Lesson #44 · Topic 3C · Practice

Answer Key

1. a. $H_0 : p = 0.11$, $H_a : p > 0.11$ where $p =$ the true proportion of all math teachers who are left-handed
   b. $H_0 : p = 0.203$, $H_a : p \neq 0.203$ where $p =$ the true proportion of all teenagers at Julibel's school who have a job

2. a. The alternative hypothesis is one-sided $(H_a : p < 0.74)$ when it should be two-sided $(H_a : p \neq 0.74)$ because the question says "is different than".
   b. Both hypotheses use the incorrect proportion. Hypotheses should always be stated using the claimed proportion (0.74), not the sample proportion (0.63).
   c. Both hypotheses use incorrect notation. Hypotheses should always be stated using the notation of the parameter (p), not the notation of the statistic $(\hat{p})$.

3. a. $\frac{13}{50} = 0.26$
   b. Assuming the deck is standard, there is an estimated 0.26 probability of getting 1 or fewer spades in a sample of 10 cards purely by chance.
   c. Because 0.26 $>$ 0.05, José does not have convincing statistical evidence that the deck of cards was not standard.

4. a. This interpretation is missing the condition that the p -value was calculated "assuming H_0 is true".
   b. A p -value is the probability of getting the sample statistic $(\hat{p} = 0.66)$ or more extreme. In this case, the p -value is the probability of getting $\hat{p} = 0.66$ or less, purely by chance.
   c. Assuming H_0 is true $(p = 0.75)$, there is a 0.019 probability of getting a $\hat{p}$ of 0.66 or less purely by chance.
   d. Because 0.019 $<$ 0.05, Chloe does have convincing statistical evidence that the true proportion of all students at her school who can taste PTC is less than 0.75.

5. a. $\frac{2}{100} = 0.02$
   b. Mean $=$ 0.50. Standard deviation $= \sqrt{\frac{(0.5)(0.5)}{50}} = 0.071$
   c. Approximately normal because $50(0.5) = 25 \geq 10$ and $50(1 - 0.5) = 25 \geq 10$.
   d. 0.0243

6. C

7. D