EXAM PAPER

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

**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

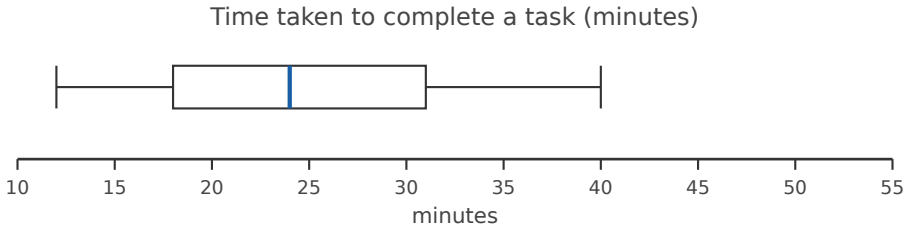
You are not permitted to write during reading time — you may only read the paper and plan your approach. Answer every question you can. Write your working in the space provided for long-answer questions. Marking guidance and full explanations are provided in the separate answer key.

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# Data analysis

36 minutes • Calculator allowed

1. The box plot below displays the time taken, in minutes, by a group of workers to complete a task. Any value greater than which of the following would be displayed as an outlier?




A. 37.5

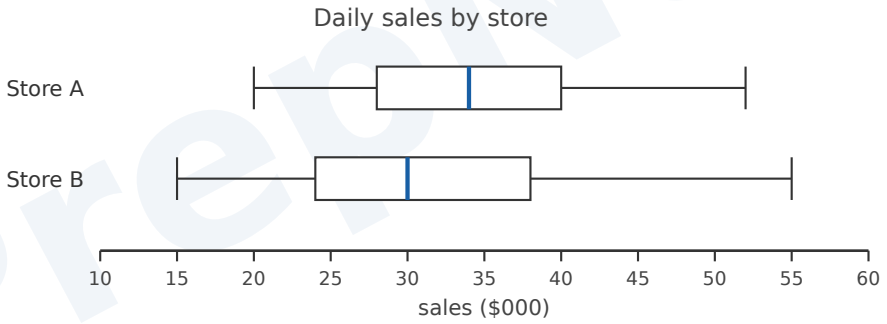
B. 43.5

C. 50.5

D. 44

E. 62

2. The parallel box plots below display daily sales, in thousands of dollars, for two stores. The interquartile range for Store B is




A. 14

B. 12

C. 23

D. 40

E. 2

3. In a study of housing, the variable postcode is best described as

A. numerical and discrete

B. numerical and continuous

C. categorical and ordinal

D. neither numerical nor categorical

E. categorical and nominal

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4. The weights of a large group of adults are approximately normally distributed with a mean of 70 kg and a standard deviation of 4 kg. The percentage of these adults with a weight between 62 kg and 78 kg is closest to

A. 34%

B. 95%

C. 68%

D. 99.7%

E. 47.5%

5. A test has a mean of 72 and a standard deviation of 8. The standardised score (z-score) of a student who scored 60 is

A. −12

B. 1.5

C. −0.67

D. −1.5

E. 1

6. On a test with a mean of 64 and a standard deviation of 12, a student’s standardised score was 1.25. The student’s actual mark was

A. 76

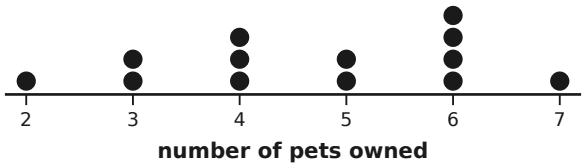
B. 79

C. 80

D. 78

E. 65.25

7. The dot plot below shows the number of pets owned by each of 13 households. The median number of pets owned is




A. 4

B. 4.5

C. 5

D. 6

E. 7

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8. The two-way frequency table below shows the responses of 140 people to a survey question. The percentage of females who answered Yes is closest to

Response by gender

| Response | Male | Female |
|---|---|---|
| **Yes** | 42 | 35 |
| **No** | 18 | 45 |

A. 43.8%

B. 25.0%

C. 45.5%

D. 70.0%

E. 24.8%

9. The correlation coefficient between two numerical variables is $r = -0.68$. The percentage of the variation in one variable that is explained by the variation in the other is closest to

A. 68%

B. 82%

C. 23%

D. 54%

E. 46%

10. A least squares line fitted to data on delivery cost and distance has the equation cost = 12.5 + 3.2 × distance, where cost is in dollars and distance is in kilometres. The slope of this line tells us that, on average,

A. the cost of a delivery is $3.20

B. the cost of a delivery is $12.50

C. each extra kilometre adds $3.20 to the cost

D. each extra kilometre adds $12.50 to the cost

E. each extra dollar of cost adds 3.2 kilometres

11. A least squares line has the equation $y = 8.4 + 1.6x$. When $x = 12$, the actual value of $y$ was 25.1. The residual for this data point is

A. $-2.5$

B. 2.5

C. 27.6

D. 25.1

E. $-0.5$

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12. A least squares line is fitted to a set of data, and the residual plot shows a clear curved pattern. This indicates that

A. the data contains an outlier

B. the correlation coefficient must be negative

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

D. the least squares line has been calculated incorrectly

E. the two variables are not associated

13. A scatterplot of y against x shows an association that increases steadily but flattens out as x increases. Which transformation is most likely to linearise this association?

A. a $y^2$ transformation

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

C. an $x^2$ transformation

D. a $1/y$ transformation

E. no transformation will linearise it

14. The table below shows visitor numbers, in hundreds, over seven months. The three-point moving average for month 4 is

Monthly visitor numbers (hundreds)

| **Month** | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
|---|---|---|---|---|---|---|---|
| **Visitors** | 24 | 28 | 26 | 30 | 34 | 32 | 38 |

A. 26

B. 28

C. 29.3

D. 30

E. 32

15. The seasonal index for winter sales at a ski hire shop is 1.25. In one winter, actual sales were $8000. The deseasonalised sales figure for that winter is

A. $9600

B. $10 000

C. $8000

D. $6250

E. $6400

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16. The seasonal indices for summer, autumn and winter are 1.15, 0.92 and 1.08 respectively. The seasonal index for spring is

A. 0.85

B. 0.95

C. 1.00

D. 0.75

E. 1.15

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# Recursion and financial modelling

18 minutes • Calculator allowed

17. A sequence is generated by the recurrence relation $A_0 = 12$, $A_{n+1} = 3A_n - 8$. The value of $A_2$ is

A. 28

B. 44

C. 100

D. 76

E. 220

18. A machine is purchased for $24 000 and depreciated using the flat rate method at 15% of the purchase price per annum. The value of the machine after four years is

A. $8400

B. $9600

C. $12 528

D. $14 400

E. $10 200

19. A car purchased for $32 000 loses 12% of its value each year. A recurrence relation that models the value $V_n$, in dollars, of the car after n years is

A. $V_0 = 32\,000$, $V_{n+1} = V_n - 0.12$

B. $V_0 = 32\,000$, $V_{n+1} = 1.12V_n$

C. $V_0 = 32\,000$, $V_{n+1} = V_n - 3840$

D. $V_0 = 32\,000$, $V_{n+1} = 0.12V_n$

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

20. A delivery van is purchased for $45 000 and depreciated by the unit cost method at a rate of $0.25 per kilometre travelled. After the van has travelled 60 000 km, its value is

A. $28 000

B. $15 000

C. $33 750

D. $30 000

E. $44 750

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**38.**

**39.**

**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 1). 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

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