Exam

Name_____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the problem.

1) A discrete random variable x can assume five possible values: 2, 3, 5, 8, 10. Its probability distribution is shown below. Find the probability for the value of x = 5. 1) _____

x	2	3	5	8	10
p(x)	0.10	0.20	???	0.30	0.10

A) 0.1 B) 0.2 C) 0.7 D) 0.3

2) The Fresh Oven Bakery knows that the number of pies it can sell varies from day to day. The owner believes that on 50% of the days she sells 100 pies. On another 25% of the days she sells 150 pies, and she sells 200 pies on the remaining 25% of the days. To make sure she has enough product, the owner bakes 200 pies each day at a cost of $2 each. Assume any pies that go unsold are thrown out at the end of the day. If she sells the pies for $5 each, find the probability distribution for her daily profit. 2) _____

A)

Profit	*P*(profit)
$500	.5
$750	.25
$1000	.25

B)

Profit	*P*(profit)
$300	.5
$450	.25
$600	.25

C)

Profit	*P*(profit)
$100	.5
$350	.25
$600	.25

D)

Profit	*P*(profit)
$300	.5
$550	.25
$800	.25

3) Consider the given discrete probability distribution. Find the probability that x equals 4. 3) _____

x	2	4	7	8
$P(x)$	0.24	?	0.28	0.01

A) 0.53 B) 0.47 C) 2.12 D) 1.88

4) Consider the given discrete probability distribution. Find $P(x > 3)$. 4) _____

x	1	2	3	4	5
$p(x)$	.1	.2	.2	.3	.2

A) .2 B) .3 C) .7 D) .5

5) A discrete random variable x can assume five possible values: 2, 3, 5, 8, 10. Its probability distribution is shown below. Find the probability that the random variable x is a value greater than 5. 5) _____

x	2	3	5	8	10
p(x)	0.10	0.20	0.30	0.30	0.10

A) 0.70 B) 0.60 C) 0.40 D) 0.30

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

6) Consider the given discrete probability distribution. Find $P(x = 1 \text{ or } x = 2)$. 6) _____

x	0	1	2	3	4	5
$p(x)$	.30	.25	.20	.15	.05	.05

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

7) A lab orders a shipment of 100 frogs each week. Prices for the weekly shipments of frogs follow the distribution below: 7) _____

Price	$10.00	$12.50	$15.00
Probability	0.3	0.4	0.3

How much should the lab budget for next year's frog orders assuming this distribution does not change? (Hint: Find the expected price and assume 52 weeks per year.)

A) $12.50 B) $650.00 C) $1250.00 D) $3,380,000.00

8) A local bakery has determined a probability distribution for the number of cheesecakes it sells in a given day. The distribution is as follows: 8) _____

Number sold in a day	0	5	10	15	20
Prob (Number sold)	0.06	0.2	0.13	0.08	0.53

Find the number of cheesecakes that this local bakery expects to sell in a day.

A) 14.16 B) 20 C) 10 D) 14.1

Answer the question True or False.

9) The expected value of a discrete random variable must be one of the values in which the random variable can result. 9) _____

A) True B) False

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Solve the problem.

10) An automobile insurance company estimates the following loss probabilities for the next year on a $25,000 sports car: 10) _____

Total loss:	0.001
50% loss:	0.01
25% loss:	0.05
10% loss:	0.10
No loss:	0.839

Assuming the company will sell only a $500 deductible policy for this model (i.e., the owner covers the first $500 damage), how much annual premium should the company charge in order to average $565 profit per policy sold?

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

11) A discrete random variable x can assume five possible values: 2, 3, 5, 8, 10. Its probability distribution is shown below. Find the mean of the distribution. 11) _____

x	2	3	5	8	10
p(x)	0.10	0.20	0.30	0.30	0.10

A) 5.7 B) 5.6 C) 5.0 D) 5.5

12) A lab orders a shipment of 100 frogs each week. Prices for the weekly shipments of frogs follow the distribution below: 12) _____

Price	$10.00	$12.50	$15.00
Probability	0.3	0.45	0.25

Suppose the mean cost of the frogs is $12.38 per week. Interpret this value.

A) Most of the weeks resulted in frog costs of $12.38.
B) The median cost for the distribution of frog costs is $12.38.
C) The average cost for all weekly frog purchases is $12.38.
D) The frog cost that occurs more often than any other is $12.38.

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

13) Calculate the mean for the discrete probability distribution shown here. 13) _____

X	2	6	9	14
$P(X)$	.2	.3	.3	.2

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

14) A recent article in the paper claims that business ethics are at an all–time low. Reporting on a recent sample, the paper claims that 41% of all employees believe their company president possesses low ethical standards. Suppose 20 of a company's employees are randomly and independently sampled and asked if they believe their company president has low ethical standards and their years of experience at the company. Could the probability distribution for the number of years of experience be modelled by a binomial probability distribution? 14) _____
A) Yes, the sample size is $n = 20$.
B) No, the employees would not be considered independent in the present sample.
C) Yes, the sample is a random and independent sample.
D) No, a binomial distribution requires only two possible outcomes for each experimental unit sampled.

15) A recent study suggested that 70% of all eligible voters will vote in the next presidential election. Suppose 20 eligible voters were randomly selected from the population of all eligible voters. Which of the following is necessary for this problem to be analyzed using the binomial random variable? 15) _____

I. There are two outcomes possible for each of the 20 voters sampled.
II. The outcomes of the 20 voters must be considered independent of one another.
III. The probability a voter will actually vote is 0.70, the probability they won't is 0.30.

A) II only B) III only C) I only D) I, II, and III

Answer the question True or False.

16) A binomial random variable is defined to be the number of units sampled until x successes is observed. 16) _____
A) True B) False

Solve the problem. Round to four decimal places.

17) If x is a binomial random variable, compute p(x) for n = 3, x = 1, q = 0.3. 17) _____
A) 0.1777 B) 0.4631 C) 0.1890 D) 0.4410

Solve the problem.

18) We believe that 90% of the population of all Business Statistics students consider statistics to be an exciting subject. Suppose we randomly and independently selected 23 students from the population and observed fewer than five in our sample who consider statistics to be an exciting subject. Make an inference about the belief that 90% of the students consider statistics to be an exciting subject. 18) _____
A) The 90% number is too low. The real percentage is higher than 90%.
B) The 90% number is exactly right.
C) The 90% number is too high. The real percentage is lower than 90%.
D) It is impossible to make any inferences about the 90% number based on this information.

19) A literature professor decides to give a 15–question true–false quiz. She wants to choose the passing grade such that the probability of passing a student who guesses on every question is less than .10. What score should be set as the lowest passing grade? 19) _____
A) 10 B) 11 C) 9 D) 12

20) A recent study suggested that 70% of all eligible voters will vote in the next presidential election. Suppose 20 eligible voters were randomly selected from the population of all eligible voters. Use a binomial probability table to find the probability that more than 10 but fewer than 16 of the 20 eligible voters sampled will vote in the next presidential election. 20) _____

A) 0.845 B) 0.714 C) 0.649 D) 0.780

21) If x is a binomial random variable, calculate μ for n = 30 and p = 0.7. 21) _____

A) 21 B) 2.1 C) 6.3 D) 15

22) We believe that 81% of the population of all Business Statistics students consider statistics to be an exciting subject. Suppose we randomly and independently selected 39 students from the population. How many of the sampled students do we expect to consider statistics to be an exciting subject? 22) _____

A) 33.82 B) 32.16 C) 31.59 D) 39

23) The number of road construction projects that take place at any one time in a certain city follows a Poisson distribution with a mean of 6. Find the probability that exactly three road construction projects are currently taking place in this city. 23) _____

A) 0.301168 B) 0.089235 C) 0.050409 D) 0.014936

24) The number of traffic accidents that occur on a particular stretch of road during a month follows a Poisson distribution with a mean of 8.8. Find the probability that fewer than three accidents will occur next month on this stretch of road. 24) _____

A) 0.992686 B) 0.007314 C) 0.975566 D) 0.024434

25) Suppose a Poisson probability distribution with $\lambda = 8.3$ provides a good approximation of the distribution of a random variable x. Find σ for x. 25) _____

A) 8.3 B) $\sqrt{8.3}$ C) 4.2 D) 68.89

Answer the question True or False.

26) The conditions for both the hypergeometric and the binomial random variables require that each trial results in one of two outcomes. 26) _____

A) True B) False

27) The conditions for both the hypergeometric and the binomial random variables require that the trials are independent. 27) _____

A) True B) False

Solve the problem.

28) Given that x is a hypergeometric random variable, compute $p(x)$ for $N = 6$, $n = 3$, $r = 3$, and $x = 1$. 28) _____

A) .45 B) .375 C) .125 D) .55

29) Given that x is a hypergeometric random variable with $N = 10$, $n = 5$, and $r = 6$, compute the mean of x. 29) _____

A) 4 B) 2 C) 1 D) 3

30) Suppose a man has ordered twelve 1–gallon paint cans of a particular color (lilac) from the local paint store in order to paint his mother's house. Unknown to the man, three of these cans contains an incorrect mix of paint. For this weekend's big project, the man randomly selects four of these 1–gallon cans to paint his mother's living room. Let x = the number of the paint cans selected that are defective. Unknown to the man, x follows a hypergeometric distribution. Find the mean of this distribution. 30) _____

A) 1 B) 3 C) 12 D) 4