EXERCISES FOR SECTION 3.2-33

Question 1: According to police sources a car with a certain protection system will be recovered 78% of the time. Find the probability that 3 of 8 stolen cars will be recovered.

Select one:

a. 0.5711

b. 0.8754

c. 0.0440

d. 0.0137

Question 2: The probability that an individual is left-handed is 0.15. In a class of 30 students, what is the probability of finding five left-handers?

Select one:

a. 0.054

b. 0.153

c. 0.002

d. 0.186

Question 3: An airline reports that it has been experiencing a 12% rate of no-shows on advanced reservations. Among 100 advanced reservations, find the probability that there will be fewer than 15 no-shows.
Select one:
a. 0.251
b. 0.3187
c. 0.7549
d. 0.7840

Question 4: To calculate the probability of obtaining three aces in eight draws of a card with replacement from an ordinary deck, we would use the
Select one:
a. multinomial distribution.
b. Poisson distribution.
c. binomial distribution.
d. hypergeometric distribution.

Question 5: Find the probability that in 20 tosses of a fair six-sided die, a five will be obtained at least 5 times.
Select one:
a. 0.0871
b. 0.3875
c. 0.2313
d. 0.1223

Question 6: Find the probability that in 40 tosses of a fair six-sided die, a five will be obtained at most 11 times.
Select one:
a. 0.9739
b. 0.0853
c. 0.8810
d. 0.9106

Question 7: A test consists of 10 true/false questions. To pass the test a student must answer at least 4 questions correctly. If a student guesses on each question, what is the probability that the student will pass the test?

Select one:

a. 0.117
b. 0.8281
c. 0.945
d. 0.172

Question 8: Suppose that 14% of people are left handed. If 5 people are selected at random, what is the probability that exactly 2 of them are left handed?

Select one:

a. 0.1139
b. 0.0121
c. 0.2278
d. 0.1247

Question 9: The on-line access computer service industry is growing at an extraordinary rate. Current estimates suggest that 25% of people with home-based computers have access to on-line services. Suppose that 10 people with home-based computers were randomly and independently sampled. What is the probability that exactly 5 of those sampled have access to on-line services at home?

Select one:

a. 0.1032
b. 0.0584
c. 0.9389
d. 0.3333

Question 10: The on-line access computer service industry is growing at an extraordinary rate. Current estimates suggest that 10% of people with home-based computers have access to on-line services. Suppose that 8 people with home-based computers were randomly and independently sampled. What is the probability that at least 1 of those sampled have access to on-line services at home?

Select one:

a. 0.9648
b. 0.8329
c. 0.0352
d. 0.5695

Question 11: Samples of 10 parts from a metal punching process are selected every hour. Let X denote the number of parts in the sample of 10 that require rework. If the percentage of parts that require rework at 3%, what is the probability that X exceeds 2?

Select one:

a. 0.4114

b. 0.0028

c. 0.0159

d. 0.3152

EXERCISES FOR SECTION 3.4

Question 1. Find the standard deviation for the probability distribution.

x	0	1	2	3	4
P(x)	0.1296	0.3456	0.3456	0.1536	0.0256

Select one:
a. 1.12
b. 0.96
c. 0.98
d. 1.88

Question 2. Find the standard deviation for the given probability distribution.

x	0	1	2	3	4
P(x)	0.37	0.05	0.13	0.25	0.20

Select one:
a. 1.71
b. 2.45
c. 1.60
d. 2.56

Question 3. Find the variance for the given probability distribution.

x	0	1	2	3	4
$P(x)$	0.17	0.28	0.05	0.15	0.35

Select one:
a. 2.46
b. 2.69
c. 2.63
d. 7.43

Question 4. The following table is the probability distribution of the number of golf balls ordered by customers

x	3	6	9	12	15
$P(x)$	0.11	0.14	0.36	0.29	0.10

Find the mean of the this probability distribution.
Select one:
a. 8.22
b. 6.63
c. 9.3
d. 9.39

Question 5. Find the mean of the following probability distribution.

x	0	1	2	3	4
$P(x)$	0.19	0.37	0.16	0.26	0.02

Select one:
a. 1.45
b. 1.64
c. 1.55
d. 1.74

Question 6. The accompanying table shows the probability distribution for x, the number that shows up when a loaded die is rolled. Find the variance for the probability distribution.

x	1	2	3	4	5	6
P(x)	0.16	0.19	0.22	0.21	0.12	0.10

Select one:
a. 9.62
b. 2.36
c. 2.03
d. 2.41

Question 7. The probabilities that a batch of 4 computers will contain 0, 1, 2, 3, and 4 defective computers are 0.4521, 0.3970, 0.1307, 0.0191, and 0.0010, respectively. Find the variance for the probability distribution.

Select one:

a. 0.59

b. 0.51

c. 1.11

d. 0.69

Question 8. The random variable *X* represents the number of tests that a patient entering a hospital will have along with the corresponding probabilities. Find the mean and standard deviation for the random variable *X*.

x	0	1	2	3	4
P(*x*)	5/17	3/17	6/17	2/17	1/17

Select one:

a. mean: 1.47; standard deviation: 1.42

b. mean: 1.47; standard deviation: 1.19

c. mean: 1.59; standard deviation: 1.09

d. mean: 1.59; standard deviation: 3.72

Question 9. In a pizza takeout restaurant, the following probability distribution was obtained. The random variable *X* represents the number of toppings for a large pizza. Find the mean and standard deviation for the random variable *X*.

x	0	1	2	3	4
P(x)	0.40	0.30	0.20	0.06	0.04

Select one:

a. mean: 1.04; standard deviation: 1.09

b. mean: 1.30; standard deviation: 1.54

c. mean: 1.04; standard deviation: 0.49

d. mean: 1.30; standard deviation: 2.38

Question 10. A basketball player is asked to shot free throws in sets of four. The player shoots 100 sets of 4 free throws. The probability distribution for making a particular number of free throws id given below. Determine the standard deviation for this discrete probability distribution.

x	0	1	2	3	4
P(*x*)	0.42	0.07	0.22	0.27	0.02

Select one:

a. 1.32

b. 1.10

c. 1.21

d. 1.05

Question 11. Find the variance of the following probability distribution.

x	1	2	3	4	5	6	7	8	9	10
$P(x)$	0.05	0.19	0.20	0.25	0.12	0.10	0	0.08	0	0.01

Select one:
a. 0.56
b. 3.57
c. 3.97d. 1.95

Question 12. What is the standard deviation of the following probability distribution?

x	0	1	2	3	4	5	6
$P(x)$	0.30	0.25	0.20	0.12	0.07	0.04	0.02

Select one:
a. 1.82
b. 2.23
c. 1.54
d. 1.16

EXERCISES FOR SECTION 3.5

1. Suppose that X has a discrete uniform distribution on the integers 0 through 5. Determine the mean of the random variable Y = 4X

Select one:

a. 5

b. 10

c. 2.5

d. 6

2. The range of the random variable X is {1, 2, 3, 6, u}, where u is unknown. If each value is equally likely and the mean of X is 10, determine the value of u.

Select one:

a. 24

b. 19

c. 38

d. 12

3. Let the random variable X have a discrete uniform distribution on the integers $1 \leq X \leq 10$ Determine P(X < 6).

Select one:

a. 0.5

b. 0.6

c. 0.4

d. 0.7

4. Product codes of 3, 4 or 5 letters are equally likely. What is the mean of the number of letters in 20 codes?
Select one:
a. 8
b. 80
c. 4
d. 40

5. Let the random variable X have a discrete uniform distribution on the integers 12, 13, ..., 19. Find the value of $P(X > 17)$.
Select one:
a. 0.6
b. 1/3
c. 0.25
d. 3/8

6. Product codes of 1, 2 or 3 letters are equally likely. What is the mean of the number of letters in 50 codes?
a. 2
b. 20
c. 80
d. 100

7. Suppose that X has a discrete uniform distribution on the integers 2 to 5. Find V(4X).
Select one:
a. 12.3
b. 10
c. 4.47
d. 20
e. None of the other choices is correct

8. Product codes of 6, 7, 8 or 9 letters are equally likely. Which of the following statements are true?
(i) Standard deviation of the number of letters in one code is 1.25.
(ii) The probability of the event that the code has at least 7 letters is 0.5
Select one:
a. Both (i) and (ii)
b. None of the other choices is correct
c. (i) only
d. (ii) only

9. The thickness measurements of a coating process are uniform distributed with values 0.1, 0.14, 0.18, 0.16. Determine the standard deviation of the coating thickness for this process.
Select one:
a. 0.01
b. 0.03
c. 0.02
d. 0.0009
e. None of the other choices is correct

10. Suppose that X has a discrete uniform distribution on the integers 20 to 79. Which of the followings are true?
(i) $P(X > 41) = 13/20$
(ii) $E(10X) = 495$
Select one:
a. None of the other choices is correct
b. Both (i) and (ii)
c. (i) only
d. (ii) only

11. Suppose that X has a discrete uniform distribution on the integers 2 to 8. Which of the following are true?

(i) $E(4X) = 20$

(ii) $\sigma(X) = 4$

Select one:

a. Both (i) and (ii)

b. (ii) only

c. (i) only

d. None of the other choices is correct

EXERCISES FOR SECTION 3.6 (Binom-mean)

1. Find the mean for the binomial distribution which has the values of n = 33 and p = 0.2. Round answer to the nearest tenth.

Select one:
a. 6.9
b. 7.3
c. 6.1
d. 6.6

2. Find the mean for the binomial distribution which has the stated values of n = 20 and p = 3/5. Round answer to the nearest tenth.

Select one:
a. 12.7
b. 12.3
c. 12.0
d. 11.5

3. Find the standard deviation for the binomial distribution which has the stated values of n = 2661 and p = 0.63. Round your answer to the nearest hundredth.

Select one:
a. 24.91
b. 28.18
c. 22.50
d. 29.03

4. The probability that a house in an urban area will be burglarized is 15%. If 30 houses are randomly selected, what is the mean of the number of houses burglarized?
Select one:
a. 1
b. 4.5
c. 1.5
d. 2

5. According to a college survey, 12% of all students work full time. Find the mean for the number of students who work full time in samples of size 54.
Select one:
a. 4.00
b. 0.22
c. 3.52
d. 6.48

6. According to a college survey, 15% of all students work full time. Find the mean for the random variable X, the number of students who work full time in samples of size 42.
Select one:
a. 3.52
a. 3.52
c. 2.75
d. 4.00

7. A die is rolled 22 times and the number of times that two shows on the upper face is counted. If this experiment is repeated many times, find the mean for the number of twos.

Select one:

a. 1.67

b. 2.98

c. 3.67

d. 8.33

8. On a 50-question multiple choice test , each question has four possible answers, one of which is correct. For students who guess at all answers, find the mean for the random variable X, the number of correct answers.

Select one:

a. 22.5

b. 5

c. 2.5

d. 12.5

9. The probability that a person has immunity to a particular disease is 0.06. Find the mean for the random variable X, the number who have immunity in samples of size 106.

Select one:

a. 6.36

b. 10.4

c. 6.84

d. 15.6

10. The probability is 0.85 that a person shopping at a certain store will spend less than $20. For random samples of 82 customers, find the mean number of shoppers who spend less than $20.
Select one:
a. 19.6
b. 44.0
c. 69.7
d. 62.0

11. According to a CNN poll taken in February of 2008, 67% of respondents disapproved of the overall job that President Bush was doing. Based on this poll, for samples of size 140, what is the mean number of American adults who disapprove of the overall job that President Bush is doing?
Select one:
a. 134
b. 93.8
c. 67
d. 44.22

EXERCISES FOR SECTION 3.6 Binom-probability)

1. A salesperson knows that 20% of her presentations result in sales. Find the probabilities that in the next 60 presentations at least 9 result in sales.

Select one:

a. 0.6421

b. 0.8189

c. 0.8732

d. 0.1241

2. In a binomial distribution with 10 trials, which of the following is true?

Select one:

a. $P(x < 4) = P(x \geq 5) - P(x \geq 4)$

b. $P(3 \leq x \leq 5) = P(3 < x < 5)$

c. $P(x > 7) = P(x \geq 8)$

d. $P(x < 6) = 1 - P(x \geq 7)$

3. If the probability of a newborn child being female is 0.5, find the probability that in 50 births, 35 or more will be female.

a. 0.0033

b. 0.1841

c. 0.0606

d. 0.8059

3. Assume that a procedure yields a binomial distribution with a trial repeated 4 times. Use the binomial probability formula to find the probability of 3 successes given the probability 1/6 of success on a single trial.
Select one:
a. 0.0231
b. 0.0154
c. 0.0039
d. 0.0116

4. Assume that a procedure yields a binomial distribution with a trial repeated 12 times. Use the binomial probability formula to find the probability of 5 successes given the probability 0.25 of success on a single trial.
Select one:
a. 0.082
b. 0.103
c. 0.091
d. 0.027

5. Assume that a procedure yields a binomial distribution with a trial repeated 64 times. Use the binomial probability formula to find the probability of 3 successes given the probability 0.04 of success on a single trial.

6. Assume that a procedure yields a binomial distribution with a trial repeated 64 times. Use the binomial probability formula to find the probability of 3 successes given the probability 0.04 of success on a single trial.
Select one:
a. 0.221
b. 0.091
c. 0.139
d. 0.375

7. In a recent survey, 80% of the community favored building a police substation in their neighborhood. If 15 citizens are chosen, what is the probability that the number favoring the substation is more than 12?
Select one:
a. 0.1208
b. 0.6019
c. 0.398
d. 0.3518

8. In a recent survey, 95% of the community favored building a police substation in their neighborhood. If 50 citizens are chosen, what is the probability that the number favoring the substation is exactly 42?
Select one:
a. 0.6218
b. 0.0046
b. 0.0046
d. 0.0024

9. In a recent survey, 85% of the community favored building a police substation in their neighborhood. If 20 citizens are chosen, what is the probability that the number favoring the substation is exactly 12?
Select one:
a. 0.5501
b. 0.0059
c. 0.0046
d. 0.6218

10. A telemarketer found that there was a 1.5% chance of a sale from his phone solicitations. Find the probability of getting 28 or more sales for 1000 telephone calls.
Select one:
a. 0.0401
b. 0.8810
c. 0.0016

11. A card game is played in which the player wins if a face card is drawn (king, queen, jack) from a deck of 52 cards. If the player plays 10 times, what is the probability that the number of wins for the player is 5?
Select one:
a. 0.9868
b. 0.5821
c. 0.0444
d. 0.0132

EXERCISES FOR SECTION 3.7

1. The probability of a successful optical alignment in the assembly of an optical data storage product is 0.7. Assume the trials are independent. What is the probability that the first successful alignment requires exactly 4 trials?

a. 0.006
b. 0.103
c. 0.072
d. 0.019

2. The probability of a successful optical alignment in the assembly of an optical data storage product is 0.7. Assume the trials are independent. What is the probability that the first **two** successful alignments require exactly 4 trials?

Select one:
a. 0.132
b. 0.402
c. 0.005
d. 0.017

EXERCISES FOR SECTION 3.8

1. A batch contains 36 bacteria cells, in which 12 are not capable of cellular replication. Suppose you examine 7 bacteria cells selected at random, without replacement. What is the probability that exactly 3 of them are not capable of cellular replication?

Select one:
a. 0.83
b. 0.28
c. 0.17
d. 0.72

2. A batch contains 36 bacteria cells, in which 12 are not capable of cellular replication. Suppose you examine 7 bacteria cells selected at random, without replacement. What is the probability that exactly 3 of them are capable of cellular replication?

Select one:
a. 0.88
b. 0.72
c. 0.12
d. 0.28

EXERCISES FOR SECTION 3.9

1. The number of weeds that remain living after a specific chemical has been applied averages 1.21 per square yard and follows a Poisson distribution. Based on this, what is the probability that a 1 square yard section will contain less than 5 weeds?

Select one:
a. 0.0998
b. 0.5000
c. 0.6324
d. 0.9920

2. The manager of a movie theater has determined that the distribution of customers arriving at the concession stand is Poisson distributed with a standard deviation equal to 2 people per 10 minutes. If the servers can accommodate 3 customers in a 10-minute period, what is the probability that the servers will be idle for an entire ten minute period?

Select one:
a. 0.1353
b. 0.2135
c. 0.9807
d. 0.0183

3. If the standard deviation for a Poisson distribution is known to be 3, the expected value of that Poison distribution is:
Select one:
a. 9.
b. about 1.73.
c. 3.

4. The number of calls to an Internet service provider during the hour between 6:00 and 7:00 p.m. is described by a Poisson distribution with mean equal to 15. Given this information, what is the expected number of calls in the first 30 minutes?
Select one:
a. 7.5
b. 225
c. 3.87
d. 15

5. The number of customers that arrive at a fast-food business during a one-hour period is known to be Poisson distributed with a mean equal to 8.60. What is the probability that exactly 8 customers will arrive in a one-hour period?
a. 0.0065
b. 0.7832
c. 0.2073
d. 0.1366

Suppose X has a Poisson probability distribution with λ = 9.0. Find μ and δ.

6. Assume that x has a Poisson probability distribution. Find $P(x = 6)$ when $\mu = 1.0$.
Select one:
a. 0.0005
b. 0.0031
c. 0.9999
d. 1

7. Suppose X has a Poisson probability distribution with $\lambda = 9.0$ find μ and δ
Select one:
a. $\mu = 9.0, \sigma = 81.0$
b. a. $\mu = 9.0, \sigma = 3.0$
c. a. $\mu = 9.0, \sigma = 9.0$
d. a. $\mu = 3.0, \sigma = 3.0$

8. The number of visible defects on a product container is thought to be Poisson distributed with a mean equal to 4.3. Based on this, the probability that 2 containers will contain less than 2 defects is:
Select one:
a. 0.1359
b. 0.1850
c. 0.0073
d. 0.0018

9. An automobile service center can take care of 12 cars per hour. If cars arrive at the center randomly and independently at a rate of 8 per hour on average, what is the probability of the service center being totally empty in a given hour?Select one:
a. 0.1755
b. 0.0003
c. 0.0067
d. 0.2011

10. An automobile service center can take care of 12 cars per hour. If cars arrive at the center randomly and independently at a rate of 8 per hour on average, what is the probability of the service center being totally empty in a given hour?
Select one:
a. 0.1755
b. 0.2011
c. 0.0003
d. 0.0067

11. The Columbia Power Company experiences power failures with a mean of 0.120 per day. Use the Poisson Distribution to find the probability that there are exactly two power failures in a particular day.
Select one:
a. 0.006
b. 0.018
c. 0.085
d. 0.027