

Part I: Circle the correct answer.

1. The student body of a large university consists of 60% female students. A random sample of 8 students is selected. What is the probability that among the students in the sample at least 7 are female?

- a. 0.1064
 b. 0.0896
 c. 0.0168
 d. 0.8936

$$P(7) = \binom{8}{7} (0.6)^7 (0.4)^1 =$$

$$+ P(8) = \dots$$

2. The following represents the probability distribution for the daily demand of microcomputers at a local store.

Demand	Probability
0	0.1
1	0.2
2	0.3
3	0.2
4	0.2

$$E(x) = \sum f(x) x$$

The expected daily demand is

- a. 1.0
 b. 2.2
 c. 2, since it has the highest probability
 d. of course 4, since it is the largest demand level
3. An experiment consists of making 80 telephone calls in order to sell a particular insurance policy. We are interested in the number of insurance policies sold, the random variable in this experiment is a

- a. discrete random variable
 b. continuous random variable
 c. complex random variable
 d. simplex random variable

discrete

4. Which of the following statements about a discrete random variable and its probability distribution are true?

- a. Values of the random variable can never be negative
 b. Some negative values of $f(x)$ are allowed as long as $\sum f(x) = 1$.
 c. Values of $f(x)$ must be greater than or equal to zero.
 d. The values of $f(x)$ increase to a maximum point and then decrease.

(5, 6, and 7) The assembly time for a product is uniformly distributed between 6 to 10 minutes.

5. The probability density function has what value in the interval between 6 and 10?

- a. 0.25
 b. 4.00
 c. 5.00
 d. zero

$$\frac{1}{10-6} = \frac{1}{4}$$

6. The probability of assembling the product in 7 minutes or more is

- a. 0.25
 b. 0.75
 c. zero
 d. 1

$$\frac{1}{4} * (10-7) = .75$$

7 10 11

7. The standard deviation of assembly time (in minutes) is approximately

- a. 1.3333
- b. 1.1547
- c. 0.1111
- d. 0.5773

$$\sigma = \sqrt{s^2} = \sqrt{1.33}$$

$$\mu = \frac{A+B}{2} = \frac{6+10}{2} = 8$$

$$\sigma^2 = \frac{(b-A)^2}{12} = \frac{(10-6)^2}{12} = \frac{16}{12} = 1.33$$

8. The key difference between the binomial and hypergeometric distribution is that with the hypergeometric distribution

- a. the probability of success must be less than 0.5
- b. the trials are independent of each other
- c. the random variable is continuous
- d. the probability of success changes from trial to trial

9. A professor receives, on average, 24.7 e-mails from students the day before the midterm exam. To compute the probability of receiving at least 10 e-mails on such a day, he will use what type of probability distribution?

- a. Binomial distribution.
- b. Hypergeometric distribution.
- c. Exponential distribution
- d. Poisson distribution.

10. At a computer manufacturing company, the actual size of computer chips is normally distributed with a mean of 1 centimeter and a standard deviation of 0.1 centimeter. A random sample of 12 computer chips is taken. What is the standard error for the sample mean?

- a. 0.050
- b. 0.091
- c. 0.120
- d. 0.029

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$$

11. Major league baseball salaries averaged \$1.5 million with a standard deviation of \$0.8 million in 1994. Suppose a sample of 100 major league players was taken. Find the approximate probability that the average salary of the 100 players exceeded \$1 million.

- a. Approximately 1
- b. 0.2357
- c. 0.7357
- d. Approximately 1

$$z = 6.25$$

within 3 standard deviations
= 99.7% → z1

12. For air travelers, one of the biggest complaints is of the waiting time between when the airplane taxis away from the terminal until the flight takes off. This waiting time is known to have a skewed-right distribution with a mean of 10 minutes and a standard deviation of 8 minutes. Suppose 100 flights have been randomly sampled. Describe the sampling distribution of the mean waiting time between when the airplane taxis away from the terminal until the flight takes off for these 100 flights.

- a. Distribution is skewed-right with mean = 10 minutes and standard error = 0.8 minutes.
- b. Distribution is skewed-right with mean = 10 minutes and standard error = 8 minutes.
- c. Distribution is approximately normal with mean = 10 minutes and standard error = 8 minutes.
- d. Distribution is approximately normal with mean = 10 minutes and standard error = 0.8 minutes.

$$E(\bar{x}) = \mu = 10$$

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}} = \frac{8}{10} = 0.8$$

13. What type of probability distribution will the consulting firm most likely employ to analyze the insurance claims in the following problem?

An insurance company has called a consulting firm to determine if the company has an unusually high number of false insurance claims. It is known that the industry proportion for false claims is 3%. The consulting firm has decided to randomly and independently sample 100 of the company's insurance claims. They believe the number out of these 100 that are false will yield the information the company desires.

- a. Poisson distribution.
- b. Hypergeometric distribution.
- c. Binomial distribution.
- d. None of the above.

14. The following data was collected from a simple random sample of a population

13 15 14 16 12

The point estimate of the population mean

- a. cannot be determined, since the population size is unknown
- b. is 14
- c. is 4
- d. is 5

15. Four hundred people were asked whether gun laws should be more stringent.

Three hundred said "yes," and 100 said "no." The point estimate of the proportion in the population who will respond "yes" is

- a. 300
- b. approximately 300
- c. 0.75
- d. 0.25