

Sampling and Data Collection Exam Questions

[Note: Questions 1-3 are from AQA Level 3 Mathematical Studies, Analysis of Data Practice Questions]

Q1.

Question	Solution	Marks	Comments
(a)	1925	B1	
(b)	Primary and Continuous	B2	None incorrect B1 One or two correct and one incorrect
Total		3	

Q2.

(a)	Continuous	B1	Any indication
(b)	Discrete	B1	Any indication
(c)	Qualitative	B1	Any indication
Total		3	

Q3.

(a)(i)	Stratified random	B1	Accept stratified
(a)(ii)	$n / 400 \times 80$ where $n = 10$ or 60 or 330	M1	Condone $n = 9$ or 59 or 329 for M1 only
	Other two illustrated	A1	
(b)	Select (80) random numbers using tables/calculator/computer generated	B1	SC1 for : put all the seat numbers or numbers 1 – 400 or all 400 numbers in a hat and withdraw 80
	Ignore repeats (and numbers > 400)	B1	
	Match to seats	B1	
Total		6	

Q4, (OCR 4768, Jun 2009, Q3i)

(i)	For a systematic sample		
	• she needs a list of all staff	E1	
	• with no cycles in the list.	E1	
	All staff equally likely to be chosen if she		
	• chooses a random start between 1 and 10	E1	
	• then chooses every 10 th .	E1	
	Not simple random sampling since not all samples are possible.	E1	5

Q5, (OCR 4768, Jun 2010, Q1i)

Systematic Sampling. It lacks any element of randomness.	B1	May be implied by the next mark. Allow reasonable alternatives e.g. “the list may contain cycles.” Beware proposals for a different sampling method.	[3]
	E1		
Choose a random starting point in the range 1 – 10.	E1		

Q6, (AQA Level 3 Mathematical Studies, Specimen Paper 1, Q1)

a	sample size too small sample not stratified/ not taken in proportion to group size may be helpful to select according to age may be helpful to select according to length of experience may be helpful to select according to full time/part time	B2	oe B1 for one reason B2 for two distinct reasons
----------	---	----	--

Alt 1 b	sample size of at least 20 recommended	B1	
	stratified sample	B1	
	their sample size $\times \frac{130}{197}$ or their sample size $\times \frac{58}{197}$ or their sample size $\times \frac{9}{197}$	M1	
	correct values for each department based on their sample size	A1	allow rounding or truncation of any value as long as total is correct

Alt 2 b	sample size of at least 20 recommended	B1	
	systematic sample	B1	
	explains how staff are listed	M1	
	explains that the nth person is chosen	A1	this must result in the correct sample size

Alt 3 b	sample size of at least 20 recommended	B1	
	random sample	B1	
	explains how the staff will be individualised	M1	eg names written on paper and put in a box staff numbered
	method of selection explained	A1	eg owner picks names from box at random random number generator used

Q7, (AQA Level 3 Mathematical Studies, Jun 2016, Paper 1, Q4)

<p>a</p>	<p>Full explanation eg Yes as it takes the sample in proportion to the number of girls and boys or Yes as there are more girls than boys in year 12 so the sample will have more girls than boys or Yes as it is (more) representative of the number of girls and boys or Yes as it is representative of the population or Yes as the ratio of girls to boys in the sample is the same as in the year group</p>	<p>B2</p>	<p>B1 partial explanation eg Yes as there are more girls than boys Yes as it is more representative</p>
<p>b</p>	<p>Number the girls Use a random number generator/button/ tables Use the first 34 different numbers (within the range) or Use the first 34 numbers ignoring repeats</p> <p>Additional Guidance</p> <p>Put all the girls names in a hat and pick out 34 is B0</p>	<p>B1 B1 B1</p>	<p>Not 'Number the girls from 1 to 34' SC2 Number each girl, put all the numbers in a hat/box etc and pick out 34 oe</p>
<p>4c</p>	<p>Cluster</p>	<p>B1</p>	<p>Accept convenience</p>

Q8, (AQA Level 3 Mathematical Studies, Jun 2017)

(a)	Collect prices from estate agents/websites for house prices/ recent house sales/newspapers and across different areas of London	E2	E1 Partial explanation (only one of the comments)
	Additional Guidance		
	For different area allow different suburbs/estates/streets		

(b)	(No,) London prices may not be representative of the whole country or London prices are likely to be higher/different than some other parts of the country	B1	
	Additional Guidance		
	No may be implied eg It would not be sensible		
	Ignore other non-contradictory comments eg sample size too small		
	Its London/it's the capital		B0

Q9, (OCR 4768, Jan 2011, Q2a)

(a)	(i) There are identifiable subgroups or strata that might exhibit different characteristics. Each stratum is randomly sampled. Use it to obtain a representative sample. Can get information on the individual strata.	E1		4
(i)		E1		
(ii)	For each stratum $\dots \times \frac{2000}{79368}$ giving 813.9, 836.9, 245.4, 103.8 so 814, 837, 245, 104	M1	All correct.	2
(ii)		A1		

Q10, (OCR 4768, Jan 2013, Q4ai)

(a)	(i)	Number all the projects to be marked. (Sampling frame.) Use a form of random number generator to select the projects in the sample until 12 projects have been selected.	E1	Do not award if candidate subsequently describes a different method of sampling (eg systematic sampling). Condone absence of 12.
			E1	
			[2]	

Q11, (OCR 4733, Jan 2007, Q2)

(i)	900 ÷ 12 = 75	B1	1	75 only
(ii)	(a) True, first choice is random	B1	1	True stated with reason based on first choice
	(b) False, chosen by pattern	B1	1	False stated, with any non-invalidating reason
(iii)	Not equally likely e.g. P(1) = 0, or triangular	M1		"Not equally likely", or "Biased" stated
		A1	2	Non-invalidating reason

