Solutions

2.1

- H_0: the mean is 30 (or more).
- H_1: the mean is under 30.

2.2

- $SE = 6.0/\sqrt{36} = 1.0$.
- $t = (28.2 - 30)/1.0$.
- $= \mathbf{-1.8}$.

2.3

- Licensed: $-1.8 < -1.69$, so reject H0 at the 5% level – the data are inconsistent with a 30-minute mean.
- Also licensed: the evidence concerns THIS sample; the effect is about 1.8 minutes (report it with its interval).

2.4

- 25 tests at $\alpha = 0.05$ expect at least one false positive with probability $1 - 0.95^{25} \approx 0.72$.
- This p = 0.04 was selected from a lottery – demand pre-registration and a fresh confirmation.

2.5

- (a) → significant, trivially small: act only if 0.3 matters to the business (it usually does not).
- (b) → a 4-minute gap customers would feel, but the evidence is short (p = 0.12): collect more data before acting.
- The moral: significance answers existence; the effect size answers relevance. (across marks)

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