

Question 27 (13 marks)

Content: FM5: Annuities & loan repayments

Outcomes assessed: H2, H8

Targeted Performance Bands: 4-5

	Solution	Criteria	Marks
27(a)	$A = M \left(\frac{(1+r)^n - 1}{r} \right)$ $25000 = M \left(\frac{1 + \frac{0.096^{36}}{12} - 1}{0.008} \right)$ $M = \$601.99$ or Using graphic calculator: $n = 3 \times 12$ $I = 9.6\%$ $PV = 0$ $PMT = 0$ $FV = 25\,000$ $P/Y = 12$ $C/Y = 12$ $\therefore PMT = \\$601.99$	3 marks for correct substitution into equation and correct answer. 2 marks for significant progress towards answer. 1 mark for some progress towards answer.	3

Content:DA3: Displaying single data sets

Outcomes assessed: P2, P4, P7

Targeted Performance Bands:3-4

	Solution						Criteria	Mark			
27(b)(i)	Gobble			Munch			2 marks for correct ordered plot. 1 mark for partial correct answer.	2			
	4	4	1	1	7	8					
	8	6	6	2	2	4			9		
		3	3	3	1	3			4	6	7
			0	4							
			6	5							

Content:DA4: Summary statistics

Outcomes assessed: P2, P7

Targeted Performance Bands: 4-5

	Solution	Criteria	Mark
27(b)(ii)	6.99	1 mark for correct answer.	1

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Content: DA5: Interpreting sets of data
Outcomes assessed: H1, H2, H4, H5, H11

Targeted Performance Bands: 5-6

	Solution	Criteria	Mark
27(b)(iii)	*Shape & skewness- Gobble: positive skew Munch: negative skew *Location Gobble: median=27; Munch: median=30; same mean. *Spread Munch has a smaller spread (smaller S.D.)	3 marks for correct comment on each aspect. 2 marks for significant correct comments. 1 mark for some relevant and correct comments.	3

Content: DA5: Interpreting sets of data

Outcomes assessed: H1, H2, H4, H5, H11

Targeted Performance Bands: 4-5

	Solution	Criteria	Mark
27(b)(iv)	Discontinue “Gobble” because “Munch” results are more consistent (lower S.D.) and so would probably be easier to sell.	1 mark given for adequate reason.	1

Content: PB4: Applications of probability

Outcomes assessed: H2, H4, H10

Targeted Performance Bands: 4-5

	Solution	Criteria	Marks
27(c)(i)	Financial Expectation = $\left\langle \frac{60}{360} \times 10 \right\rangle + \left\langle \frac{90}{360} \times 5 \right\rangle + \left\langle \frac{30}{360} \times 15 \right\rangle = \4.17	2 marks for correct substitution and correct answer. 1 mark for partial correct work.	2

Content: PB4: Applications of probability

Outcomes assessed: H2, H4, H10

Targeted Performance Bands: 4-5

	Solution	Criteria	Mark
27(c)(ii)	Needs to be greater than \$4.17 to make it a profitable game for James.	1 mark for correct answer.	1

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Question 28 (13 marks)

Content: DA7: Correlation
Outcomes assessed: H1, H2, H4, H5
Targeted Performance Bands: 3-4

	Solution	Criteria	Marks
28(a)(i)	Middle median point coordinates (52, 30)	1 mark for correct coordinates.	1

Content: DA7: Correlation
Outcomes assessed: H1, H2, H4, H5
Targeted Performance Bands: 4-5

	Solution	Criteria	Mark
28(a)(ii)	$\text{gradient} = \frac{35 - 23}{64 - 40}$ $= \frac{12}{24}$ $= \frac{1}{2}$	1 mark for correct answer.	1

Content: DA7: Correlation
Outcomes assessed: H1, H2, H4, H5, H9, H11
Targeted Performance Bands: 4-5

	Solution	Criteria	Mark
28(a)(iii)	The distribution of points indicate a positive correlation and so there is some amount of fact to offer support for Karen's proposal.	2 marks for mentioning "positive", "correlation", and a statement of judgement. 1 mark for mentioning aspects of correct answer.	2

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Content: AM3: Algebraic skills and techniques
Outcomes assessed: H3, H11

Targeted Performance Bands: 5-6

	Solution	Criteria	Mark
28(b)	$A = P(1 + r)^n$ $2P = P(1.07)^n$ $2 = (1.07)^n$ Guess & check : When, $n = 10$ $(1.07)^{10} = 1.967$ When, $n = 11$ $(1.07)^{11} = 2.11$ Therefore it doubles in the 11 th year.	2 marks for correct substitution and correct answer. 1 mark for partial correct work.	2

Content: AM4: Modelling linear and non-linear relationships
Outcomes assessed: H1, H2

Targeted Performance Bands: 3-4

	Solution	Criteria	Marks
28(c)(i)	15 000°C	1 mark for correct answer.	1

Content: AM4: Modelling linear and non-linear relationships
Outcomes assessed: H1, H2

Targeted Performance Bands: 3-4

28(c)(ii)	Solution						Criteria	Marks
	T(millions of years)	0	1	2	3	4		
	T(°C)	15000	12960	11197	9675	8359		
							1 mark for 11197 1 mark for 8359	2

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Content: AM4:Modelling linear and non-linear relationships
Outcomes assessed: H1, H2, H3
Targeted Performance Bands: 3-4

	Solution	Criteria	Mark
28(c)(iii)	Temperature of Star	2 marks for correct axes and graph. 1 mark for progress towards answer.	2

Content: AM4:Modelling linear and non-linear relationships
Outcomes assessed: H1, H2, H3, H5, H11
Targeted Performance Bands:4-5

	Solution	Criteria	Mark
28(c)(iv)	Exponential curve. It is non-linear, cuts vertical axis at 1500 and approaches the horizontal axis but never touches it.	2 marks for mentioning 'exponential' and one other descriptor. 1 mark for mentioning one of the descriptors.	2

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