Lesson #19 · Topic 2B · Practice

Answer Key

1. Answers will vary. Possible answer: Assign all black cards to represent packing a sandwich, assign all hearts to represent packing leftovers, and assign all diamonds to represent ordering take-out. After shuffling the deck, randomly select a card and record the color of the card selected.

2. a. Yes, Penny has some evidence. For the sample of days, Nick got up when his alarm clock rings the first time only $\frac{4}{7}$ or about 57% of the time, which is lower than his claimed percent of 85%.
   b. No, Penny does not have proof. Results vary from sample to sample. It is possible that Nick truly does get up the first time his alarm clock rings 85% of the time, but this particular random sample produced an estimate of 57% purely by chance.

3. a. In exactly one roll of three dice out of 30 attempts, the sum of the three dice was 5.
   b. $\frac{2}{30} \approx 0.067$ or about 6.7%
   c. Fran's simulated probability is less than the true probability. In the short run, results are unpredictable. Only after many simulations (the long run) will the simulated probability approach the true probability (Law of Large Numbers).

4. a. Yes, because the observed result is unlikely to happen purely by chance (0.8% < 5%) with a fair coin.
   b. There is convincing evidence that this coin is not a fair coin.

5. a. $0.20(12) = 2.4$ people
   b. Yes, because $1 < 2.4$.
   c. 16
   d. $\frac{16}{50} = 0.32 \text{ or } 32\%$

   e. No. Assuming the 20% claim is true, the probability of getting 0 or 1 coupons in a group of 12 friends purely by chance is 32%. Since this result is not statistically significant (32% > 5%) , it is plausible that the café's claim is true and the result happened purely by chance.

6. a. Answers will vary. Possible answer: Aarav could flip a coin 42 times (or use a simulation for flipping coins) and assign heads as "not eating breakfast" and tails as "eating breakfast" and record the number of heads.
   b. Aarav would have to repeat the simulation many, many times, and each time record the number of flips out of 42 that land on heads. He could then count the number of simulations where he got 12 or fewer heads and divide by the total number of simulations to arrive at an estimate of the probability of getting 12 or fewer students that do not eat breakfast. If this
   evidence to dispute the article on the school's websi

7. D

8. D