Type I and type II errors

Answers

Further Maths topic practice

This topic online

Q	Answer	Marks
1	**a)** Concluding that the proportion of faulty cases has increased, when in fact it is still 0.06 **b)** Concluding there is no evidence of an increase in the proportion of faulty cases, when in fact it has increased **c)** Type II error	3
2	**a)** 0.0444 **b)** X is discrete: $P(X \leq 3) = 0.0444$ and $P(X \leq 4) = 0.1182$, so no critical region gives exactly 0.05	3
3	**a)** $H0: \lambda = 4$, $H1: \lambda > 4$; $X \geq 9$ **b)** 0.0214	4
4	**a)** $X \geq 9$ **b)** 0.6769	5
5	**a)** $X \leq 2$ (0.0138) or $X \geq 15$ (0.0173) **b)** 0.0310 **c)** 0.7715	7
6	**a)** $X \geq 15$ **b)** 0.0440 **c)** 0.7712	6
7	**a)** $P(X \leq 6) = 0.0458 < 0.05$: reject H0, evidence the rate has decreased **b)** $X \leq 1$ **c)** 0.8009	9
8	**a)** $H0: \mu = 250$, $H1: \mu < 250$; $\bar{X} < 246.71$ **b)** 0.1962	7
9	**a)** 0.0736 **b)** 0.1855	6
10	**a)** $H0: \lambda = 9$, $H1: \lambda \neq 9$; $X \leq 3$ or $X \geq 16$ **b)** 0.0433 **c)** 0.0250 **d)** 0.8483	10
11	**a)** $\bar{X} < 2.597$ **b)** 0.5051 **c)** It increases: the critical region gets smaller, so a false H0 is less likely to be rejected	9
12	**a)** $H0: p = 0.25$, $H1: p \neq 0.25$; $X \leq 2$ or $X \geq 13$ **b)** 0.0322 **c)** 0.3592 **d)** Reject H0: evidence the proportion has changed; she might have made a Type I error, since H0 was rejected	10

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

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