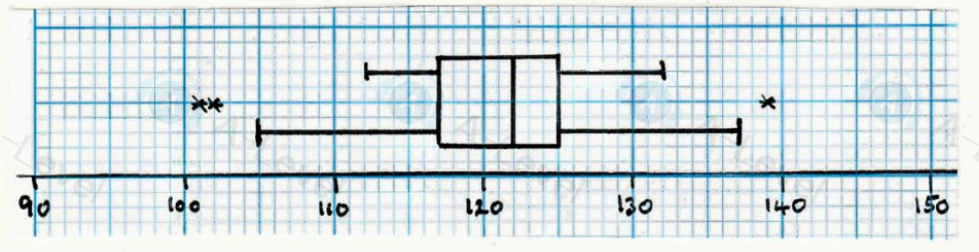


Question Number	Scheme	Marks
1.(a)	$S_{yy} = 2628.25 - \frac{141.5^2}{10} = 626.025^*$	M1A1cso (2)
(b)	$r = \frac{74.664}{\sqrt{9.25924 \times 626.025}} = 0.98068\dots$ awrt <b>0.981</b>	M1 A1 (2)
(c)	$r \approx 0.981$ is close to 1 <u>or</u> a <b>strong correlation</b> .	B1 (1)
(d)	$b = \frac{74.664}{9.25924} [= 8.063728\dots]$ $a = \frac{141.5}{10} - \left(\frac{74.664}{9.25924}\right) \times \left(\frac{49.04}{10}\right) = -25.39452\dots$ $y = -25.4 + 8.06x$	M1 M1 A1 (3)
(e)	$y = -25.4 + 8.06 \times 4.4 [= 10.08\dots]$ $m = (10.08\dots) + 25 = 35.085\dots$ (mpg) awrt <b>35.1</b>	M1 depM1 A1 (3)
(f)	As $44(p)/4.4(x)$ is within the range of the data set <u>or</u> it involves <u>interpolation</u> , (the actual miles per gallon should be) <u>reliable</u> .	M1 A1 (2)

Notes

Total 13

4.	$[F(6) =] \frac{45}{77}$ and $[F(7) =] \frac{60}{77}$ $[P(W = 7) = F(7) - F(6) =] \frac{60}{77} - \frac{45}{77} [= \frac{15}{77}]$ and $[P(W = 8) = F(8) - F(7) =] 1 - \frac{60}{77} [= \frac{17}{77}]$ $E(W) = 6 \times \frac{45}{77} + 7 \times \frac{15}{77} + 8 \times \frac{17}{77}$ $[= 6 \times 0.5844 + 7 \times 0.1948 + 8 \times 0.22077]$ $= \frac{73}{11}$ or awrt <b>6.64</b>	M1  M1  M1  A1
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Question Number	Scheme	Marks
6. (a)	$Q_1 = 117$ $Q_2 = 122$ $Q_3 = 125$	B1B1B1 (3)
(b)	IQR = $125 - 117 = \underline{8}$	B1ft (1)
(c)	Upper limit: $125 + 1.5 \times 8 = 125 + 12 = \underline{137}$ Lower limit: $117 - 12 = \underline{105}$ Outliers are: <u>101</u> <u>102</u> and <u>139</u>	M1A1 A1ft (3)
(d)		M1 A1ft B1 B1 (4)
(e)	$[\bar{x} = ] \underline{121}$ $[\sigma_x = ] \sqrt{\frac{279709}{19} - \bar{x}^2} = \sqrt{14721.526... - 14641} = \sqrt{80.526...}$ , = awrt <u>8.97</u>	B1 M1,A1 (3)
(f)	$\bar{x} + 2.7 \times \sigma_x = \text{awrt } \underline{145}$ $\bar{x} - 2.7 \times \sigma_x = \text{awrt } \underline{96.8}$ (allow 97)	M1A1 (2)
(g)	Probably not suitable... since: data is skewed <u>or</u> (f) says no outliers, (c) says 3 <u>or</u> (a) says median = 122, (e) says mean = 121	B1 (1) <b>[Total 17]</b>

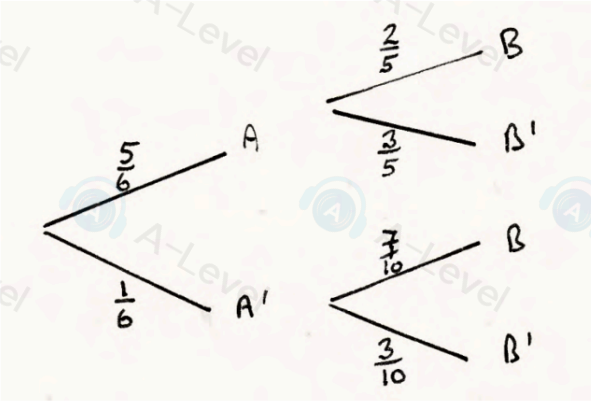
Question	Scheme	Marks	
6(a)	0.16 oe	B1 (1)	
	<b>Mark parts (b) and (c) together</b> <b>If values are given in the diagram and the script, then the script takes precedence</b>		
(b)	$[P(C)=]0.04+0.15+0.12+p[=0.31+p]$ $[P(S)=]0.1+0.15+0.12+0.23[=0.6]$ $[P(S \cap C)=]0.15+0.12[=0.27]$ ("0.31"+p)×"0.6"="0.27" oe $p=0.14$ oe	$[P(C')=]0.1+0.23+q[=0.33+q]$ $[P(S')=]1-(0.12+0.15+0.1+0.23)[=0.4]$ $[P(S' \cap C')=]q$ ("0.33"+q)×"0.4"=q oe $q=0.22$ oe	M1M1  M1d A1 (4)
(c)	$q=1-(0.04+0.12+0.15+0.1+0.23+"p")$ $q=0.22$ oe	$p=1-(0.04+0.12+0.15+0.1+0.23+"q")$ $p=0.14$ oe	M1 A1ft (2)
(d)(i)	$[P((C \cup S) \cap G')]=0.39$ oe	B1 (1)	
(ii)	$P(C (S \cap G))=\frac{0.15}{0.15+0.1}$ $=0.6$ oe	M1 A1 (2)	
(e)	Number of teenagers = $\frac{76}{0.15+"p"}$ oe Number who don't play Scrabble = $\left(\frac{76}{0.15+p}\right) \times 0.4$ (=104.8...) $=104.8\dots$ awrt 105	M1 M1 A1 (3)	
<b>Notes</b>		<b>Total</b> <b>13</b>	

Question	Scheme	Marks
4. (a)	$P(Y > 17) = 1 - P(Y < 17) = \underline{0.4}$	B1 (1)
(b)	$P(Y < \mu) = 0.5$ or $[P(\mu < Y < 17) =] 0.6 - 0.5$ $= \underline{0.1}$	M1 A1 (2)
(c)	$[P(Y < \mu   Y < 17) =]$ $\frac{P(Y < \mu)}{P(Y < 17)}$ or $\frac{0.5}{0.6}$ $= \frac{5}{6}$ awrt <u>0.833</u>	M1 A1 (2)
		<b>[5]</b>

Question Number	Scheme	Marks
3(a)	$P(X < 40) = P\left(Z < \frac{40-42}{5}\right) = P(Z < -0.4)$ $= 1 - 0.6554$ $= 0.3446$	M1 M1 A1 (3)
(b)	$P(\text{Qualify}) = 1 - ("0.3446")^3 \quad \text{or}$ $(1 - "0.3446") + ("0.3446")(1 - "0.3446") + ("0.3446")^2(1 - "0.3446")$ <p>[q = 0.9590... full calc: 0.9590867...]</p> $P(X > 45) = P\left(Z > \frac{45-42}{5}\right) = P(Z > 0.6)$ $= 1 - 0.7257 \quad \text{or} \quad 0.2743 \quad \text{allow } 1 - \text{awrt } 0.726 \quad \text{or} \quad \text{awrt } 0.274$ $P(X > 45 \text{ on 3rd throw} \mid \text{in final}) = \frac{"0.3446"^2 \times "0.2743"}{"0.959"}$ $= \frac{"0.0326..."}{"0.9590..."} \quad (\text{calc: } 0.033952...)$ $= \text{awrt } \underline{0.034}$	M1 M1 A1 dM1 A1 A1 (5)
<b>Total 8</b>		

Question Number	Scheme	Marks
6(a)	$P(V > 104.9) = P\left(Z > \frac{104.9-100}{2.5}\right)$ $= 1 - 0.975$ $= 0.0250$	M1 M1 A1 (3)
(b)	$\text{Expected number} = 150 \times "0.025"$ $= 3.75$	M1 A1 (2)
(c)	$\left[ P(V > v \mid V < 104.9) \right] = \frac{[P(v < V < 104.9)]}{P(V < 104.9)} = 0.2801$ $P(v < V < 104.9) = (1 - "0.025") - P(V < v)$ $P(V < v) = (1 - "0.025") - (1 - "0.025") \times 0.2801 [= 0.7019] \text{ oe}$ $\frac{v-100}{2.5} = 0.53$ $v = 101.325$	M1 M1 dM1 M1A1 A1 (6)

Question Number	Scheme	Marks
<b>3.(a)</b>	(Discrete) <b><u>Uniform</u></b>	B1 (1)
<b>(b)</b>	$P(X=4) = \frac{1}{5}$ oe	B1 (1)
<b>(c)</b>	$F(3) = \frac{3}{5}$ oe	B1 (1)
<b>(d)</b>	$P(3X-3 > X+4) = P(X > 3.5)$ $= \frac{2}{5}$ oe	M1 A1 (2)
<b>(e)</b>	$E(X) = \underline{3}$	B1 (1)
<b>(f)</b>	$E(X^2) = \frac{1}{5}(1^2 + 2^2 + 3^2 + 4^2 + 5^2)$ $= \underline{11}$	M1 A1 (2)
<b>(g)</b>	$\text{Var}(X) = 11 - 3^2$ or $\frac{(5+1)(5-1)}{12}$ $= \underline{2}$	M1 A1 (2)
<b>(h)</b>	$11.4 = aE(X) - 3$ or $11.4 = 3a - 3$ $a = 4.8$ $\text{Var}(4.8X - 3) = '4.8'^2 \times '2'$ $= 46.08$	M1 A1 M1 A1 awrt <b><u>46.1</u></b> (4) <b>Total 14</b>

Question Number	Scheme	Marks
4. (a)	<p>[Let <math>P(A) = p</math>]</p> $0.4p + 0.7(1 - p) = 0.45$ $0.25 = 0.3p$ $p = \frac{5}{6}$ 	<p>M1A1 M1 A1 B1ft B1 (6)</p>
(b)	$[P(A'   B')] = \frac{\frac{1}{6} \times 0.3}{0.55}$ $= \frac{1}{11}$	<p>M1 A1 (2) <b>[Total 8]</b></p>