Name_____ Course Number:_____ Section Number:_____

Directions: Answer the questions in the spaces provided, or attach paper. Circle the correct choice for each response set. If required, show calculations in the blank spaces near the problems.

Provide an appropriate response.

1) A gambler claimed that he had loaded a die so that it would hardly ever come up 1. He said the outcomes of 1, 2, 3, 4, 5, 6 would have probabilities $\frac{1}{20}, \frac{1}{6}, \frac{1}{6}, \frac{1}{6}, \frac{1}{6}, \frac{1}{6}$

respectively. Can he do what he claimed? Why or why not? Is a probability distribution described by listing the outcomes along with their corresponding probabilities? Why or why not? Explain.

2) List the two requirements for a probability histogram. Discuss the relationship between the sum of the probabilities in a probability distribution and the total area represented by the bars in a probability histogram.

Find the mean of the given probability distribution.

3) A police department reports that the probabilities that 0, 1, 2, and 3 burglaries will be reported in a given day are 0.49, 0.44, 0.06, and 0.01, respectively.

    A) $\mu = 0.25$ B) $\mu = 1.08$ C) $\mu = 1.50$ D) $\mu = 0.59$

Provide an appropriate response. Round to the nearest hundredth.

4) The random variable x is the number of houses sold by a realtor in a single month at the Sendsom's Real Estate Office. Its probability distribution is as follows. Find the standard deviation for the probability distribution.

Houses Sold (x)	Probability P(x)
0	0.24
1	0.01
2	0.12
3	0.16
4	0.01
5	0.14
6	0.11
7	0.21

    A) $\sigma = 2.25$ B) $\sigma = 6.86$ C) $\sigma = 4.45$ D) $\sigma = 2.62$

Answer the question.

5) Suppose that voting in municipal elections is being studied and that the accompanying tables describes the probability distribution for four randomly selected people, where x is the number that voted in the last election. Is it unusual to find four voters among four randomly selected people?

x	P(x)
0	0.23
1	0.32
2	0.26
3	0.15
4	0.04

A) Yes   B) No

Assume that a researcher randomly selects 14 newborn babies and counts the number of girls selected, x. The probabilities corresponding to the 14 possible values of x are summarized in the given table. Answer the question using the table.

Probabilities of Girls

x(girls)	P(x)	x(girls)	P(x)	x(girls)	P(x)
0	0.000	5	0.122	10	0.061
1	0.001	6	0.183	11	0.022
2	0.006	7	0.209	12	0.006
3	0.022	8	0.183	13	0.001
4	0.061	9	0.122	14	0.000

6) Find the probability of selecting 9 or more girls.

A) 0.212   B) 0.122   C) 0.061   D) 0.001

Provide an appropriate response.

7) Suppose you buy 1 ticket for $1 out of a lottery of 1,000 tickets where the prize for the one winning ticket is to be $500. What is your expected value?

A) –$0.40   B) $0.00   C) –$0.50   D) –$1.00

Determine whether the given procedure results in a binomial distribution. If not, state the reason why.

8) Choosing 7 marbles from a box of 40 marbles (20 purple, 12 red, and 8 green) one at a time with replacement, keeping track of the number of red marbles chosen.

A) Not binomial: the trials are not independent.

B) Procedure results in a binomial distribution.

C) Not binomial: there are too many trials.

D) Not binomial: there are more than two outcomes for each trial.

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Assume that a procedure yields a binomial distribution with a trial repeated n times. Use the binomial probability formula to find the probability of x successes given the probability p of success on a single trial. Round to three decimal places.

   9) $n = 5$, $x = 2$, $p = 0.70$

     A) 0.198   B) 0.132   C) 0.700   D) 0.464

Find the indicated probability. Round to three decimal places.

   10) The participants in a television quiz show are picked from a large pool of applicants with approximately equal numbers of men and women. Among the last 10 participants there have been only 2 women. If participants are picked randomly, what is the probability of getting 2 or fewer women when 10 people are picked?

     A) 0.055   B) 0.044   C) 0.011   D) 0.054

Find the indicated probability.

   11) The brand name of a certain chain of coffee shops has a 59% recognition rate in the town of Coffleton. An executive from the company wants to verify the recognition rate as the company is interested in opening a coffee shop in the town. He selects a random sample of 10 Coffleton residents. Find the probability that the number that recognize the brand name is not 4.

     A) 0.000576   B) 0.0480   C) 0.121   D) 0.879

Find the mean, μ, for the binomial distribution which has the stated values of n and p. Round answer to the nearest tenth.

   12) $n = 1742$; $p = 0.57$

     A) $\mu = 1002.6$ B) $\mu = 985.4$ C) $\mu = 1000.2$ D) $\mu = 992.9$

Find the standard deviation, σ, for the binomial distribution which has the stated values of n and p. Round your answer to the nearest hundredth.

   13) $n = 50$; $p = 0.4$

     A) $\sigma = 3.46$ B) $\sigma = 7.58$ C) $\sigma = 6.73$ D) $\sigma = 1.05$

Use the given values of n and p to find the minimum usual value μ – 2σ and the maximum usual value μ + 2σ. Round your answer to the nearest hundredth unless otherwise noted.

   14) $n = 213$, $p = 0.10$

     A) Minimum: 30.06; maximum: 12.54   B) Minimum: 12.54; maximum: 30.06

     C) Minimum: –17.04; maximum: 59.64   D) Minimum: 16.92; maximum: 25.68

Solve the problem.

   15) The probability that a person has immunity to a particular disease is 0.4. Find the mean number who have immunity in samples of size 18.

     A) 0.4   B) 10.8   C) 7.2   D) 9.0

16) The probability that a radish seed will germinate is 0.7. A gardener plants seeds in batches of 20. Find the standard deviation for the number of seeds germinating in each batch.

    A) 17.6   B) 4.2   C) 2   D) 42

Determine if the outcome is unusual. Consider as unusual any result that differs from the mean by more than 2 standard deviations. That is, unusual values are either less than μ − 2σ or greater than μ + 2σ.

17) The Acme Candy Company claims that 60% of the jawbreakers it produces weigh more than .4 ounces. Suppose that 800 jawbreakers are selected at random from the production lines. Would it be unusual for this sample of 800 to contain 488 jawbreakers that weigh more than .4 ounces?

    A) Yes   B) No

18) A survey for brand recognition is done and it is determined that 68% of consumers have heard of Dull Computer Company. A survey of 800 randomly selected consumers is to be conducted. For such groups of 800, would it be unusual to get 484 consumers who recognize the Dull Computer Company name?

    A) Yes   B) No

Use the Poisson Distribution to find the indicated probability.

19) The town of Fastville has been experiencing a mean of 64.1 car accidents per year. Find the probability that on a given day the number of car accidents in Fastville is 0. (Assume 365 days in a year.)

    A) 0.109   B) 0.982   C) 0.738   D) 0.839

Find the indicated mean.

20) An insurance company in the town of Codrington sells life insurance. They are determining the premium for a $100,000 life insurance for a 50−year old woman. The probability that a 50−year old woman in Codrington survives the year is 0.9968. The company sells 1200 such policies to 50−year old females. The company will use the Poisson distribution to approximate the probability of various number of deaths during the year in this group of 1200 women. Find the mean of the appropriate Poisson distribution (the mean number of deaths in a year in such groups of 1200 females). Round your answer to the nearest hundredth.

    A) 3.84   B) 1196.16   C) 0.38   D) 38.4

1) No, he cannot do what he claimed. We are certain that one of the outcomes 1, 2, 3, 4, 5, or 6 must occur, so the sum of their probabilities must be 1.
The list of outcomes along with their corresponding probabilities does not describe a probability distribution because the sum of the probabilities is not 1.
2) The sum of the probabilities in a probability distribution must be 1 and each individual probability must be between 0 and 1, inclusive. The total area of the bars in a probability histogram is 1.
3) D
4) D
5) A
6) A
7) C
8) B
9) B
10) A
11) D
12) D
13) A
14) B
15) C
16) C
17) B
18) A
19) D
20) A