

2023 VCAA General Mathematics Exam 1 Solutions

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Data analysis

1	2	3	4	5	6	7	8
B	A	E	D	B	C	A	C
9	10	11	12	13	14	15	16
B	A	D	D	C	B	C	D

Recursion and financial modelling

17	18	19	20	21	22	23	24
D	C	E	C	E	D	D	B

Matrices

25	26	27	28	29	30	31	32
A	B	A	D	E	D	C	C

Networks and decision mathematics

33	34	35	36	37	38	39	40
D	A	C	B	B	D	B	E

Data analysis

Q2 $IQR = 138 - 135 = 3$, upper fence $= 138 + 1.5 \times 3 = 142.5$ **A**

Q3 $8 \times 6 - (8 + 11 + 5 + 6 + 9) = 9$ **E**

Q4 $95\% \times 2380 = 2261$ **D**

Q5 $\frac{X - 163.56}{8.14} = -0.85$, $X \approx 156.6$ **B**

Q6 $\log_{10} 3175 \approx 3.5017$, $\log_{10} 4999 \approx 3.6989$,
 $\log_{10} 8925 \approx 3.9506$ **C**

Q9 Slope $= \frac{32.2 - 9.9}{8.53 - 14.9} \approx -3.501$ **B**

Q12 $8.52 = -3.8 + 12.6 \times \log_{10}(\text{age})$, $\log_{10}(\text{age}) \approx 0.9778$
 $\text{age} \approx 10^{0.9778} \approx 9.501$ **D**

Q15 $\frac{323 + 327}{2} = 325$ **C**

Q16 $S.I. = \frac{\text{actual}}{\text{deaseasonalised}} = \frac{\text{actual}}{1.35 \times \text{actual}} = 0.741$ **D**

Recursion and financial modelling

Q20 $\frac{3000 - 600}{4} = 600$, $\frac{600}{3000} = 0.2 = 20\%$ **C**

Q21 $3000(1-r)^4 = 600$, $(1-r)^4 = 0.2$, $r \approx 0.33 - 33\%$ **E**

Q22 $r = 0.00325 \times 12 = 0.039 = 3.9\%$
Use TVM Solver: $N = 300.0009457$, use $N = 300$, $FV \approx -2.466$
Last payment $= 2611.65 + 2.466 \approx 2614.12$ **D**

Q23 Use TVM Solver: $I\% \approx 3.624141$
Effective rate $= \left(1 + \frac{0.03624}{4}\right)^4 - 1 \approx 0.0367 = 3.67\%$ **D**

Q24 $a = Ra - d$, $R = \frac{a+d}{a}$ **B**

Matrices

Q26 $PQ = \begin{bmatrix} t \\ a \\ m \\ e \\ s \end{bmatrix}$

Q27 As $n \rightarrow \infty$, $T^n \rightarrow \begin{bmatrix} 0 & 0 & 0 \\ 1 & 1 & 1 \\ 0 & 0 & 0 \end{bmatrix}$ **A**

Q29 3 rows 2 columns matrix, k_{ij} are all positive, and $k_{31} = 4$ **E**

Q32

$T = \begin{bmatrix} 0.2 & 0.4 & 0.3 & 0.4 \\ 0.3 & 0.3 & 0.3 & 0.2 \\ 0.4 & 0.2 & 0.3 & 0.1 \\ 0.1 & 0.1 & 0.1 & 0.3 \end{bmatrix}$ Monday $A = \begin{bmatrix} 150 \\ 50 \\ 220 \\ 40 \end{bmatrix}$

Tuesday $TA = \begin{bmatrix} 132 \\ 134 \\ 140 \\ 54 \end{bmatrix}$ Wednesday $T^2A = \begin{bmatrix} 143.6 \\ 132.6 \\ 127 \\ 56.8 \end{bmatrix}$

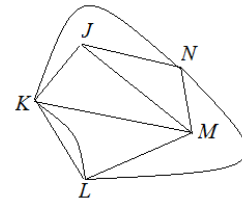
Percentage $= \frac{0.30 \times 140}{127} \approx 0.33 = 33\%$ **C**

Networks and decision mathematics

Q35 $7 + 6 + 9 + 10 + 8 = 40$ **C**

Q36 Anthea Duty 4, Bob Duty 2, Cho Duty 3 Dario Duty
 $18 + 8 + 7 + 7 = 30$ **B**

Q37 6 enclosed and 1 outside **B**



Q39 Capacity of minimum cut $= 12 + 4 + 7 = 23$ **B**

Q40 The given diagram has low flow to F.
Reversing the direction of flow along GF provides more flow to F to make the minimum cut close to exit H.
It gives the largest increase from 23 to 30. **E**

Please inform mathline@itute.com re conceptual and/or mathematical errors