

Question			Answer	Marks	AO	Guidance
13	(a)		$H_0 : p = 0.37$ and $H_1 : p < 0.37$	B1	1.1	Allow equivalent in words Do not allow percentages
				[1]		
13	(b)		p is the <u>probability</u> that an <u>adult</u> selected at random in the United Kingdom <u>never exercises</u> (or plays sport)	B1	2.5	Accept ' <u>proportion</u> ' but <u>not</u> number/amount etc B1B1 in (a)(b) if another symbol instead of p used <u>if correctly defined</u> Underlined words needed
				[1]		
13	(c)		$P(X) \leq 35 = 0.058...$ their 0.058.. compared with 0.05 $0.058 > 0.05$ or $35.033... > 35$ or $0.059867 > 0.05$ <u>and</u> 'so do not reject H_0 '	B1 M1 A1	1.1 1.1 2.2b	may see $P(X < 35) = 0.0386$ or $P(X \leq 36) = 0.0847$ using $X \sim B(118, 0.37)$ – SC 1 mark Use of $P(X = 35) = 0.01961$..is M0 There is another approach using Normal approx to Binomial to find 5% CR $Y \sim N(43.66, 27.5058)$ which gives CV 35.033... Or finding value from ND $P(Y \leq 35.5) = 0.059867..$ (must be using a continuity correction so $P(Y \leq 35) = 0.0493465..$ is M0) 'accept H_0 ' is ok

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			There is no evidence (or insufficient evidence) to suggest/support at the 5% level that the percentage of adults (selected at random in the United Kingdom) who never exercises (or plays sport) is less than 37%	A1*	2.4	Fully correct contextual conclusion No assertive statements such as ‘proves that’ or ‘shows that’ ‘concludes that’ etc Accept percentage/proportion or probability with 0.37 Dependent on award of all other marks in (c)
				[4]		