



**General Certificate of Secondary  
Education**

*Statistics*

**Higher Tier**

**Specimen Mark Scheme**

**The following abbreviations are used on the mark scheme:**

- M** Method marks awarded for a correct method.
- A** Accuracy marks awarded when following on from a correct method. It is not necessary always to see the method. This can be implied.
- B** Marks awarded independent of method.
- M dep** A method mark which is dependent on a previous method mark being awarded.
- ft** Follow through marks. Marks awarded for correct working following a mistake in an earlier step.
- SC** Special Case. Marks awarded for a common misinterpretation which has some mathematical worth.
- oe** Or equivalent.
- eeoo** Each error or omission.

Q	Answer	Mark	Comments
1(a)	A3	B1	
(b)	A1 B11	B1, B1	
(c)	B3, B6	B1	
	B23	B1	
	B16	B1	
(d)(i)	<b>QWC question</b>		
	A clear, concise and comprehensive answer that addresses all the major issues (listing and numbering the 5 wards, using random numbers, repeat method). The answer should be fully coherent and contain statistical terminology.		3
	The answer displays some understanding of the factors to be considered with an appreciation of the issues involved. The structure of the answer does not clearly connect the points, but displays some comprehension of the issue at hand. Some limited reference to statistical terminology.		1-2
	No relevant content		0
(d)(ii)	Cost, time	B1	
	Low response rate	B1	
(e)	58%	B1	
2(a)	Mixed	B1	Accept Other Black
(b)	35 – 30	M1	Accept 30 – 35
	5	A1	
(c)	<i>Similarity</i> – Under 16 or 35 – 64 no justification needed OR first 3 groups increase OR 65 and over smallest %	B1	beware incorrect statements about numbers not %, penalise once
	<i>Difference</i> – 65 and over with qualification e.g higher % whites or 16 – 34 with qualification e.g lower % whites	B1	do not allow ‘young’ or ‘old’

Q	Answer	Mark	Comments
3(a)	Symmetric diagram	B1	
	Left side finishing at approx. 74		
(b)	Line of symmetry at 92 or maximum	B1	
	Correct use of standard deviation	B1	
	Higher peak than other diagram	B1	
(c)	0.5	B1	
(d)	0 or very small	B1	
4(a)	$V^2$ , 100, 400 etc	B1	One error B1, 2 or more errors B0 Follow through their values (Omission is an error)
	Correct plots	B2	
(b)	Through double mean point	M1	
	and between (4900, 220) and (4900, 230)	A1	
(c)	Their intercept (approx '30')	B1	
(d)	Correct values on triangle	B1	
	Attempt at gradient	M1	
	approx 0.038 to 0.04	A1	
(e)	$R = '30' + '0.039' v^2$	B1	
(f)	Sub in their formula	M1	
	Accept 335 to 360	A1	
(g)	No. extrapolation	B1	

Q	Answer	Mark	Comments
<b>5(a)</b>	$\sum d^2 = 154.5$	M1, M1	dep
	formula	M1	dep
	rank coefficient = $-.839(3)$	A1	accept $-0.84$
<b>(b)</b>	Negative correlation – rankings reversed – disagrees with expert	B1	Strict fit from (a) in context
<b>(c)</b>	$0.05 \div 0.02$	B1, B1	-1 for each extra
<b>(d)</b>	used for interval not ordinal data	B1	
<b>6(a)</b>	Range = 0.074	B1	
<b>(b)</b>	Correct plots	B1 B1 √	
<b>(c)</b>	Range OK	B1	
	Mean increasing	B1	
<b>7(a)</b>	Allocation of a number on a dice to a doctor	B1	
<b>(b)</b>	QWC Question		
	A clear, concise and comprehensive answer that addresses all the major issues (a sensible attempt at allocation of random numbers, clearer defined allocation of numbers, random selection). The answer should be fully coherent and contain statistical terminology.		3
	The answer displays some understanding of the factors to be considered with an appreciation of the issues involved. The structure of the answer does not clearly connect the points, but displays some comprehension of the issue at hand. Some limited reference to statistical terminology.		1-2
	No relevant content		0

Q	Answer	Mark	Comments
<b>8(a)</b>	QWC Question		
	A clear, concise and comprehensive answer that addresses all the major issues (listing, random start, ever 9 <sup>th</sup> after that). The answer should be fully coherent and contain statistical terminology.	3	
	The answer displays some understanding of the factors to be considered with an appreciation of the issues involved. The structure of the answer does not clearly connect the points, but displays some comprehension of the issue at hand. Some limited reference to statistical terminology.	1-2	
	No relevant content	0	
<b>(b)</b>	Only production	B1	Only one section of the factory
	Only male	B1	
<b>(c)(i)</b>	$\frac{16}{400} \times 50 = 2$	M1 A1 cao	SC1 for one male and one female
<b>(c)(ii)</b>	$\frac{24}{400} \times 50 = 3$	M1 A1	
<b>(d)</b>	Continuous linear scale Labels	B1 B1	not yes/no
	Discrete scale (boxes) Labels	B1 B1	accept good/bad and agree/disagree
<b>9 (a)</b>	Mean = 31.5	B1	
	$\frac{10829}{10} - 31.5^2$	M1	
	$= \sqrt{90.65}$	M1 dep	
	$= 9.52$	A1	Accept 9.5
<b>(b)(i)</b>	23 has been replaced by a larger number	B1	Total mark gone up
<b>(ii)</b>	32 is nearer to the mean	B1	

Q	Answer	Mark	Comments
<b>10(a)(i)</b>	300	B1	Or 310 if $n + 1$ used
<b>(a)(ii)</b>	470 – 230	M1	230 – 235 LQ
	240	A1 ft	235 – 240 for M1A1
<b>(a)(iii)</b>	63/120	M1	62 – 64 inclusive
	$\times 100$	M1	
	52.5	A1 ft	accept 51.6% - 53.33...% from their calculations
<b>(a)(iv)</b>	Read off at 108 = £540	M1	
		A1	
<b>(b)(i)</b>	their median is lower	B1	or reference lower maximum (must define what they are comparing)
	their IQR is smaller	B1	or reference the reduced range (must define what they are comparing)
<b>(b)(ii)</b>	Data from the non-manual sector	B1	oe e.g obtain data on part-time / full-time / hours worked
<b>(c)(i)</b>	0.42, 0 0.4167 or 0.447 acceptable	M1	M1 for sub, either
		A1	ft for males
		A1	females cao
<b>(c)(ii)</b>	Positive skew, symmetrical	B1 ft	
		B1	Allow normal

Q	Answer	Mark	Comments												
<b>11(a)</b>	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%; text-align: center;">124</td> <td style="width: 33%; text-align: center;">1820</td> <td style="width: 33%; text-align: center;">1944</td> </tr> <tr> <td style="text-align: center;">341</td> <td style="text-align: center;">239</td> <td style="text-align: center;">580</td> </tr> <tr> <td style="text-align: center;">155</td> <td style="text-align: center;">21</td> <td style="text-align: center;">(176)</td> </tr> <tr style="border-top: 1px solid black;"> <td style="text-align: center;">(620)</td> <td style="text-align: center;">2080</td> <td style="text-align: center;">(2700)</td> </tr> </table>	124	1820	1944	341	239	580	155	21	(176)	(620)	2080	(2700)	B4	-1 each error or omission
124	1820	1944													
341	239	580													
155	21	(176)													
(620)	2080	(2700)													
<b>(b)(i)</b>	$\frac{239}{2700}$	B1ft	or .0885 2dp or better follow through on numerator												
<b>(b)(ii)</b>	$\frac{A+B-AB}{2700} = \frac{859}{2700}$	M1 A1ft	or .318												
<b>(b)(iii)</b>	$\frac{1820}{2080} = \frac{7}{8}$	M1 A1	or .875 follow through on numerator and denominator												
<b>(c)</b>	$\frac{155}{2700} \times 200 = 11$	M1 A1ft	(11.48 accept) allow 11.5 ft on numerator only												