***Business Analytics, 2e, GE* (Evans)**

**Chapter 5 Probability Distributions and Data Modeling**

1) Which of the following is true about the classical definition of probability?

A) It is based on judgment and experience.

**B) If the process that generates the outcomes is known, probabilities can be deduced from theoretical arguments.**

C) The probability that an outcome will occur is simply the relative frequency associated with that outcome.

D) It is based on observed data.

Answer: B

Diff: 1

Blooms: Knowledge

Topic: Basic Concepts of Probability

LO1: Explain the concept of probability and provide examples of the three definitional perspectives of probability.

LO2: Identify and apply the basic concepts and tools of probability

2) John and Mike were offered mints. What is the probability that at least John or Mike would respond favorably? (Hint: Use the classical definition).

A) 

B) 

**C) **

D) 

Answer: C

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: Basic Concepts of Probability

LO1: Use probability rules and formulas to perform probability calculations.

LO2: Identify and apply the basic concepts and tools of probability

**3) Consider an event X comprised of three outcomes whose probabilities are , , and . Compute the probability of the complement of the event.**

**A) **

B) 

C) 

D) 

Answer: A

Diff: 3

Blooms: Apply

AACSB: Analytic Skills

Topic: Basic Concepts of Probability

LO1: Use probability rules and formulas to perform probability calculations.

LO2: Identify and apply the basic concepts and tools of probability

Use the data given below to answer the following question(s).

In an event *X,* the probability of rolling a sum of 8 on two dice is  while the probability of rolling an 11 is. In another event Y, the probability of rolling a 2 is , the probability of rolling a 9 is , and the probability of rolling a 4 is .

4) What is the probability that either event X or Y occurs?

A) 

B) 

C) 

D) 

Answer: B

Diff: 3

Blooms: Apply

AACSB: Analytic Skills

Topic: Basic Concepts of Probability

LO1: Use probability rules and formulas to perform probability calculations.

LO2: Identify and apply the basic concepts and tools of probability

5) What is probability that neither X nor Y will occur?

A) 

B) 

C) 

D) 

Answer: D

Diff: 3

Blooms: Apply

AACSB: Analytic Skills

Topic: Basic Concepts of Probability

LO1: Use probability rules and formulas to perform probability calculations.

LO2: Identify and apply the basic concepts and tools of probability

6) Consider an event Z that includes all outcomes of rolling two dice whose sum is odd. What is the probability that either event Y or Z occurs?

A) 

B) 

C) 

D) 

Answer: B

Diff: 3

Blooms: Apply

AACSB: Analytic Skills

Topic: Basic Concepts of Probability

LO1: Use probability rules and formulas to perform probability calculations.

LO2: Identify and apply the basic concepts and tools of probability

7) Which of the following computes the probability of an event P given that event Q is known to have occurred?

**A) *P(P|Q) = P(P and Q) / P(Q)***

B) *P(Q|P) = P(Q) - P(P)*

C) *P(P|Q) = P(Q) - P(P or Q)*

D) *P(Q|P) = P(P or Q) - P(Q)*

Answer: A

Diff: 1

Blooms: Knowledge

Topic: Basic Concepts of Probability

LO1: Explain conditional probability and how it can be applied in a business context.

LO2: Identify and apply the basic concepts and tools of probability

Use the data given below to answer the following question(s).

15 students were asked to choose between the broad categories of Arts, Science, and Math as their preferred area of study.

|  |  |  |
| --- | --- | --- |
| **Respondent** | **Gender** | **Preference** |
| 1 | Female | Arts |
| 2 | Male | Science |
| 3 | Male | Math |
| 4 | Female | Arts |
| 5 | Female | Math |
| 6 | Male | Science |
| 7 | Male | Math |
| 8 | Male | Math |
| 9 | Female | Arts |
| 10 | Male | Arts |
| 11 | Male | Science |
| 12 | Female | Science |
| 13 | Female | Math |
| 14 | Male | Arts |
| 15 | Female | Arts |

8) What is the probability that a respondent is male and prefers Arts?

A) 

B) 

C) 

D) 

Answer: C

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: Basic Concepts of Probability

LO1: Use probability rules and formulas to perform probability calculations.

LO2: Identify and apply the basic concepts and tools of probability

9) What is the probability that a respondent prefers Science given that the respondent is female?

A) 

B) 

C) 

D) 

Answer: B

Diff: 2

Blooms: Apply

AACSB: Analytic Skills

Topic: Basic Concepts of Probability

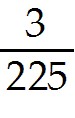
LO1: Use probability rules and formulas to perform probability calculations.

LO2: Identify and apply the basic concepts and tools of probability

10) Use the multiplication law of probability to compute the probability that the respondent is male and prefers Math.

A) 

B) 

C) 

**D) **

Answer: D

Diff: 3

Blooms: Apply

AACSB: Analytic Skills

Topic: Basic Concepts of Probability

LO1: Apply the multiplication law of probability.

LO2: Identify and apply the basic concepts and tools of probability

11) Identify the correct statement from the following.

**A) The events that a respondent is female and chooses Math are not independent.**

B) All events are independent of each other.

C) The events that a respondent is male and chooses Science are not dependent.

D) The events that a respondent is female and that she chooses Science are independent.

Answer: A

Diff: 3

Blooms: Apply

AACSB: Analytic Skills

Topic: Basic Concepts of Probability

LO1: Determine if two events are independent using probability arguments.

LO2: Identify and apply the basic concepts and tools of probability

12) Which of the following will hold true if events X and Y are independent?

A) *P(X) = P(Y) × P(X and Y)*

B) *P(Y) = P(X|Y)*

C) *P(X and Y) = [P(X) + P(Y)] - P(X or Y)*

D) *P(X) = P(X|Y)*

Answer: D

Diff: 2

Blooms: Knowledge

Topic: Basic Concepts of Probability

LO1: Determine if two events are independent using probability arguments.

LO2: Identify and apply the basic concepts and tools of probability

13) Which of the following is a continuous random variable?

A) the outcomes of rolling two dice

**B) the time to complete a specific task**

C) the number of new hires in a year

D) the number of hits on a Web site link

Answer: B

Diff: 2

Blooms: Understand

Topic: Random Variables and Probability Distributions

LO1: Explain the difference between a discrete and a continuous random variable.

LO2: Identify and apply the basic concepts and tools of probability

14) While rolling two dice, what is the probability of rolling a sum of 7 or more?

A) 

B) 

C) 

D) 

Answer: A

Diff: 3

Blooms: Apply

AACSB: Analytic Skills

Topic: Discrete Probability Distributions

LO1: Use the cumulative distribution function to compute probabilities over intervals.

LO2: Explain the characteristics and applications of discrete probability distributions

15) The \_\_\_\_\_\_\_\_ of a random variable corresponds to the notion of the mean, or average, for a sample.

A) mode

B) variance

**C) expected value**

D) standard deviation

Answer: C

Diff: 1

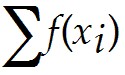
Blooms: Knowledge

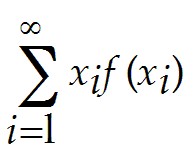
Topic: Discrete Probability Distributions

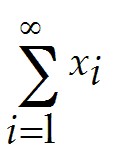
LO1: Compute the expected value and variance of a discrete random variable.

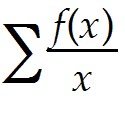
LO2: Explain the characteristics and applications of discrete probability distributions

16) For a discrete random variable X, which of the following computes the expected value?

A) 

B) 

C) 

D) 

Answer: B

Diff: 1

Blooms: Knowledge

Topic: Discrete Probability Distributions

LO1: Compute the expected value and variance of a discrete random variable.

LO2: Explain the characteristics and applications of discrete probability distributions

17) Which of the following is a weighted average of the squared deviations from the expected value?

A) skewness

B) mean difference

C) kurtosis

**D) variance**

Answer: D

Diff: 1

Blooms: Knowledge

Topic: Discrete Probability Distributions

LO1: Compute the expected value and variance of a discrete random variable.

LO2: Explain the characteristics and applications of discrete probability distributions

18) Which of the following formulas will compute the variance of a discrete random variable X?

A)

B)

**C)**

D)

Answer: C

Diff: 1

Blooms: Knowledge

Topic: Discrete Probability Distributions

LO1: Compute the expected value and variance of a discrete random variable.

LO2: Explain the characteristics and applications of discrete probability distributions

19) Which of the following is true about variance?

**A) It measures the uncertainty of a random variable.**

B) Higher variance implies low uncertainty.

C) It is the square root of a random variable's standard deviation.

D) It is the weighted average of all possible outcomes.

Answer: A

Diff: 2

Blooms: Understand

Topic: Discrete Probability Distributions

LO1: Compute the expected value and variance of a discrete random variable.

LO2: Explain the characteristics and applications of discrete probability distributions

20) Which of the following characterizes a random variable having two possible outcomes, each with a constant probability of occurrence?

A) Beta distribution

**B) Bernoulli distribution**

C) Poisson distribution

D) Binominal distribution

Answer: B

Diff: 1

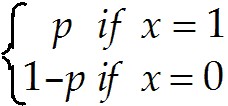
Blooms: Knowledge

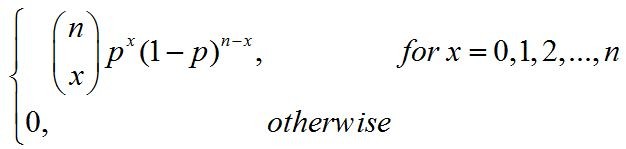
Topic: Discrete Probability Distributions

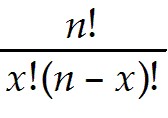
LO1: Calculate probabilities for the Bernoulli, binomial, and Poisson distributions, using the probability mass function and Excel functions.

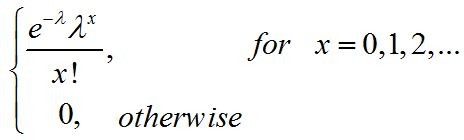
LO2: Explain the characteristics and applications of discrete probability distributions

21) Which of the following is the probability mass function of the Bernoulli distribution?

A) 

B)

C) 

D)

Answer: B

Diff: 1

Blooms: Knowledge

Topic: Discrete Probability Distributions

LO1: Calculate probabilities for the Bernoulli, binomial, and Poisson distributions, using the probability mass function and Excel functions.

LO2: Explain the characteristics and applications of discrete probability distributions

22) The binominal distribution:

A) is a discrete distribution used to model the number of occurrences in some unit of measure.

B) assumes that the average number of occurrences per unit is a constant and that occurrences are independent.

C) is symmetric irrespective of the value of the probability of success.

**D) models*n* independent replications of a Bernoulli experiment, each with a probability *p* of** success.

Answer: D

Diff: 2

Blooms: Understand

Topic: Discrete Probability Distributions

LO1: Calculate probabilities for the Bernoulli, binomial, and Poisson distributions, using the probability mass function and Excel functions.

LO2: Explain the characteristics and applications of discrete probability distributions

23) Which of the following is true of the binomial distribution?

A) The expected value of the binomial distribution is *np(1 - p)*, where *n* is the number of experiments and *p* is the probability of success.

**B) The binomial distribution can assume different shapes and amounts of skewness, depending on the parameters.**

C) In Excel's binomial distribution function, setting *cumulative* to TRUE will provide the probability mass function for a specified value.

D) The expected value of the binomial distribution is λ, a constant.

Answer: B

Diff: 2

Blooms: Understand

Topic: Discrete Probability Distributions

LO1: Calculate probabilities for the Bernoulli, binomial, and Poisson distributions, using the probability mass function and Excel functions.

LO2: Explain the characteristics and applications of discrete probability distributions

Use the data given below to answer the following question(s).

On an average, the number of students that choose to study Arts subjects at Greyin Tide University is 17 each year. (Hint: Use Poisson distribution formula).

24) What is the probability that exactly 13 students will take up Arts in the coming year?

A) 0.08795

B) 0.20087

C) 0.04798

**D) 0.06585**

Answer: D

Diff: 3

Blooms: Apply

AACSB: Analytic Skills

Topic: Discrete Probability Distributions

LO1: Calculate probabilities for the Bernoulli, binomial, and Poisson distributions, using the probability mass function and Excel functions.

LO2: Explain the characteristics and applications of discrete probability distributions

25) What is the probability of 8 takers or less for Arts subjects in the coming year?

A) 0.00716

B) 0.01260

C) 0.03164

D) 0.04744

Answer: B

Diff: 3

Blooms: Apply

AACSB: Analytic Skills

Topic: Discrete Probability Distributions

LO1: Calculate probabilities for the Bernoulli, binomial, and Poisson distributions, using the probability mass function and Excel functions.

LO2: Explain the characteristics and applications of discrete probability distributions

26) A probability density function:

A) is the probability distribution of discrete outcomes.

B) suggests that the probability that a random variable assumes a specific value must be positive.

**C) characterizes outcomes of a continuous random variable.**

D) can yield negative values depending on the values of the random variable, *X*.

Answer: C

Diff: 1

Blooms: Knowledge+

Topic: Continuous Probability Distributions

LO1: List the key properties of probability density functions.

LO2: Explain the characteristics and applications of continuous probability distributions

27) Which of the following is true about probability density functions?

A) A graph of the density function must lie at or below the x-axis.

B) The total area under the density function below the x-axis is 2.0.

C) It calculates the probability of a random variable lying withina certain interval.

D) *P (a)* x *P (b)* is the area under the density function between two numbers a and b.

Answer: C

Diff: 2

Blooms: Understand

Topic: Continuous Probability Distributions

LO1: List the key properties of probability density functions.

LO2: Explain the characteristics and applications of continuous probability distributions

28) Which of the following characterizes a continuous random variable for which all outcomes between some minimum and maximum value are equally likely?

A) exponential distribution

B) uniform distribution

C) normal distribution

D) lognormal distribution

Answer: B

Diff: 1

Blooms: Knowledge

Topic: Continuous Probability Distributions

LO1: Use the probability density and cumulative distribution functions to calculate probabilities for a uniform distribution.

LO2: Explain the characteristics and applications of continuous probability distributions

29) Which of the following is true of normal distributions?

A) The mean, median, and mode are all equal.

B) Its measure of skewness is always greater than 1.

C) The range of the random variable *X* is bounded.

D) Mathematical formulas make it easier to compute normal distributions.

Answer: A

Diff: 2

Blooms: Remember

Topic: Continuous Probability Distributions

LO1: Describe the normal and standard normal distributions and use Excel functions to calculate probabilities.

LO2: Explain the characteristics and applications of continuous probability distributions

30) The exponential distribution:

A) has the density function *f* (*x) =* e-λ*x* , *forx* ≥ 0.

B) models the time between randomly occurring events.

C) has an expected value λ.

D) is described by the familiar bell-shaped curve.

Answer: B

Diff: 2

Blooms: Knowledge

Topic: Continuous Probability Distributions

LO1: Describe properties of the exponential distribution and compute probabilities.

LO2: Explain the characteristics and applications of continuous probability distributions

31) Which of the following distributions is appropriate when the probability of zero is very low, but the most likely value is just greater than zero?

A) triangular distribution

B) exponential distribution

C) lognormal distribution

D) beta distribution

Answer: C

Diff: 1

Blooms: Knowledge

Topic: Continuous Probability Distributions

LO1: Give examples of other types of distributions used in business applications.

LO2: Explain the characteristics and applications of continuous probability distributions

32) Which of the following is true of the parameters of a beta distribution function?

A) The parameters of the distribution function, α and β, can be negative.

B) The values of the parameters do not affect the skewness of the distribution.

C) If either parameter is 1.0 and the other is lesser than 1.0, the distribution takes an "L" shape.

D) If the parameter β exceeds the other parameter α, the distribution is positively skewed.

Answer: D

Diff: 2

Blooms: Remember

Topic: Continuous Probability Distributions

LO1: Give examples of other types of distributions used in business applications.

LO2: Explain the characteristics and applications of continuous probability distributions

33) Which of the following is true about the *Random Number Generation* tool?

A) The *Random Number Generation* dialog presents only three distributions to choose from: beta, lognormal, and triangular.

B) The default distribution in this tool is the continuous distribution.

C) Repeating the process generates a new set of sample values.

D) Pressing the recalculation (F9) key is an easy way to change the values generated.

Answer: C

Diff: 2

Blooms: Understand

Topic: Random Sampling from Probability Distributions

LO1: Use Excel's Random Number Generation tool.

LO2: Use a modern software tool to perform statistical calculations.

34) Which of the following is true about using sample data?

A) All samples have the same characteristics and hence always adequately represent the underlying population.

B) It can limit the ability to predict uncertain events that may occur because potential values outside the range of the sample data are not included.

C) It is better to use sample data than trying to identify the underlying probability distribution and fitting a theoretical distribution to it.

D) Using sample data in a decision model increases the ability to predict uncertain events.

Answer: B

Diff: 2

Blooms: Understand

Topic: Data Modeling and Distribution Fitting

LO1: Fit distributions using Analytic Solver Platform.

LO2: Use a modern software tool to perform statistical calculations.

35) The Kolmogorov-Smirnov procedure:

A) compares the cumulative distribution of the data with the theoretical distribution to base its conclusion.

B) puts more weight on the differences between the tails of the distributions.

C) breaks down the theoretical distribution into areas of equal probability and compares the data points within each area to the number that would be expected for that distribution.

D) is useful when a better fit is needed at the extreme tails of the distribution.

Answer: A

Diff: 1

Blooms: Knowledge

Topic: Data Modeling and Distribution Fitting

LO1: Fit distributions using Analytic Solver Platform.

LO2: Identify and apply the basic concepts and tools of probability

Use the data given below to answer the following question(s).

At a casino, a combination of two spinners is used to decide the winner based on the sum of scores from spinning. The spinners each have four colored spaces - red, yellow, blue, and green. Red = 1, Yellow = 2, Blue = 3, and Green = 4

36) What is the probability that the spinners land on colors summing up to exactly 3?

Answer: There are 16 outcomes. The following is a breakdown of all possible sums and their frequencies.

|  |  |  |  |
| --- | --- | --- | --- |
| Outcome *x* | Frequency | f(x) | F(x) |
| 2 | 1 | 0.0625 | 0.0625 |
| 3 | 2 | 0.1250 | 0.1875 |
| 4 | 3 | 0.1875 | 0.3750 |
| 5 | 4 | 0.2500 | 0.6250 |
| 6 | 3 | 0.1875 | 0.8125 |
| 7 | 2 | 0.1250 | 0.9375 |
| 8 | 1 | 0.0625 | 1.0000 |

The probability that the spinners land on colors summing up to exactly 3 = 0.1250

Diff: 1

Blooms: Apply

AACSB: Analytic Skills

Topic: Discrete Probability Distributions

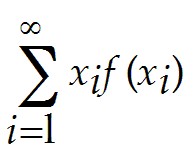
LO1: Calculate probabilities for the Bernoulli, binomial, and Poisson distributions, using the probability mass function and Excel functions.

LO2: Explain the characteristics and applications of discrete probability distributions

37) Compute the expected value of the random variable that denotes the possible summed scores from the

two spinners.

Answer: For a discrete random variable *X*, the expected value, denoted *E*[*X*], is the weighted average of all possible outcomes, where the weights are the probabilities:

*E*[*X*] =

|  |  |  |  |
| --- | --- | --- | --- |
| Outcome, *x* | Frequency | Probability, f(x) | xf(x) |
| 2 | 1 | 1/16 | 1/8 |
| 3 | 2 | 1/8 | 3/8 |
| 4 | 3 | 3/16 | 3/4 |
| 5 | 4 | 1/4 | 5/4 |
| 6 | 3 | 3/16 | 9/8 |
| 7 | 2 | 1/8 | 7/8 |
| 8 | 1 | 1/16 | 1/2 |
|  |  | Expected value | 5 |

Diff: 3

Blooms: Apply

AACSB: Analytic Skills

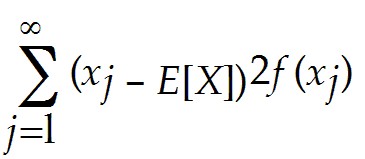
Topic: Discrete Probability Distributions

LO1: Compute the expected value and variance of a discrete random variable.

LO2: Explain the characteristics and applications of discrete probability distributions

38) Compute the variance of the random variable that denotes the possible summed scores from the two spinners.

Answer: The variance, Var[*X*], of a discrete random variable *X* as a weighted average of the squared deviations from the expected value:

*Var*[*X*] =

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Outcome,  *x* | Probability, f(x) | xf(x) | (x-E[X]) | (x-E[X])2 | (x-E[X])2f(x) |
| 2 | 1/16 | 1/8 | -3 | 9 | 9/16 |
| 3 | 1/8 | 3/8 | -2 | 4 | 1/2 |
| 4 | 3/16 | 3/4 | -1 | 1 | 3/16 |
| 5 | 1/4 | 5/4 | 0 | 0 | 0 |
| 6 | 3/16 | 9/8 | 1 | 1 | 3/16 |
| 7 | 1/8 | 7/8 | 2 | 4 | 1/2 |
| 8 | 1/16 | 1/2 | 3 | 9 | 9/16 |
|  | Expected Value | 5 |  | Variance | 2 1/2 |

Diff: 3

Blooms: Apply

AACSB: Analytic Skills

Topic: Discrete Probability Distributions

LO1: Compute the expected value and variance of a discrete random variable.

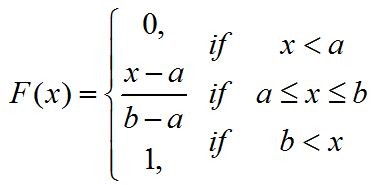
LO2: Explain the characteristics and applications of discrete probability distributions

Use the data given below to answer the following question(s).

The profit from selling folding tables varies uniformly each quarter between $1,500 and $2,300.

39) What is the probability that profit will be less than $1,900?

Answer:



F(1,900) = (1,900 - 1,500) / (2,300 - 1,500) = 0.50

Diff: 3

Blooms: Apply

AACSB: Analytic Skills

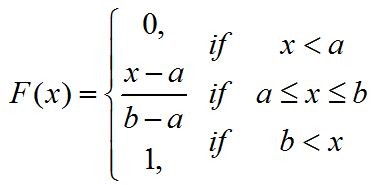
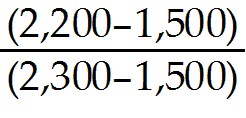
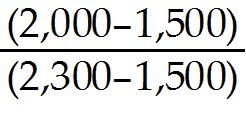
Topic: Continuous Probability Distributions

LO1: Use the probability density and cumulative distribution functions to calculate probabilities for a uniform distribution.

LO2: Explain the characteristics and applications of continuous probability distributions

40) What is the probability that profit will be between $2,000 and $2,200?

Answer: P(2,000 ≤ X ≤ 2,200) = P(X ≤ 2,200) - P(X ≤ 2,000) = F(2,200) - F(2,000)

Since quarterly profit here follows a uniform distribution, where a = $1,500 and b = $2,300, the probability that profit will be between $2,000 and $2,200 =  -  = 0.25

Diff: 3

Blooms: Apply

AACSB: Analytic Skills

Topic: Continuous Probability Distributions

LO1: Use the probability density and cumulative distribution functions to calculate probabilities for a uniform distribution.

LO2: Explain the characteristics and applications of continuous probability distributions

**41) If P(X|Y) = P(X), it implies that event Y is dependent on event X.**

**Answer: FALSE**

Diff: 1

Blooms: Knowledge

Topic: Basic Concepts of Probability

LO1: Determine if two events are independent using probability arguments.

LO2: Identify and apply the basic concepts and tools of probability

**42) The expected value and variance of the Poisson distribution are equal to λ.**

**Answer: TRUE**

Diff: 1

Blooms: Knowledge

Topic: Discrete Probability Distributions

LO1: Calculate probabilities for the Bernoulli, binomial, and Poisson distributions, using the probability mass function and Excel functions.

LO2: Explain the characteristics and applications of discrete probability distributions

**43) The Excel function NORM.DIST finds probabilities for the standard normal distribution.**

**Answer: FALSE**

Diff: 1

Blooms: Knowledge

Topic: Continuous Probability Distributions

LO1: Describe the normal and standard normal distributions and use Excel functions to calculate probabilities.

LO2: Explain the characteristics and applications of continuous probability distributions

**44) The beta distribution is a function of three parameters, the minimum, *a*; maximum, *b*; and most likely, *c*.**

**Answer: FALSE**

Diff: 1

Blooms: Knowledge

Topic: Continuous Probability Distributions

LO1: Give examples of other types of distributions used in business applications.

LO2: Explain the characteristics and applications of continuous probability distributions

**45) The VLOOKUP function in Excel can be used to generate outcomes from any discrete distribution.**

**Answer: TRUE**

Diff: 1

Blooms: Knowledge

Topic: Random Sampling from Probability Distributions

LO1: Sample from discrete distributions in a spreadsheet using VLOOKUP.

LO2: Use a modern software tool to perform statistical calculations.

46) How are probability, experiment, outcome, and sample space related to each other?

**Answer: Probability is the likelihood that an outcome will occur. An experiment is a process that results in an outcome. The outcome of an experiment is a result that is observed. The collection of all possible outcomes of an experiment is called the sample space.**

Diff: 1

Blooms: Knowledge

Topic: Basic Concepts of Probability

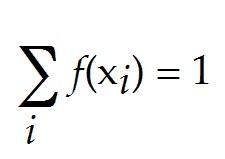
LO1: Explain the concept of probability and provide examples of the three definitional perspectives of probability.

LO2: Identify and apply the basic concepts and tools of probability

47) What are the properties of a probability mass function?

**Answer: A probability mass function has the properties that (1) the probability of each outcome must be between 0 and 1 and (2) the sum of all probabilities must add to 1; that is,**

**0 ≤ *f(*x*i*) ≤ 1, for all *i***



Diff: 2

Blooms: Understand

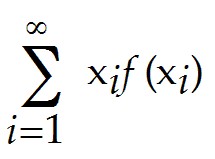
Topic: Discrete Probability Distributions

LO1: Verify the properties of a probability mass function.

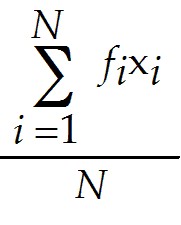
LO2: Explain the characteristics and applications of discrete probability distributions

48) Explain the similarity between the formulas for computing population mean and expected value of discrete random variable X.

Answer: For a discrete random variable *X*, the expected value, denoted *E*[*X*], is the weighted average of all possible outcomes, where the weights are the probabilities:



The population mean can be computed using the formula:

*μ =* 

If this formula is written as the sum of *xi* multiplied by *(fi/ N),* then *fi / N* can be thought of as the probability of *xi*. Then this expression for the mean has the same basic form as the expected value formula.

Diff: 2

Blooms: Understand

Topic: Discrete Probability Distributions

LO1: Compute the expected value and variance of a discrete random variable.

LO2: Explain the characteristics and applications of discrete probability distributions

49) How can normal probabilities be computed using Excel? Given the cumulative probability, how can the value of the random variable be found?

Answer: **The Excel 2010 function NORM.DIST(*x, mean, standard\_deviation, cumulative*)** computes normal probabilities. NORM.DIST(*x, mean, standard\_deviation, TRUE*) calculates the cumulative probability F *(x)* = P (X ≤ *x*) for a specified mean and standard deviation. The Excel function NORM.INV(*probability, mean, standard\_dev*) can be used to compute the value of *x* if the cumulative probability is known. In this function, *probability* is the cumulative probability value corresponding to the value of *x* which is sought.

Diff: 2

Blooms: Understand

Topic: Continuous Probability Distributions

LO1: Describe the normal and standard normal distributions and use Excel functions to calculate probabilities.

LO2: Explain the characteristics and applications of continuous probability distributions

50) What is a random number? How is it generated in Excel?

**Answer: A random number is one that is uniformly distributed between 0 and 1. In Excel, a random number may be generated within any cell using the function RAND( ). This function has no arguments; therefore, nothing should be placed within the parentheses (but the parentheses are required).**

Diff: 2

Blooms: Knowledge

Topic: Random Sampling from Probability Distributions

LO1: Use Excel's Random Number Generation tool.

LO2: Use a modern software tool to perform statistical calculations.