1. Event $A$ occurs with probability 0.3, and event $B$ occurs with probability 0.4. If $A$ and $B$ are independent, we may conclude
   a. $P(A \text{ and } B) = 0.12$.
   b. $P(A|B) = 0.3$.
   c. $P(B|A) = 0.4$.
   * d. All of the above

2. Suppose we toss a coin and roll a die. Let $A$ be the event that the number of spots showing on the die is three or less and $B$ be the event that the coin comes up heads. The events $A$ and $B$ are
   a. disjoint.
   b. conditional.
   * c. independent.
   d. marginal.

3. An event $A$ will occur with probability 0.5. An event $B$ will occur with probability 0.6. The probability that both $A$ and $B$ will occur is 0.1. We may conclude
   a. events $A$ and $B$ are independent.
   b. events $A$ and $B$ are disjoint.
   * c. either $A$ or $B$ always occurs.
   d. None of the above

Use the following to answer Questions 4–6.

A survey of college students finds that 25% like classical music, 40% like rock music, and 10% like both classical music and rock music.

4. What is the proportion of students that like neither classical music nor rock music?

45%

5. What is the proportion of students that like either classical music or rock music?

55%

6. What is the conditional probability that a student likes classical music given that he or she does not like rock music?

25%
7. Suppose you interview 10 randomly selected workers and ask how many miles they commute to work. You’ll compute the sample mean commute distance. Now imagine repeating the survey many, many times, each time recording a different sample mean commute distance. In the long run, a histogram of these sample means represents
   a. the bias, if any, that is present in the sampling method.
   b. the true population average commute distance.
   c. a simple random sample.
   * d. the sampling distribution of the sample mean.

Use the following to answer Questions 8 and 9.

In a large population of college-educated adults, the mean IQ is 112 with standard deviation 25. Suppose 300 adults from this population are randomly selected for a market research campaign.

8. The distribution of the sample mean IQ is
   a. approximately Normal, mean 112, standard deviation 25.
   * b. approximately Normal, mean 112, standard deviation 1.443.
   c. approximately Normal, mean 112, standard deviation 0.083.
   d. approximately Normal, mean equal to the observed value of the sample mean, standard deviation 25.

9. What is the probability that the sample mean IQ is greater than 115?

0.0188

10. The central limit theorem says that when a simple sample of size \( n \) is drawn from any population with mean \( \mu \) and standard deviation \( \sigma \), then when \( n \) is sufficiently large
    a. the standard deviation of the sample mean is \( \sigma^2/n \).
    b. the distribution of the population is approximately Normal.
    * c. the distribution of the sample mean is approximately Normal.
    d. the distribution of the sample mean is exactly Normal.

11. Fill out the blank.
    ___________________________ says that the sample mean \( \bar{X} \) of the observed values tends to get closer and closer to the mean \( \mu \) of the population, as the number of observations (n) increases,