

## Parameters for a Binomial Distribution Quiz

- In a certain region, 94 percent of the people have a certain characteristic in their blood. Suppose a group of 45 people from the region are selected at random. Let the random variable  $B$  represent the number of people in the sample without the characteristic. Random variable  $B$  follows a binomial distribution with a mean of 2.7 people. Which of the following is the best interpretation of the mean?

  - For all groups of 45 people, the average number of people without the characteristic is 2.7.
  - Every group of 45 people will have 2.7 people with the characteristic.
  - Every group of 45 people will have 2.7 people without the characteristic.
  - On average, 2.7 people are selected until finding someone with the characteristic.
  - On average, 2.7 people are selected until finding someone without the characteristic.
- A company that ships crystal bowls claims that bowls arrive undamaged in 95 percent of the shipments. Let the random variable  $G$  represent the number of shipments with undamaged bowls in 25 randomly selected shipments. Random variable  $G$  follows a binomial distribution with a mean of 23.75 shipments and a standard deviation of approximately 1.09 shipments. Which of the following is the best interpretation of the mean?

  - Every shipment of 25 bowls will have 23.75 undamaged bowls.
  - Every shipment of 25 bowls will have 23.75 damaged bowls.
  - On average, the company receives 23.75 shipments before receiving the first shipment with a damaged bowl.
  - For all possible shipments of size 25, the average number of damaged shipments is equal to 23.75.
  - For all possible shipments of size 25, the average number of undamaged shipments is equal to 23.75.
- According to 2015 census data, 42.7 percent of Colorado residents were born in Colorado. If a sample of 250 Colorado residents is selected at random, what is the standard deviation of the number of residents in the sample who were born in Colorado?

  - 6.75
  - 7.82
  - 10.33
  - 11.97
  - 61.17
- A certain factory that manufactures office chairs has a quality control process to identify defective chairs. The binomial random variable  $D$  represents the number of chairs in a sample of chairs that are defective. The mean of  $D$  is 10 chairs and the standard deviation is 3 chairs. Based on the distribution of  $D$ , which of the following would be an accurate interpretation of the value 0.1 ?

  - The total number of defective chairs made
  - The total number of non-defective chairs made
  - The relative frequency of the sample size to the population of chairs
  - The probability of identifying a non-defective chair
  - The probability of identifying a defective chair
- In 2014, 85 percent of households in the United States had a computer. For a randomly selected sample of 200 households in 2014, let the random variable  $C$  represent the number of households in the sample that had a computer. What are the mean and standard deviation of  $C$  ?

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- (A) The mean is 85 households, and the standard deviation is 0.36 household.
  - (B) The mean is 144.5 households, and the standard deviation is 5.05 households.
  - (C) The mean is 144.5 households, and the standard deviation is 13.04 households.
  - (D) The mean is 170 households, and the standard deviation is 5.05 households.
  - (E) The mean is 170 households, and the standard deviation is 0.36 household.
6. According to a survey about how workers get to work in Wyoming, 77 percent of workers get to work by driving alone, 11 percent get to work by carpooling, 4 percent get to work by walking, and 8 percent get to work by other means of transportation. Suppose a sample of 200 Wyoming workers is selected at random. Let the random variable  $D$  represent the number of workers in the sample who get to work by driving alone. What is the expected value of  $D$ ?
- (A) 8
  - (B) 16
  - (C) 22
  - (D) 46
  - (E) 154