

Discrete probability distributions

MULTIPLE CHOICE

1. A numerical description of the outcome of an experiment is called a
- descriptive statistic
 - probability function
 - variance
 - random variable

ANS: D

PTS: 1

TOP: Discrete Probability Distributions

2. A continuous random variable may assume
- any value in an interval or collection of intervals
 - only integer values in an interval or collection of intervals
 - only fractional values in an interval or collection of intervals
 - only the positive integer values in an interval

ANS: A

PTS: 1

TOP: Discrete Probability Distributions

3. An experiment consists of determining the speed of automobiles on a highway by the use of radar equipment. The random variable in this experiment is a
- discrete random variable
 - continuous random variable
 - complex random variable
 - simplex random variable

ANS: B

PTS: 1

TOP: Discrete Probability Distributions

4. The weight of an object is an example of
- a continuous random variable
 - a discrete random variable
 - either a continuous or a discrete random variable, depending on the weight of the object
 - either a continuous or a discrete random variable depending on the units of measurement

ANS: A

PTS: 1

TOP: Discrete Probability Distributions

5. A description of the distribution of the values of a random variable and their associated probabilities is called a
- probability distribution
 - random variance
 - random variable
 - expected value

ANS: A

PTS: 1

TOP: Discrete Probability Distributions

6. Which of the following is **not** a required condition for a discrete probability function?
- $f(x) \geq 0$ for all values of x
 - $\sum f(x) = 1$ for all values of x
 - $\sum f(x) = 0$ for all values of x
 - $\sum f(x) \geq 1$ for all values of x

ANS: C

PTS: 1

TOP: Discrete Probability Distributions

Exhibit 5-12

The police records of a metropolitan area kept over the past 300 days show the following number of fatal accidents.

Number of Fatal Accidents	Number of Days
0	45
1	75
2	120
3	45
4	15

7. Refer to Exhibit 5-12. What is the probability that in a given day there will be less than 3 accidents?
- a. 0.2
 - b. 120
 - c. 0.5
 - d. 0.8

ANS: D PTS: 1 TOP: Discrete Probability Distributions

8. Refer to Exhibit 5-12. What is the probability that in a given day there will be no accidents?
- a. 0.00
 - b. 1.00
 - c. 0.85
 - d. 0.15

ANS: D PTS: 1 TOP: Discrete Probability Distributions

9. Variance is
- a. a measure of the average, or central value of a random variable
 - b. a measure of the dispersion of a random variable
 - c. the square root of the standard deviation
 - d. the sum of the squared deviation of data elements from the mean

ANS: B PTS: 1 TOP: Discrete Probability Distributions

10. The standard deviation is the
- a. variance squared
 - b. square root of the sum of the deviations from the mean
 - c. same as the expected value
 - d. positive square root of the variance

ANS: D PTS: 1 TOP: Discrete Probability Distributions

11. A weighted average of the value of a random variable, where the probability function provides weights is known as
- a. a probability function
 - b. a random variable
 - c. the expected value
 - d. random function

ANS: C PTS: 1 TOP: Discrete Probability Distributions

12. The expected value of a discrete random variable
- a. is the most likely or highest probability value for the random variable
 - b. will always be one of the values x can take on, although it may not be the highest probability value for the random variable
 - c. is the average value for the random variable over many repeats of the experiment
 - d. None of these alternatives is correct.

ANS: C PTS: 1 TOP: Discrete Probability Distributions

13. X is a random variable with the probability function:

$$f(X) = X/6 \quad \text{for } X = 1, 2 \text{ or } 3$$

The expected value of X is

- a. 0.333
- b. 0.500
- c. 2.000
- d. 2.333

ANS: D PTS: 1 TOP: Discrete Probability Distributions

Exhibit 5-1

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

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

14. Refer to Exhibit 5-1. The probability of having a demand for at least two computers is
- a. 0.7
 - b. 0.3
 - c. 0.4
 - d. 1.0

ANS: A PTS: 1 TOP: Discrete Probability Distributions

Exhibit 5-3

Roth is a computer-consulting firm. The number of new clients that they have obtained each month has ranged from 0 to 6. The number of new clients has the probability distribution that is shown below.

Number of New Clients	Probability
0	0.05
1	0.10
2	0.15
3	0.35
4	0.20
5	0.10
6	0.05

15. Refer to Exhibit 5-3. The variance is
- 1.431
 - 2.047
 - 3.05
 - 21

ANS: B

PTS: 1

TOP: Discrete Probability Distributions

Exhibit 5-5

Probability Distribution

x	f(x)
10	.2
20	.3
30	.4
40	.1

16. Refer to Exhibit 5-5. The expected value of x equals
- 24
 - 25
 - 30
 - 100

ANS: A

PTS: 1

TOP: Discrete Probability Distributions

Exhibit 5-6

A sample of 2,500 people was asked how many cups of coffee they drink in the morning. You are given the following sample information.

Cups of Coffee	Frequency
0	700
1	900
2	600
3	300
	<u>2,500</u>

17. Refer to Exhibit 5-6. The expected number of cups of coffee is

- a. 1
- b. 1.2
- c. 1.5
- d. 1.7

ANS: B

PTS: 1

TOP: Discrete Probability Distributions

Exhibit 5-9

The probability distribution for the daily sales at Michael's Co. is given below.

Daily Sales (In \$1,000s)	Probability
40	0.1
50	0.4
60	0.3
70	0.2

18. Refer to Exhibit 5-9. The expected daily sales are

- a. \$55,000
- b. \$56,000
- c. \$50,000
- d. \$70,000

ANS: B

PTS: 1

TOP: Discrete Probability Distributions

Exhibit 5-10

The probability distribution for the number of goals the Lions soccer team makes per game is given below.

Number Of Goals	Probability
0	0.05
1	0.15
2	0.35
3	0.30
4	0.15

19. Refer to Exhibit 5-10. The expected number of goals per game is

a. 0
b. 1
c. 2, since it has the highest probability
d. 2.35

ANS: D

PTS: 1

TOP: Discrete Probability Distributions

20. Refer to Exhibit 5-10. What is the probability that in a given game the Lions will score less than 3 goals?

a. 0.85
b. 0.55
c. 0.45
d. 0.80

ANS: B

PTS: 1

TOP: Discrete Probability Distributions

Exhibit 5-11

A local bottling company has determined the number of machine breakdowns per month and their respective probabilities as shown below:

Number of Breakdowns	Probability
0	0.12
1	0.38
2	0.25
3	0.18
4	0.07

21. Refer to Exhibit 5-11. The expected number of machine breakdowns per month is

a. 2
b. 1.70
c. one, since it has the highest probability
d. at least 4

ANS: B

PTS: 1

TOP: Discrete Probability Distributions

22. Refer to Exhibit 5-11. The probability of no breakdowns in a month is
- a. 0.88
 - b. 0.00
 - c. 0.50
 - d. 0.12

ANS: D

PTS: 1

TOP: Discrete Probability Distributions

Exhibit 5-13

Oriental Reproductions, Inc. is a company that produces handmade carpets with oriental designs. The production records show that the monthly production has ranged from 1 to 5 carpets. The production levels and their respective probabilities are shown below.

Production Per Month	Probability
x	f(x)
1	0.01
2	0.04
3	0.10
4	0.80
5	0.05

23. Refer to Exhibit 5-13. The standard deviation for the production is
- a. 4.32
 - b. 3.74
 - c. 0.374
 - d. 0.612

ANS: D

PTS: 1

TOP: Discrete Probability Distributions

24. A probability distribution showing the probability of x successes in n trials, where the probability of success does not change from trial to trial, is termed a
- a. uniform probability distribution
 - b. binomial probability distribution
 - c. hypergeometric probability distribution
 - d. normal probability distribution

ANS: B

PTS: 1

TOP: Discrete Probability Distributions

25. Twenty percent of the students in a class of 100 are planning to go to graduate school. The standard deviation of this binomial distribution is
- a. 20
 - b. 16
 - c. 4
 - d. 2

ANS: C

PTS: 1

TOP: Discrete Probability Distributions

26. The binomial probability distribution is used with
- a continuous random variable
 - a discrete random variable
 - any distribution, as long as it is not normal
 - None of these alternatives is correct.

ANS: B PTS: 1 TOP: Discrete Probability Distributions

27. Which of the following is a characteristic of a binomial experiment?
- at least 2 outcomes are possible
 - the probability changes from trial to trial
 - the trials are independent
 - None of these alternatives is correct.

ANS: C PTS: 1 TOP: Discrete Probability Distributions

28. Assume that you have a binomial experiment with $p = 0.5$ and a sample size of 100. The expected value of this distribution is
- 0.50
 - 0.30
 - 100
 - 50

ANS: D PTS: 1 TOP: Discrete Probability Distributions

29. The standard deviation of a binomial distribution is
- $\sigma(x) = P(1 - P)$
 - $\sigma(x) = nP$
 - $\sigma(x) = nP(1 - P)$
 - None of these alternatives is correct.

ANS: D PTS: 1 TOP: Discrete Probability Distributions

30. The variance for the binomial probability distribution is
- $\text{var}(x) = P(1 - P)$
 - $\text{var}(x) = nP$
 - $\text{var}(x) = n(1 - P)$
 - $\text{var}(x) = nP(1 - P)$

ANS: D PTS: 1 TOP: Discrete Probability Distributions

31. Assume that you have a binomial experiment with $p = 0.4$ and a sample size of 50. The variance of this distribution is
- 20
 - 12
 - 3.46
 - 144

ANS: B PTS: 1 TOP: Discrete Probability Distributions

Exhibit 5-2

The student body of a large university consists of 60% female students. A random sample of 8 students is selected.

32. Refer to Exhibit 5-2. What is the probability that among the students in the sample exactly two are female?
- a. 0.0896
 - b. 0.2936
 - c. 0.0413
 - d. 0.0007

ANS: C

PTS: 1

TOP: Discrete Probability Distributions

33. Refer to Exhibit 5-2. What is the probability that among the students in the sample at least 6 are male?
- a. 0.0413
 - b. 0.0079
 - c. 0.0007
 - d. 0.0499

ANS: D

PTS: 1

TOP: Discrete Probability Distributions

Exhibit 5-4

Forty percent of all registered voters in a national election are female. A random sample of 5 voters is selected.

34. Refer to Exhibit 5-4. The probability that there are no females in the sample is
- a. 0.0778
 - b. 0.7780
 - c. 0.5000
 - d. 0.3456

ANS: A

PTS: 1

TOP: Discrete Probability Distributions

Exhibit 5-7

The probability that Pete will catch fish when he goes fishing is .8. Pete is going to fish 3 days next week. Define the random variable X to be the number of days Pete catches fish.

35. Refer to Exhibit 5-7. The probability that Pete will catch fish on one day or less is
- a. .008
 - b. .096
 - c. .104
 - d. .8

ANS: C

PTS: 1

TOP: Discrete Probability Distributions

36. Refer to Exhibit 5-7. The variance of the number of days Pete will catch fish is
- a. .16
 - b. .48
 - c. .8
 - d. 2.4

ANS: B

PTS: 1

TOP: Discrete Probability Distributions