

## Discrete probability distributions

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### 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.

<b>Number of New Clients</b>	<b>Probability</b>
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

- a. 1.431
- b. 2.047
- c. 3.05
- d. 21

ANS: B

PTS: 1

TOP: Discrete Probability Distributions

**Exhibit 5-5**

Probability Distribution

<b>x</b>	<b>f(x)</b>
10	.2
20	.3
30	.4
40	.1

16. Refer to Exhibit 5-5. The expected value of x equals

- a. 24
- b. 25
- c. 30
- d. 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
- 0
  - 1
  - 2, since it has the highest probability
  - 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?
- 0.85
  - 0.55
  - 0.45
  - 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
- 2
  - 1.70
  - one, since it has the highest probability
  - 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 x	Probability 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