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) Helene claimed that the expected value when rolling a fair die was 3.5. Steve said that wasn't possible. He said that the expected value was the most likely value in a single roll of the die, and since it wasn't possible for a die to turn up with a value of 3.5, the expected value couldn't possibly be 3.5. Who is right? Explain.

2) Do probability distributions measure what did happen or what will probably happen? How do we use probability distributions to make decisions?

Find the mean of the given probability distribution.

3) The probabilities that a batch of 4 computers will contain 0, 1, 2, 3, and 4 defective computers are 0.4979, 0.3793, 0.1084, 0.0138, and 0.0007, respectively. Round answer to the nearest hundredth.

   A) $\mu = 1.14$ B) $\mu = 0.54$ C) $\mu = 2.00$ D) $\mu = 0.64$

Provide an appropriate response. Round to the nearest hundredth.

4) The probabilities that a batch of 4 computers will contain 0, 1, 2, 3, and 4 defective computers are 0.4979, 0.3793, 0.1084, 0.0138, and 0.0007, respectively. Find the standard deviation for the probability distribution.

   A) $\sigma = 0.73$ B) $\sigma = 0.54$ C) $\sigma = 0.97$ D) $\sigma = 0.68$

Answer the question.

5) Suppose that a law enforcement group studying traffic violations determines that the accompanying table describes the probability distribution for five randomly selected people, where x is the number that have received a speeding ticket in the last 2 years. Is it unusual to find no speeders among five randomly selected people?

x	P(x)
0	0.08
1	0.18
2	0.25
3	0.22
4	0.19
5	0.08

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 exactly 5 girls.

A) 0.001   B) 0.061   C) 0.022   D) 0.122

Provide an appropriate response.

7) In a game, you have a 1/33 probability of winning $121 and a 32/33 probability of losing $7. What is your expected value?

A) –$6.79   B) $3.67   C) $10.45   D) –$3.12

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

8) Choosing 5 people (without replacement) from a group of 34 people, of which 15 are women, keeping track of the number of men chosen.

A) Not binomial: the trials are not independent.

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

C) Procedure results in a binomial distribution.

D) Not binomial: there are too many trials.

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) $n = 4$, $x = 3$, $p = \dfrac{1}{6}$

    A) 0.012   B) 0.004   C) 0.015   D) 0.023

Find the indicated probability. Round to three decimal places.

10) In a study, 37% of adults questioned reported that their health was excellent. A researcher wishes to study the health of people living close to a nuclear power plant. Among 12 adults randomly selected from this area, only 3 reported that their health was excellent. Find the probability that when 12 adults are randomly selected, 3 or fewer are in excellent health.

    A) 0.120   B) 0.295   C) 0.174   D) 0.204

Find the indicated probability.

11) The brand name of a certain chain of coffee shops has a 53% 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 7 Coffleton residents. Find the probability that exactly 4 of the 7 Coffleton residents recognize the brand name.

    A) 0.00819   B) 0.287   C) 0.0789   D) 0.254

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

12) $n = 2142$; $p = 0.63$

    A) $\mu = 1349.5$ B) $\mu = 1353.2$ C) $\mu = 1341.0$ D) $\mu = 1344.2$

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) $n = 1622$; $p = 0.57$

    A) $\sigma = 23.21$ B) $\sigma = 17.53$ C) $\sigma = 24.06$ D) $\sigma = 19.94$

Use the given values of n and p to find the minimum usual value $\mu - 2\sigma$ and the maximum usual value $\mu + 2\sigma$. Round your answer to the nearest hundredth unless otherwise noted.

14) $n = 104$, $p = 0.21$

    A) Minimum: 17.69; maximum: 25.99   B) Minimum: −12.67; maximum: 56.35

    C) Minimum: 30.15; maximum: 13.53   D) Minimum: 13.53; maximum: 30.15

Solve the problem.

15) A company manufactures batteries in batches of 13 and there is a 3% rate of defects. Find the mean number of defects per batch.

    A) 0.4   B) 12.6   C) 3.9   D) 39

16) According to a college survey, 22% of all students work full time. Find the standard deviation for the number of students who work full time in samples of size 16.

    A) 3.5   B) 1.7   C) 2.6   D) 1.9

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 $\mu - 2\sigma$ or greater than $\mu + 2\sigma$.

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 409 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 537 consumers who recognize the Dull Computer Company name?

    A) Yes   B) No

Use the Poisson Distribution to find the indicated probability.

19) Sunita's job is to provide technical support to computer users. Suppose the arrival of calls can be modeled by a Poisson distribution with a mean of 4.7 calls per hour. What's the probability that in the next 10 minutes there will be 2 or more calls?

    A) 0.1005   B) 0.6421   C) 0.1852   D) 0.1402   E) 0.9482

Find the indicated mean.

20) The mean number of homicides per year in one city is 37.2. Suppose a Poisson distribution will be used to find the probability that on a given day there will be fewer than 4 homicides. Find the mean of the appropriate Poisson distribution (the mean number of homicides per day). Round your answer to four decimal places.

    A) 37.2   B) 0.102   C) 0.715   D) 9.3

1) Helene is right. The expected value is not the most likely value in a single trial, it is the mean value obtained from infinitely many trials. The expected value is the mean we would expect to get if the die could be rolled infinitely many times, which is 3.5.

2) Probability distributions measure what will probably happen. Probability distributions provide a theoretical model that is likely to occur. We can then compare actual outcomes to these results to make decisions.

3) D
4) A
5) B
6) D
7) D
8) A
9) C
10) B
11) B
12) A
13) D
14) D
15) A
16) B
17) A
18) B
19) C
20) B