15

A. 13

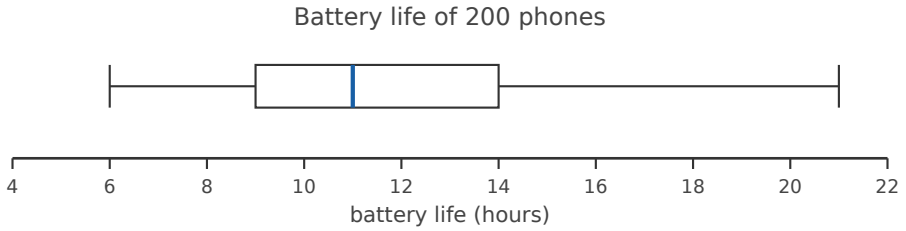
B. 15

C. 17

D. 27

E. 31

3. The box plot below shows the battery life, in hours, of 200 phones. The number of phones with a battery life of more than 14 hours is closest to



A. 14

B. 25

C. 50

D. 100

E. 150

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4. The time taken to assemble a desk is approximately normally distributed with a mean of 45 minutes and a standard deviation of 6 minutes. Using the 68–95–99.7% rule, the percentage of desks assembled in between 39 and 57 minutes is

A. 47.5%

B. 68%

C. 81.5%

D. 83.85%

E. 95%

5. The resting heart rates of adults are approximately normally distributed with a mean of 72 beats per minute and a standard deviation of 8 beats per minute. For an adult with a resting heart rate of 56 beats per minute, the standardised score, and the approximate percentage of adults with a lower resting heart rate, are

A. $z = -2$ and 2.5%

B. $z = -2$ and 5%

C. $z = 2$ and 2.5%

D. $z = -2$ and 16%

E. $z = -1.6$ and 5.5%

6. The table below shows, as column percentages, the preferred type of holiday of people in three age groups. Which one of the following statements supports the view that preferred type of holiday is associated with age group?

Preferred holiday (column %)

Holiday type	Under 30	30 to 50	Over 50
Beach	52%	38%	25%
City	30%	32%	30%
Nature	18%	30%	45%
Total	100%	100%	100%

A. The percentage preferring a beach holiday decreases as age increases, from 52% to 38% to 25%.

B. The percentage preferring a city holiday is about the same in every age group.

C. Most people aged over 50 prefer a beach holiday.

D. A nature holiday is the most popular type in every age group.

E. Because 30% of two age groups prefer city holidays, there is no association.

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7. For a group of teenagers, the correlation coefficient between daily hours of screen time and nightly hours of sleep is $r = -0.84$. The association between these variables is best described as

A. moderate, negative and linear

B. strong, positive and linear

C. weak, negative and linear

D. strong, negative and linear

E. strong and negative, with screen time causing less sleep

8. For a sample of used cars of one model, the least squares line price = 28 500 − 2100 × age is fitted, where price is in dollars and age is in years. The best interpretation of the intercept is that

A. a car of this model aged 0 years is predicted to be worth $28 500

B. the price falls by $28 500 each year

C. the price falls by $2100 each year

D. every car in the sample cost $28 500

E. a car of this model aged 1 year is predicted to be worth $28 500

9. A reciprocal transformation is applied to a set of bivariate data, and the least squares line $y = 2.5 + 40 \times (1/x)$ is fitted. The value of y predicted when $x = 8$ is

A. 2.81

B. 5.0

C. 7.5

D. 42.5

E. 322.5

10. A scatterplot shows that y decreases as x increases, and that the rate of decrease slows as x increases. A transformation that could linearise this association is

A. x^2

B. y^2

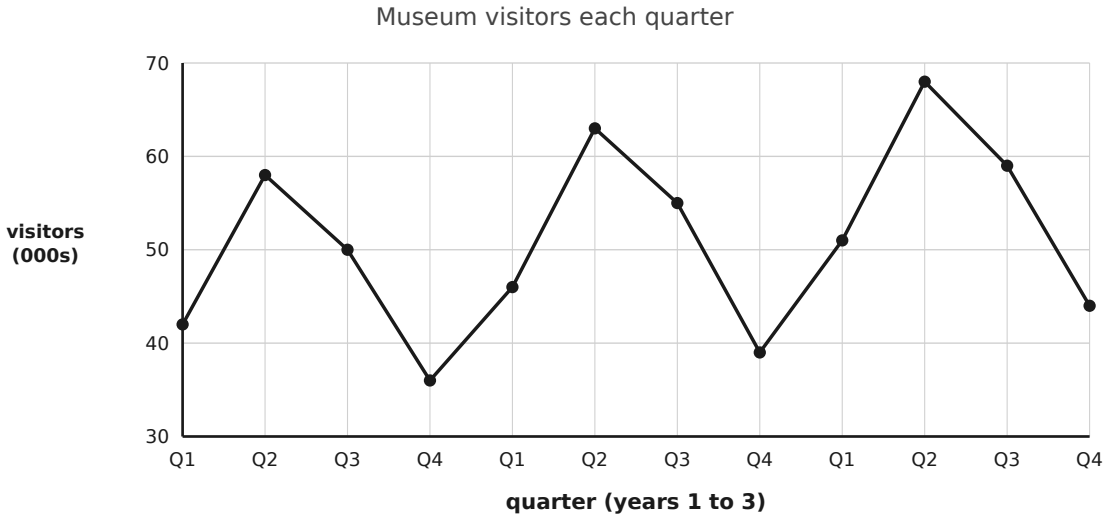
C. x^2 together with y^2

D. $\log_{10}(x)$

E. none — a straight line should be fitted without a transformation

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11. The time series plot below shows the quarterly number of visitors, in thousands, to a regional museum over three years. The plot shows



A. an increasing trend with seasonality

B. seasonality with no trend

C. a decreasing trend with seasonality

D. an increasing trend with an outlier

E. irregular fluctuations only

12. The table below shows the number of bikes hired from a stand each week for seven weeks. The five-median smoothed value for week 4 is

Weekly bike hire

Week	1	2	3	4	5	6	7
Bikes hired	12	18	15	22	17	25	20

A. 17

B. 18

C. 19.4

D. 20

E. 22

13. The deseasonalised sales of a business for Quarter 3 were $64 000, and the seasonal index for Quarter 3 is 1.15. The actual sales for Quarter 3 were

A. $9600

B. $55 652

C. $64 000

D. $65 150

E. $73 600

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14. The seasonal index for Quarter 2 sales at a shop is 0.8. To correct Quarter 2 sales for seasonality, they must be

A. decreased by 20%

B. increased by 20%

C. decreased by 25%

D. increased by 25%

E. left unchanged

15. The table below shows the maximum temperature and the number of cold drinks sold at a kiosk on seven days. Drinks sold is to be predicted from temperature. Using a CAS, the equation of the least squares line, with coefficients correct to two decimal places, is

Temperature and cold drink sales

Maximum temperature (°C)	**18**	**21**	**24**	**26**	**29**	**31**	**34**
Drinks sold	120	138	151	165	178	192	204

A. drinks sold = 5.29 + 25.65 × temperature

B. drinks sold = 25.65 + 0.19 × temperature

C. temperature = −4.75 + 0.19 × drinks sold

D. drinks sold = 164.00 + 5.29 × temperature

E. drinks sold = 25.65 + 5.29 × temperature

16. For the data in the table below, the percentage of the variation in the number of drinks sold that is explained by the variation in temperature, correct to one decimal place, is

Temperature and cold drink sales

Maximum temperature (°C)	**18**	**21**	**24**	**26**	**29**	**31**	**34**
Drinks sold	120	138	151	165	178	192	204

A. 0.3%

B. 5.3%

C. 84.0%

D. 99.7%

E. 99.8%

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Recursion and financial modelling

18 minutes • Calculator allowed

17. A sequence is generated by the recurrence relation $V_0 = 2000$, $V_{n+1} = V_n - 150$. The smallest value of n for which $V_n < 1000$ is

A. 3

B. 4

C. 5

D. 6

E. 7

18. A water tank holding 5000 L loses 4% of the water in it each day. The volume of water in the tank after three days, in litres, is

A. 4247.54

B. 4400.00

C. 4423.68

D. 4608.00

E. 5624.32

19. An investment earns interest at 6% per annum, compounding quarterly, and \$500 is added to it at the end of every quarter. A recurrence relation for the value V_n of the investment after n quarters is

A. $V_{n+1} = 1.015V_n + 500$

B. $V_{n+1} = 1.06V_n + 500$

C. $V_{n+1} = 1.015(V_n + 500)$

D. $V_{n+1} = 0.985V_n + 500$

E. $V_{n+1} = 1.5V_n + 500$

20. A loan of \$18 000 is charged interest at 9.6% per annum, compounding monthly, and is repaid with equal monthly repayments over three years. The monthly repayment, correct to the nearest cent, is

A. \$144.00

B. \$500.00

C. \$577.43

D. \$598.93

E. \$644.00

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40.

20 questions locked, up to question 40.

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 4). 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_12-4-exam1

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