EXAM PAPER

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

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. A café records, for each customer, the size of coffee ordered (small, medium or large) and the time spent waiting for it, in minutes. These two variables are, respectively,

A. categorical ordinal and numerical continuous

B. categorical nominal and numerical continuous

C. categorical ordinal and numerical discrete

D. numerical discrete and numerical continuous

E. categorical nominal and categorical ordinal

2. The number of minutes that seven customers waited in a queue were 3, 5, 5, 6, 8, 9 and 13. The standard deviation of these waiting times, correct to two decimal places, is

A. 3.07

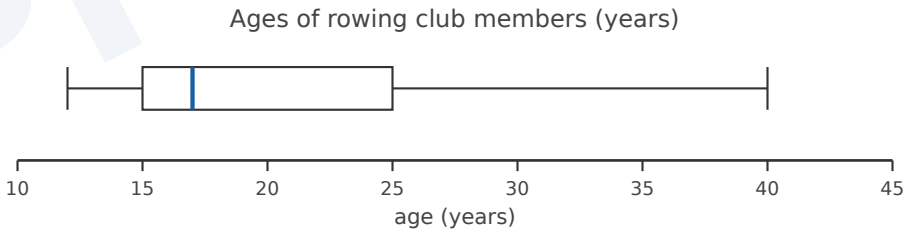
B. 3.32

C. 7.00

D. 9.43

E. 11.00

3. The box plot below displays the ages of the members of a rowing club. Which one of the following statements is true?



A. The maximum age is an outlier.

B. The interquartile range is 28 years.

C. About 50% of members are aged between 15 and 17 years.

D. The distribution is approximately symmetric.

E. The distribution is positively skewed.

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4. The heights of adult female emus are approximately normally distributed with a mean of 1.6 m and a standard deviation of 0.1 m. Using the 68–95–99.7% rule, the percentage of adult female emus taller than 1.5 m is closest to

A. 16%

B. 34%

C. 50%

D. 68%

E. 84%

5. The table below shows the test scores of five students in different classes, with each class's mean and standard deviation. Relative to their own class, the student who performed best was

Test scores

Student	Score	Class mean	Class standard deviation
Aria	74	68	4
Ben	81	75	5
Chloe	66	58	6
Dev	90	84	3
Eli	70	60	8

A. Dev

B. Aria

C. Ben

D. Chloe

E. Eli

6. A researcher wants to investigate the association between age group (under 30, 30 to 50, over 50) and preferred streaming service. The most appropriate display is

A. a scatterplot

B. a back-to-back stem plot

C. parallel box plots

D. a time series plot

E. a segmented bar chart

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7. Over one year, the correlation coefficient between the daily number of ice creams sold at a beach kiosk and the daily number of rescues made by lifeguards at that beach was r = 0.91. The best explanation for this association is that

A. hot weather increases both ice cream sales and the number of people swimming

B. eating ice cream causes swimmers to get into difficulty

C. lifeguard rescues cause people to buy ice cream

D. the association must be a coincidence because r is not equal to 1

E. the association is weak because the variables are unrelated

8. The table below shows the hours of practice and the score out of 25 for six students. Using a CAS, the equation of the least squares line for predicting score from hours of practice, with coefficients correct to two decimal places, is

Practice and score

Hours of practice	2	4	5	7	9	11
Score (out of 25)	5	9	10	15	18	22

A. score = 1.89 + 1.19 × hours

B. score = 13.17 + 1.89 × hours

C. score = 1.19 + 0.53 × hours

D. score = −0.60 + 0.53 × hours

E. score = 1.19 + 1.89 × hours

9. For a delivery company, the least squares line predicted time = 4.5 + 0.35 × distance is fitted to delivery times, in minutes, and distances, in kilometres. For one delivery the residual is −1.2. This means that

A. the actual time was 1.2 minutes less than the time predicted by the line

B. the actual time was 1.2 minutes more than the time predicted by the line

C. the predicted time for this delivery was 1.2 minutes

D. the distance was 1.2 km less than predicted

E. the line overestimates every delivery time by 1.2 minutes

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10. A scatterplot of the time, y hours, taken to complete a job against the number of workers, x, suggests that y is approximately proportional to 1/x. The plot that is most likely to be linear is

A. y against x^2

B. log(y) against x

C. y^2 against x

D. y against 1/x

E. y against log(x)

11. For a group of adults, the coefficient of determination between arm span and height is 0.81. Which one of the following is a correct interpretation?

A. 81% of adults have an arm span equal to their height.

B. Height increases by 0.81 cm for each 1 cm increase in arm span.

C. The correlation coefficient is 0.81.

D. 19% of the variation in height can be explained by the variation in arm span.

E. 81% of the variation in height can be explained by the variation in arm span.

12. The table below shows the daily number of visitors, in hundreds, to a museum over seven days. The five-mean smoothed number of visitors, in hundreds, for day 4 is

Visitors (hundreds)

Day	1	2	3	4	5	6	7
Visitors	23	27	25	31	34	30	36

A. 28

B. 29.4

C. 30

D. 30.6

E. 31

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13. The table below shows a shop’s sales, in thousands of dollars, for each quarter of one year. The seasonal index for Quarter 3, correct to two decimal places, is

Quarterly sales ($ thousands)

Quarter	1	2	3	4
Sales	120	150	90	140

A. 0.28

B. 0.72

C. 0.78

D. 0.90

E. 1.39

14. The main purpose of deseasonalising a time series is to

A. remove the seasonal pattern so that the underlying trend can be seen more clearly

B. remove any outliers from the data

C. make every season’s figures equal to the yearly mean

D. forecast future values without a trend line

E. smooth out random variation using moving averages

15. The scores of 800 students on a test are approximately normally distributed. Using the 68–95–99.7% rule, the number of students expected to score more than two standard deviations below the mean is closest to

A. 20

B. 40

C. 128

D. 400

E. 780

16. The mean of ten numbers is 12. One number, 30, is removed from the set. The mean of the remaining nine numbers is

A. 9

B. 10

C. 11

D. 12

E. 13.33

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Recursion and financial modelling

18 minutes • Calculator allowed

17. A sequence is generated by the recurrence relation $T_0 = 40$, $T_{n+1} = 0.5T_n + 12$. The value of T_3 is

A. 24

B. 25

C. 26

D. 28

E. 32

18. A laptop purchased for $2400 is depreciated using the reducing balance method. After two years its value is $1536. The annual rate of depreciation is

A. 16%

B. 18%

C. 20%

D. 32%

E. 36%

19. A tool purchased for $3600 is depreciated using the flat rate method at 12.5% of the purchase price per year. The value of the tool first falls below $1000 after

A. 4 years

B. 5 years

C. 6 years

D. 7 years

E. 8 years

20. An amount of $7500 is invested at 3.8% per annum, compounding weekly. Assuming 52 weeks in a year, the total interest earned after two years is closest to

A. $285

B. $570

C. $581

D. $592

E. $8092

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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 3). 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_12-3-exam1

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