GCE

Mathematics (MEI)

Advanced Subsidiary GCE

Unit **4766:** Statistics 1

Mark Scheme for January 2011

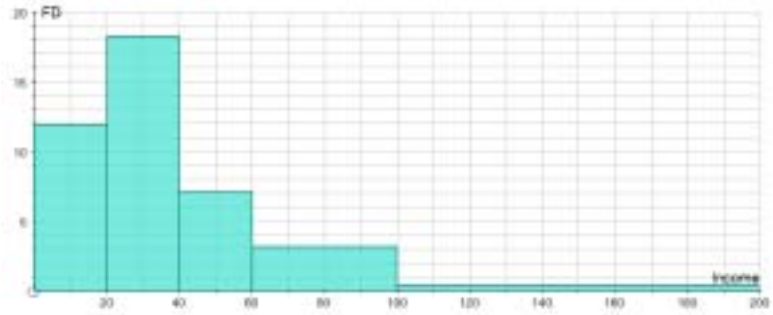
	SECTION A			
Q1 (i)	Mode = 960 (grams) Median = 1020 (grams) N.B. 96 and 102 gets SC1	B1 CAO B1 CAO	**2**	Ignore units and working
(ii)	Positive	E1	**1**	Not right skewed Not positive correlation
		TOTAL	**3**	
Q2 (i)	P(product of two scores < 10) = $\frac{13}{16}$ = 0.8125	B1	**1**	Allow 0.813 or 0.812
(ii)	P(*even*) × P(< 10) = 0.5 × $\frac{13}{16}$ = $\frac{13}{32}$ = 0.40625 P(*even* ∩ < 10) = $\frac{6}{16}$ = 0.375 So not independent.	M1 for 0.5 × $\frac{13}{16}$ or $\frac{13}{32}$ FT their answer to (i) M1 for $\frac{6}{16}$ A1	**3**	Do not allow these embedded in probability formulae Also allow P(even|<10) = 6/13≠ P(even) = 1/2 Or P(<10|even) = 6/8≠ P(<10) = 13/16 Or P(even|<10) = 6/13≠ P(even|<10') = 2/3 Or P(<10|even) = 6/8≠ P(<10|even') = 7/8 For all of these alternatives allow M2 for both probabilities. (M1 not available except if they correctly state both probabilities EG P(even|<10) and P(even) and get one correct) If they do not state what probabilities they are finding, give M2 for one of the above pairs of probabilities with ≠ symbol
		TOTAL	**4**	

Q3 (i)	$\binom{13}{3}$ ways of choosing the men = 286	M1 for $\binom{13}{3}$ seen A1	**2**	Accept $^{13}C_3$ or $^{13!}/_{(3!10!)}$ or equivalent for M1 No marks for permutations
(ii)	$\binom{13}{3}\times\binom{10}{3}$ = 286 × 120 = 34320	M1 for product A1 FT their 286	**2**	For permutations 1716 × 720 = 1235520 allow SC1 406 (from 286 + 120) scores SC1 (without further working)
(iii)	$\binom{23}{6}$=100947 34320/100947 = 1040/3059 = 0.340 (allow 0.34)	M1 for denominator of $\binom{23}{6}$ A1 FT	**2**	FT their 34320 Or $^6C_3$×13/23×12/22×11/21×10/20×9/19×8/18 = 0.340 scores M1 for product of fractions and A1 for $^6C_3$× and correct evaluation For permutations 1235520/72681840=0.017 scores SC1 Allow full marks for fractional answers, even if unsimplified 406/100947 = 0.00402 gets M1A1 with or without working
		TOTAL	**6**	

Q4 (i)	$2k + 6k + 12k + 20k + 30k = 1,\ 70k = 1$ $k = \frac{1}{70}$	M1 A1 NB **ANSWER GIVEN**	**2**	For five multiples of k (at least four correct multiples) Do not need to sum or =1 for M1 Condone omission of either $70k = 1$ or $k = 1/70$ but not both Condone omission of k: 2+6+12+20+30=70 Allow substitution of $k = 1/70$ into formula and getting at least four of 2/70, 6/70, 12/70, 20/70, 30/70 for M1 and 2/70+6/70+12/70+20/70+30/70 = 1 for A1
(ii)	$E(X) = 1\times\frac{2}{70}+2\times\frac{6}{70}+3\times\frac{12}{70}+4\times\frac{20}{70}+5\times\frac{30}{70}=4$ $E(X^2) =$ $1\times\frac{2}{70}+4\times\frac{6}{70}+9\times\frac{12}{70}+16\times\frac{20}{70}+25\times\frac{30}{70}=\frac{1204}{70}=17.2$ $Var(X) = 17.2 - 4^2 = 1.2$	M1 for Σrp (at least 3 terms correct) A1 CAO M1 for $\Sigma r^2 p$ (at least 3 terms correct) M1dep for - their $E(X)^2$ A1 FT their E(X) but not an error in $E(X^2)$ provided $Var(X) > 0$	**5**	280/70 scores M1A0 USE of $E(X-\mu)^2$ gets M1 for attempt at $(x-\mu)^2$ should see $(-3)^2$, $(-2)^2$, $(-1)^2$, 0^2, 1^2 (if $E(X)$ correct but FT their $E(X)$) (all 5 correct for M1), then M1 for $\Sigma p(x-\mu)^2$ (at least 3 terms correct with their probabilities) Allow all M marks with their probabilities, (unless not between 0 and 1, see below for all probs 1/70). Division by 5 or other spurious value at end gives max M1A1M1M1A0, or M1A0M1M1A0 if $E(X)$ also divided by 5. Unsupported correct answers get 5 marks. SC2 for use of 1/70 for all probabilities leading to $E(X) = 3/14$ and $Var(X) = 145/196 = 0.74$
		TOTAL	**7**	

Q5 (i)	P(Wet and bus) = 0.4×0.7 = 0.28	M1 for multiplying probabilities A1 CAO	**2**	Fractional answer = 7/25 (Allow 28/100)
(ii)	P(Walk or bike) = $0.6 \times 0.5 + 0.6 \times 0.4 + 0.4 \times 0.2 + 0.4 \times 0.1$ or 0.3+0.24+0.08+0.04 = 0.66	M1 for any two correct pairs M1 for sum of all four correct terms With no extra terms for second M1 A1 CAO	**3**	Or = $0.6 \times 0.9 + 0.4 \times 0.3$ gets M1 for either term = 0.54 + 0.12 gets M1 for sum of both A1 CAO Or = $1 - 0.6 \times 0.1 - 0.4 \times 0.7 = 0.66$. M1 for 1 – one correct term, M1 for complete correct expression and A1 for correct evaluation.
(iii)	P(Dry given walk or bike) $= \frac{\text{P(Dry and walk or bike)}}{\text{P(Walk or bike)}}$ $= \frac{0.6 \times 0.9}{0.66} = \frac{0.54}{0.66} = \frac{9}{11} = 0.818$	M1 for numerator leading to 0.54 M1 for denominator Ft their P(Walk or bike) from (ii) provided between 0 and 1 A1 FT	**3**	Allow 0.82, not 0.819 More accurate answer =0.81818 Fractional answer = 54/66 = 27/33 = 9/11 Condone answer of 0.8181 Do not give final A1 if ans ≥ 1
		TOTAL	**8**	

Q6 (i)	(*A*) P(Avoided air travel) $= \frac{7}{100} = 0.07$ (*B*) P(At least two) $= \frac{11+2+1+4}{100} = \frac{18}{100} = \frac{9}{50} = 0.18$	B1 aef isw M1 for (11+2+1+4)/100 A1 aef isw	**1** **2**	For M1 terms must be added must be as above or better with no extra terms (added or subtracted) for M1 Must simplify to 18/100 or 9/50 or 0.18 for A1 SC1 for 18/58 Or 1 – (14+26+0+42)/100 = 0.18 gets M1A1
(ii)	P(Reduced car use | Avoided air travel) $= \frac{6}{7} = 0.857$	M1 for denominator 7 or 7/100 or 0.07 FT their (i)A A1 CAO	**2**	Allow 0.86
(iii)	P(None have avoided air travel) $= \frac{93}{100} \times \frac{92}{99} \times \frac{91}{98} = 0.8025$	M1 for 93/100× (triple product) M1 for product of remaining fractions A1	**3**	Fuller answer 0.802511, so allow 0.803 without working, but 0.80 or 0.8 only with working . $(93/100)^3$ scores M1M0A0 which gives answer 0.804357 so watch for this. M0M0A0 for binomial probability including 0.93^{100} but ${}^3C_0 \times 0.07^0 \times 0.93^3$ still scores M1 $(k/100)^3$ for values of k other than 93 scores M0M0A0 $\frac{k}{100} \times \frac{(k-1)}{99} \times \frac{(k-2)}{98}$ for values of k other than 93 scores M1M0A0 Correct working but then multiplied or divided by some factor scores M1M0A0 ${}^{93}P_3 / {}^{100}P_3 = 0.803$ ${}^{93}P_3$ seen M1 divided by ${}^{100}P_3$ M1 0.803 A1 ${}^{93}C_3 / {}^{100}C_3 = 0.803$ Allow unsimplified fractional answer 778596/970200 =9269/11550
		TOTAL	**8**	

	SECTION B			
Q7 (i)	<table><tr><th>Income</th><th>Frequency</th><th>Width</th><th>FD</th></tr><tr><td>$0 \le x \le 20$</td><td>238</td><td>20</td><td>11.9</td></tr><tr><td>$20 < x \le 40$</td><td>365</td><td>20</td><td>18.25</td></tr><tr><td>$40 < x \le 60$</td><td>142</td><td>20</td><td>7.1</td></tr><tr><td>$60 < x \le 100$</td><td>128</td><td>40</td><td>3.2</td></tr><tr><td>$100 < x \le 200$</td><td>45</td><td>100</td><td>0. 5</td></tr></table>  <u>INCORRECT DIAGRAMS:</u> Frequency diagrams can get M0, A0, L0, W1, H0 MAXIMUM Thus frequency density = frequency × width, frequency/midpoint etc gets MAX M0A0L0W1H0	M1 for fds A1 CAO Accept any suitable unit for fd such as eg freq per £1000. L1 linear scale and label on vertical axis W1 linear scale on horizontal axis and correct width of bars H1 height of bars	**5**	At least 4 fds correct for M1 M1 can be also be gained from freq per 10K - 119, 182.5, 71, 32, 4.5 (at least 4 correct) and A1 for all correct Accept any suitable unit for fd, eg freq per £10K, BUT NOT FD per £1000 Allow fds correct to at least one dp If fd not explicitly given, M1 A1 can be gained from all heights correct (within one square) on histogram (and M1A0 if at least 4 correct) Allow restart although given fd wrong For L1, label required on vert axis in relation to first M1 mark ie fd or frequency density or if relevant freq/£10K, freq/£k etc (NOT fd/£10K) Accept f/w or f/cw (freq/width or freq/class width) Ignore horizontal label L1 can also be gained from an accurate key – may see 1 square = 36.5 or 23.8 or 14.2 For W1, must be drawn at 0, 20, 40 etc NOT 19.5 or 20.5 etc NO GAPS ALLOWED Must have linear scale. No inequality labels on their own such as $0 \le I < 20$, $20 \le I < 40$ etc but allow if a clear horizontal linear scale is also given. FT of heights *dep* on M1 all must agree with their fds If fds not given and one height is wrong then max M1A0L1W1H0 – visual check only (within one square) –no need to measure precisely

(ii)	Mean = $\frac{10\times 238+30\times 365+50\times 142+80\times 128+150\times 45}{918}$ $= \frac{37420}{918} = 40.8$	M1 for midpoints M1 for midpoints ×frequencies with divisor 918 A1 CAO	**3**	At least three midpoints correct for M1 (seen in (ii) or in table in (i)) No marks if not using midpoints Second M1 for sight of at least 3 double pairs seen out of 10 × 238 + 30 × 365 + 50 × 142 + 80 × 128 + 150 × 45 with divisor 918 Numerator = 2380+10950+7100+10240+6750 Use of LCB or UCB for midpoints here scores 0 For answer 40.76 or 40.8 or 41 mark as B3 37420/918 o.e. scores M1M1A0 NB Accept answers seen without working in part (ii) or (iii) (from calculator) Use of 'not quite right' midpoints such as 10.5, 30.5, etc can get M0M1A0 here and SC3 in (iii) Watch for incorrect method 238/10+365/30+142/50+128/80+45/150=40.71 Allow max 4 sf in final answer Also accept £40760, £40800 etc
(iii)	$\sum fx^2 = 238\times 10^2 + 365\times 30^2 + 142\times 50^2 + 128\times 80^2 + 45\times 150^2 = 2539000$ Or 238×100 + 365×900 + 142×2500 + 128×6400 + 45×22500 = 2539000 Or 2380×10 + 10950×300 + 7100×50 + 10240×80 + 13500×150 =2539000 $S_{xx} = 2539000 - \frac{37420^2}{918} = 1013666$ $s = \sqrt{\frac{1013666}{917}} = 33.2$	M1 for at least 3 multiples fx^2 A1 for Σfx^2 M1 for attempt at S_{xx} Dep on first M1 BUT NOTE M1M0 if their $S_{xx} < 0$ A1 CAO If using LCB or UCB	**4**	For A1, all midpoints and frequencies correct Or S*xx* = 2539000 – 918 × 40.76^2 = 1013855, s=33.25. Using mean 40.8 leads to 1010861 , s= 33.20, Using mean = 41 leads to S*xx* = 995844 and s = 32.95 M1M1 for $\sum f(x\text{-}\bar{x})^2$ M1 for first three terms, M1 for all 5 terms 238 × (10-40.76)^2 + 365 × (30-40.76)^2 + 142 × (50-40.76)^2 + 128 × (80-40.76)^2 + 45 × (150-40.76)^2 (= 1013666) A1 for S_{xx} = 1013666 A1 for final answer

		consistently then allow SC2 if working is fully correct but SC0 otherwise but no marks in part (ii)		For answer 33.25 or 33.3 or 33.2 (www) can just mark as B4 - these may be from calculator without working Allow 33 with correct working rmsd = √(1013666/918) (=33.23) gets M1A1M1A0 (if seen) **WATCH FOR DIVISOR OF 918** Allow max 4 sf in final answer Allow £33200 etc
(iv)	($\bar{x} - 2s = 40.76 - 2\times 33.25 = -25.74$) $\bar{x} + 2s = 40.76 + 2\times 33.25 = 107.26$ Comment that there are almost certainly some outliers. Appropriate comment such as 'No, since there is nothing to indicate that these high earners represent a separate population.'	M1 for $\bar{x} + 2s$ or $\bar{x} - 2s$ A1 for 107.26 (FT) E1 E1 Dep on upper limit in range 106 - 108	**4**	FT any positive mean and positive sd for M1 Only follow through numerical values, not variables such as *s*, so if a candidate does not find *s* but then writes here 'limit is 40.76+ 2 × standard deviation', do NOT award M1 (This rule of not following through variables applies in all situations) Award E0E0 if their upper limit > 200 Allow 'Must be some outliers' Allow any comments that implies that there are outliers No marks in (iv) unless using $\bar{x} + 2s$ or $\bar{x} - 2s$
(v)	New mean = 1.15 × 40.76 = 46.87 New variance = $1.15^2 \times 33.25^2 = 1462$ For misread 1.5 in place of 1.15 For 1.5 × 40.76 = 61.1 and $1.5^2 \times 33.25^2 = 2490$ allow SC2 if all present but SC0 otherwise	B1 FT M1A1 FT	**3**	FT their mean (if given to ≥ 2 s.f.) FT their s (if given to ≥ 2 s.f.) provided their s>0 If RMSD found in part (i) rather than s, then FT their RMSD For new SD = 38.24 found instead of variance give M1A0 even if called variance (and FT their *s*) M0A0 for 1.15 x 33.25^2= 1271 Allow max 4 sf in final answers Min 2 sf If candidate 'starts again' only award marks for CAO
		TOTAL	**19**	

Q8 (i)	$E(X) = np = 12 \times 0.2 = 2.4$ Do not allow subsequent rounding.	M1 for product A1 CAO	**2**	If wrong n used consistently throughout, allow M marks only. NB If they round to 2, even if they have obtained 2.4 first they get M1A0. For answer of '2.4 or 2 if rounded up' allow M1A0 Answer of 2 without working gets M0A0. If they attempt E(X) by summing products xp give no marks unless answer is fully correct.
(ii)	X ~ B(12, 0.2) (***A***) P(Wins exactly 2) $= \binom{12}{2} \times 0.2^2 \times 0.8^{10} = 0.2835$ OR from tables $0.5583 - 0.2749 = 0.2834$	M1 $0.2^2 \times 0.8^{10}$ M1 $\binom{12}{2} \times p^2 q^{10}$ A1 CAO OR: M2 for 0.5583 – 0.2749 A1 CAO	**3**	With $p + q = 1$ Also for 66×0.004295 Allow answers within the range 0.283 to 0.284 with or without working or 0.28 to 0.283 if working shown See tables at the website http://www.mei.org.uk/files/pdf/formula_book_mf2.pdf
	(***B***) P(Wins at least 2) $= 1 - 0.2749 = 0.7251$	M1 P($X \leq 1$) M1 1-P(X≤1) A1 CAO	**3**	M1 0.2749 seen M1 1 – 0.2749 seen Allow 0.725 to 0.73 but not 0.72. Point probability method: $P(1) = 12 \times 0.2 \times 0.8^{11} = 0.2062$, $P(0) = 0.8^{12} = 0.0687$ So P($X \leq 1$) = 0.2749 gets M1 then mark as per scheme SC1 for $1 - P(X \leq 2) = 1 - 0.5583 = 0.4417$ For misread of tables value of 0.2749 , allow 0 in (*A*) but MAX M1M1 in (*B*) For P(X>1) = P(X=2) + P(X=3) + P(X=4) +.... allow M1 for 0.2835+0.2362+0.1329+0.0532+0.0155 and second M1 for 0.0033+0.0005+0.0001 and A1 for 0.725 or better M0M0A0 for 1 - P(X=1) = 1 – 0.2062 = 0.7938

(iii)	Let p = probability that Ali wins a game H_0: $p = 0.2$ H_1: $p > 0.2$ H_1 has this form as Ali claims that he is better at winning games than Mark is. *EITHER Probability method:* $P(X \geq 7) = 1 - P(X \leq 6)$ $= 1 - 0.9133 = 0.0867 > 5\%$ So not significant, so there is not enough evidence to reject the null hypothesis and we conclude that there is not enough evidence to suggest that Ali is better at winning games than Mark. Must include 'not enough evidence' or something similar for E1. 'Not enough evidence' can be seen in the either for the A mark or the E mark. Do not allow final conclusions for E1 such as : 'there is evidence to suggest that Ali is no better at winning games than Mark' or 'Mark and Ali have equal probabilities of winning games'	B1 for definition of p in context B1 for H_0 B1 for H_1 E1 B1 for $P(X \geq 7)$ B1 for 0.0867 Or 1 – 0.9133 seen M1 for comparison with 5% dep on B1 for 0.0867 A1 for not significant or 'accept H_0' or 'cannot reject H_0' or 'reject H_1' E1 dep on M1A1 Do not award first B1 for poor symbolic notation such as $P(X = 7) = 0.0867$ This comment applies to all methods	**4** **5**	Minimum needed for B1 is p = probability that Ali wins. Allow p = P(Ali wins) for B1 Definition of p must include word probability (or chance or proportion or percentage or likelihood but NOT possibility). Preferably as a separate comment. However can be at end of H_0 as long as it is a clear definition ' p = the probability that Ali wins a game, NOT just a sentence 'probability is 0.2' H_0 : p(Ali wins) = 0.2, H_1 : p(Ali wins) > 0.2 gets B0B1B1Allow p=20%, allow θ or π and ρ but not x. However allow any single symbol <u>if defined</u> Allow $H_0 = p$=0.2, Allow $H_0 : p = {}^2/_{10}$ Do not allow $H_0 : P(X=x) = 0.2$, $H_1 : P(X=x) > 0.2$ Do not allow H_0: =0.2, =20%, P(0.2), p(0.2), p(x)=0.2, x=0.2 (unless x correctly defined as a probability) Do not allow H_1:$p \geq 0.2$, Do not allow H_0 and H_1 reversed for B marks but can still get E1 Allow NH and AH in place of H_0 and H_1 For hypotheses given in words allow Maximum B0B1B1E1 Hypotheses in words must include probability (or chance or proportion or percentage) and the figure 0.2 oe. Zero for use of point prob - $P(X = 7) = 0.0546$

	OR Critical region method: Let $X \sim B(20, 0.2)$ $P(X \geq 7) = 1 - P(X \leq 6) = 1 - 0.9133 = 0.0867 > 5\%$ $P(X \geq 8) = 1 - P(X \leq 7) = 1 - 0.9679 = 0.0321 < 5\%$ So critical region is {8,9,10,11,12,13,14,15,16,17,18,19,20} 7 does not lie in the critical region, so not significant, So there is not enough evidence to reject the null hypothesis and we conclude that there is not enough evidence to suggest that Ali is better at winning games than Mark.	B1 for 0.0867 B1 for 0.0321 M1 for at least one comparison with 5% A1 CAO for critical region and not significant or 'accept H_0' or 'cannot reject H_0' or 'reject H_1' *dep* on M1 and at least one B1 E1 dep on M1A1		Allow any form of statement of CR eg $X \geq 8$, 8 to 20, 8 or above, $X > 8$, {8, …}, annotated number line, etc but not $P(X \geq 8)$ {8,9,10,11,12} gets max B2M1A0 – tables stop at 8. NB USE OF POINT PROBABILITIES gets B0B0M0A0 Use of complementary probabilities Providing there is sight of 95%, allow B1 for 0.9133, B1 for 0.9679, M1 for comparison with 95% A1CAO for correct CR See additional notes below the scheme for other possibilities **PLEASE CHECK THAT THERE IS NO EXTRA WORKING ON THE SECOND PAGE IN THE ANSWER BOOKLET**
		TOTAL	**17**	

NOTE RE OVER-SPECIFICATION OF ANSWERS

If answers are grossly over-specified (see instruction 8), deduct the final answer mark in every case, except where there are more than two over-specified answers in a single question (only likely in question 7) in which case deduct a mark in only the first two cases of over-specification in that question. Probabilities should also be rounded to a sensible degree of accuracy.

ADDITIONAL NOTES RE Q8 PART iii

Use of n = 12

$P(X \geq 7) = 1 - P(X \leq 6) = 1 - 0.9961 = 0.0039 < 5\%$

So significant or reject H_0 etc, so there evidence to suggest that Ali is better at winning games than Mark.

Gets B1 for $P(X \geq 7)$ B1 for 0.0039 M1 for comparison with 5% dep on B1 for 0.0039 A1 for significant E1 for evidence to suggest that Ali is better at winning games than Mark. Then award MR -1 so maximum of 4 possible

Comparison with 95% method

B1 for $P(X \leq 6)$

B1 for 0.9133

M1 for comparison with 95% dep on B1
A1 for not significant or 'accept H_0' or 'cannot reject H_0'
E1

Smallest critical region method:

Either:
Smallest critical region that 7 could fall into gets B1 and has size 0.0867 gets B1, This is > 5% gets M1, A1, E1 as per scheme
NB These marks only awarded if 7 used, not other values.

Use of *k* method with no probabilities quoted:

$P(X \geq 7) = 1 - P(X \leq 6) > 5\%$
$P(X \geq 8) = 1 - P(X \leq 7) < 5\%$
These may be seen in terms of *k* or *n*.
Either $k = 8$ or $k - 1 = 7$ so $k = 8$ gets SC1
so CR is {8,9,10,11,12,13,14,15, 16, 17, 18, 19, 20} gets another SC1and conclusion gets another SC1

Use of *k* method with one probability quoted:

1 - 0.9679 < 5% or 0.0321 < 5% gets B0B1M1
$P(X \leq k - 1) = P(X \leq 7)$
so $k - 1 = 7$ so $k = 8$ (or just $k = 8$)
so CR is {8,9,10,11,12,13,14,15, 16, 17, 18, 19, 20} and conclusion gets A1E1

Two tailed test with H_1: $p \neq 0.2$
Hyp gets max B1B1B0E0
$P(X \geq 7) = 0.0867$ gets B1B1comparison with 2.5% gets M1 (must be 2.5%)
Final marks A0E0

Two tailed test done but with correct H_1: $p > 0.2$
Hyp gets max B1B1B1E1

if compare with 5% ignore work on lower tail and mark upper tail as per scheme so can score full marks
if compare with 2.5% no marks B0B0M0A0E0

One tailed test with H_1: $p<0.2$
Hyp gets max B1B1B0E0
no further marks B0B0M0A0E0

Lower tailed test with H_1: $p>0.2$
Hyp gets max B1B1B0E0
no further marks B0B0M0A0E0

Line diagram method
B1 for squiggly line between 7 and 8 or on 8 exclusively (ie just one line), B1*dep* for arrow pointing to right, M1 0.0321 seen on diagram from squiggly line or from 8, A1E1 for correct conclusion

Bar chart method
B1 for line clearly on boundary between 7 and 8 or within 8 block exclusively (ie just one line),, B1*dep* for arrow pointing to right, M1 0.0321 seen on diagram from boundary line or from 8, A1E1 for correct conclusion

Using P(Not faulty) method
H_0: $p=0.8$, H_1: $p<0.8$, where p represents the prob that Ali loses a game Ali claims that the proportion of games that he loses is less than 80% gets B1B1B1E1
$P(X\leq 13)=0.0867>5\%$ So not significant, so there is not enough evidence to reject the null hypothesis and we conclude that there is not enough evidence to suggest that Ali is better at winning games than Mark. Gets B1B1M1A1E1