

GCE Examinations  
Advanced Subsidiary / Advanced Level

**Statistics**  
**Module S1**

Paper G

**MARKING GUIDE**

This guide is intended to be as helpful as possible to teachers by providing concise solutions and indicating how marks should be awarded. There are obviously alternative methods that would also gain full marks.

Method marks (M) are awarded for knowing and using a method.

Accuracy marks (A) can only be awarded when a correct method has been used.

(B) marks are independent of method marks.



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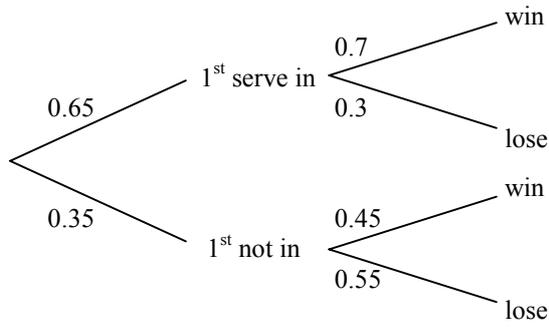
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## S1 Paper G – Marking Guide

1.	(a)	0.1 + 0.15 + 0.2 = 0.45	A1	
	(b)	0.2 + 0.3 = 0.5	M1 A1	
	(c)	$\sum yP(y) = (-0.2) + (-0.15) + 0 + 0.3 + 0.5 = 0.45$	M1 A1	
	(d)	$3E(Y) - 1 = 0.35$	M1 A1	<b>(7)</b>
<hr/>				
2.	(a)	e.g. they earn less from regular hrs so need more to supplement income	B1	
	(b)	$S_{pp} = 420.58 - \frac{86^2}{18} = 9.69111$	M1	
		$S_{hh} = 830.25 - \frac{104.5^2}{18} = 223.569$	M1	
		$S_{ph} = 487.3 - \frac{86 \times 104.5}{18} = -11.9778$	M1	
		$r = \frac{-11.9778}{\sqrt{9.69111 \times 223.569}} = -0.2573$	M1 A1	
	(c)	weak -ve correlation gives some support to hypothesis	B2	<b>(8)</b>
<hr/>				
3.	(a)	$\bar{y} = \frac{37}{80} = 0.4625$	M1	
		$\bar{C} = (250 \times 0.4625) + 3250 = \text{£}3366$ (nearest £)	M1 A1	
		std. dev. of $y = \sqrt{\frac{2317}{80} - 0.4625^2} = 5.3618$	M1	
		std. dev. of $C = 250 \times 5.3618 = \text{£}1340$ (nearest £)	M1 A1	
	(b)	used midpoints to represent data in each group	B1	
	(c)	median < mean $\therefore$ +vely skewed e.g. most cost a similar amount but some people spend a lot more	B1 B1	<b>(9)</b>
<hr/>				
4.	(a)	$P(Z < \frac{38.2 - 32.5}{\sqrt{18.6}}) = P(Z < 1.32) = 0.9066$	M2 A1	
	(b)	$P(\frac{31 - 32.5}{\sqrt{18.6}} < Z < \frac{35 - 32.5}{\sqrt{18.6}}) = P(-0.35 < Z < 0.58)$	M2	
		$= P(Z < 0.58) - P(Z < -0.35)$	M1	
		$= 0.7190 - 0.3632 = 0.3558$	A1	
	(c)	$P(Z > \frac{110 - \mu}{7.2}) = 0.138$	M1	
		$\frac{110 - \mu}{7.2} = 1.09; \mu = 102$ (3sf)	M1 A2	<b>(11)</b>
<hr/>				
5.	(a)	$\sum fx = 146; \text{mean} = \frac{146}{85} = 1.72$ (3sf)	M1 A1	
		$\sum fx^2 = 312$	M1	
		std. dev. = $\sqrt{\frac{312}{85} - (1.7176)^2} = 0.849$ (3sf)	M1 A1	
	(b)	$\sum P(x) = 19k + 16k + 11k + 4k = 50k = 1 \therefore k = \frac{1}{50}$	M2 A1	
	(c)	$\sum xP(x) = \frac{19}{50} + \frac{32}{50} + \frac{33}{50} + \frac{16}{50} = 2$	M1 A1	
	(d)	e.g. mean of model not very close $\therefore$ not very suitable	B1	<b>(11)</b>

6. (a)



B3

(b)  $(0.65 \times 0.7) + (0.35 \times 0.45) = 0.6125 \quad \left(\frac{49}{80}\right)$

M2 A1

(c)  $P(\text{1st serve in} \mid \text{won}) = \frac{P(\text{1st serve in} \cap \text{won})}{P(\text{won})}$   
 $= \frac{0.65 \times 0.7}{0.6125} = 0.743 \text{ (3sf)} \quad \left(\frac{26}{35}\right)$

M1

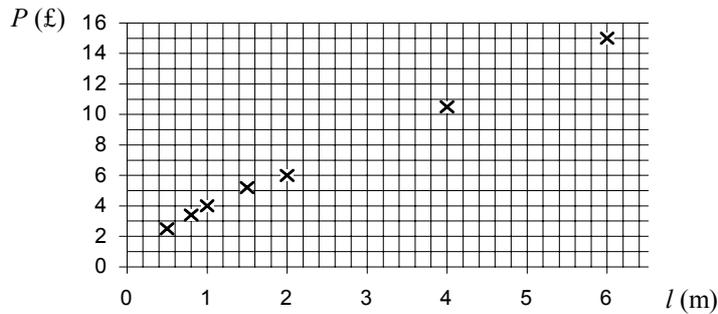
M1 A1

(d)  $P(\text{1st serve not in} \mid \text{lost}) = \frac{P(\text{1st serve not in} \cap \text{lost})}{P(\text{lost})}$   
 $= \frac{0.35 \times 0.55}{1 - 0.6125} = 0.497 \text{ (3sf)} \quad \left(\frac{77}{155}\right)$

M1

M2 A2 (14)

7. (a)



B3

(b)  $S_{lp} = 159.77 - \frac{15.8 \times 46.6}{7} = 54.5871$

M1

$S_{ll} = 60.14 - \frac{15.8^2}{7} = 24.4771$

M1

$b = \frac{54.5871}{24.4771} = 2.2301$

M1 A1

$a = \frac{46.6}{7} - (2.2301 \times \frac{15.8}{7}) = 1.6234$

M1 A1

$P = 1.62 + 2.23l$

A1

(c) increase in price in £ per extra metre of tubing

B1

(d)  $1.62 + (2.23 \times 5.2) = \text{£}13.22$

M1 A1

(e) e.g. machine may only be able to produce tubes up to a certain length so longer ones would be very difficult and expensive to make

B2

(15)

Total

(75)

