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

Answers to the 20 questions in the free preview.

Data analysis

1. A. a categorical nominal variable

Jersey numbers are labels. They have no meaningful order or size — a player wearing 20 is not "twice" a player wearing 10 — so the variable is categorical nominal.

2. B. 15

In order: 15, 18, 19, 21, 23, 24, 24, 27, 30, 32, 35, 36, 38, 41, 46. The median is the 8th value, 27. Q_1 is the median of the lower seven values, 21, and Q_3 is the median of the upper seven, 36. IQR = 36 − 21 = 15. The range is 31.

3. C. 50

14 hours is the third quartile, so about 25% of the phones lie above it: 0.25 × 200 = 50.

4. C. 81.5%

39 is one standard deviation below the mean and 57 is two above. That is 34% + 47.5% = 81.5%.

5. A. z = −2 and 2.5%

z = (56 − 72) ÷ 8 = −2. By the 68–95–99.7% rule, 95% lie within two standard deviations, so 2.5% lie below z = −2.

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

An association exists when the percentages in a category change across the groups. Beach and nature preferences both change markedly with age; the city percentages alone would not show an association.

7. D. strong, negative and linear

r = −0.84 lies between −0.75 and −1, which is conventionally strong and negative. Correlation alone does not establish that one variable causes the other.

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

The intercept is the predicted value of the response variable when the explanatory variable is zero, here a new car.

9. C. 7.5

1/x = 1/8 = 0.125, so y = 2.5 + 40 × 0.125 = 7.5. Using x instead of 1/x gives 322.5.

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

For data that decrease and flatten out, the circle of transformations suggests log x, 1/x, log y or 1/y. Squaring x or y would increase the curvature.

11. A. an increasing trend with seasonality

The peaks and troughs repeat every four quarters (seasonality), and the level of each year is higher than the year before (increasing trend).

12. B. 18

The five values centred on week 4 are 18, 15, 22, 17 and 25. In order: 15, 17, 18, 22, 25, so the median is 18. The mean, 19.4, gives the five-mean smoothed value instead.

13. E. $73 600

Actual = deseasonalised × seasonal index = 64 000 × 1.15 = $73 600. Dividing by the index gives $55 652, which reverses the calculation.

14. D. increased by 25%

Deseasonalised = actual ÷ 0.8 = actual × 1.25, an increase of 25%.

15. E. drinks sold = 25.65 + 5.29 × temperature

With temperature as x and drinks sold as y: slope 5.2919 and intercept 25.6542. Swapping the variables gives temperature = −4.75 + 0.19 × drinks sold, which predicts the wrong variable.

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16. D. 99.7%
$r = 0.9984$, so $r^2 = 0.9968$, which is 99.7%. 99.8% is r written as a percentage, a common error.

Recursion and financial modelling

17. E. 7
$V_n = 2000 - 150n$. $V_6 = 1100$ and $V_7 = 950$.

18. C. 4423.68
$5000 \times 0.96^3 = 4423.68$. Subtracting 4% of 5000 each day gives 4400, which treats the loss as linear.

19. A. $V_{n+1} = 1.015V_n + 500$
The quarterly rate is $6\% \div 4 = 1.5\%$, so each quarter the value is multiplied by 1.015, and then the deposit is added.

20. C. $577.43
Financial solver: N = 36, I% = 9.6, PV = 18 000, FV = 0, P/Y = C/Y = 12 gives PMT = −577.43. $500 ignores interest, $644 uses simple interest, and $144 is the interest-only repayment.

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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 4), with the working behind every mark.

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Networks and decision mathematics	8	8

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