



Q	Answer	Marks
1	a) $H_0: p = 0.5$, $H_1: p > 0.5$, one-tailed b) $H_0: p = 0.04$, $H_1: p < 0.04$, one-tailed c) $H_0: p = 0.08$, $H_1: p \neq 0.08$, two-tailed	3
2	$H_0: p = 0.5$, $H_1: p > 0.5$; $P(X \geq 9) = 0.0107 < 0.05$, so reject H_0 : there is evidence that Callum can tell the brands apart.	4
3	$H_0: p = 0.3$, $H_1: p < 0.3$; $P(X \leq 2) = 0.0355 < 0.05$, so reject H_0 : there is evidence that fewer students walk to school.	5
4	a) $H_0: p = 0.2$, $H_1: p > 0.2$ b) $X \geq 9$ c) 0.0468	5
5	a) $H_0: p = 0.4$, $H_1: p \neq 0.4$ b) $X \leq 7$ or $X \geq 17$ c) 0.0916	6
6	$H_0: p = 0.2$, $H_1: p > 0.2$; $P(X \geq 10) = 0.0611 > 0.05$, so do not reject H_0 : insufficient evidence that the proportion ordering dessert has increased.	5
7	a) $H_0: p = 0.15$, $H_1: p \neq 0.15$; $P(X \geq 11) = 0.0299 > 0.025$, so do not reject H_0 : insufficient evidence that the proportion is different b) a one-tailed test compares 0.0299 with 0.05; $0.0299 < 0.05$ so there would be evidence that the proportion is higher	6
8	a) $X \leq 1$ ($H_0: p = 0.08$, $H_1: p < 0.08$) b) 0.0418 c) 1 is in the critical region, so reject H_0 : evidence that the proportion of late parcels has gone down	6
9	a) $X \geq 8$ b) 0.0173 c) $P(X \geq 7) = 0.0566$: not significant at 5% ($0.0566 > 0.05$), significant at 10% ($0.0566 < 0.1$)	7
10	a) $n = 9$ b) $P(X = 0) = 0.7^9 = 0.0404$ 0.05; actual significance level 0.0404 c) 1 is not in the critical region, so do not reject H_0 : insufficient evidence that fewer than 30% of boxes contain a toy	7
11	a) $H_0: p = 0.5$, $H_1: p \neq 0.5$ b) $X \leq 5$ or $X \geq 15$ c) 0.0414 d) 14 is not in the critical region, so there is insufficient evidence that the coin is biased; her statement is not supported	7
12	a) 0.7358 b) $H_0: p = 0.85$, $H_1: p < 0.85$; $X \leq 37$ c) 0.0301 d) 37 is in the critical region, so reject H_0 : evidence that fewer than 85% of the bulbs flower e) bulbs planted together share the same soil, weather and pests, so whether one flowers may be linked to whether another does	9

Full worked solutions, written out by hand, are on the solutions sheet for this topic.