Chapter 3: Fundamentals of statistics: a review

1. Which of the following is an example of a Bernoulli experiment?

A Rolling a dice
B Coin toss
C Choosing a random number
D Guessing a number between 1 and 10

ANS: B PTS: 1 DIF: Easy TOP: Random variables and their probability distributions

2. Which of the following is not a discrete random variable?

A The number of red marbles in a jar
B The number of heads when flipping three coins
C The height of students in class
D The number of attempts to pass an econometrics multiple choice test

ANS: c PTS: 1 DIF: Easy TOP: Discrete random variables

3. Which of the following is not a continuous random variable?

A The height of each student in a class
B The weight of each student in class
C The time it took to get to school
D The number of attempts to obtain a learner's license

ANS: D PTS: 1 DIF: Easy TOP: Continuous random variables

4. Using the properties of expected values, what is the expected value of Y=3X+6 where E(X)=3?

A 15
B 3
C 9
D 6

ANS: A PTS: 1 DIF: Moderate TOP: Properties of expected values

5. Using the properties of variance, what is the variance of Y=3X+6 where var(Y)=2?

A 24
B 18
C 12
D 6

ANS: B PTS: 1 DIF: Moderate TOP: Measures of variability: variance and standard deviation

6. Suppose E(X)=15, var(X)=9. Standardise the variable to obtain the expected value for Z.

A 0
B 15
C 10
D 5

ANS: A PTS: 1 DIF: Moderate TOP: Standardising a random variable

7. Suppose E(X)=15, var(X)=9. Standardise the variable to obtain the variance for Z.

A 9
B 1
C 1/81
D 0

ANS: B PTS: 1 DIF: Moderate TOP: Standardising a random variable

8. Which of the following can be var(2X+3Y-Z) can be simplified to?

A 4var(X) + 9var(Y) + var(Z) + 12cov(X,Y) – 4cov(X,Z) – 6cov(Y,Z)
B 4var(X) + 9var(Y) + var(Z) + 12cov(X,Y) + 4cov(X,Z) + 6cov(Y,Z)
C 4var(X) + 9var(Y) - var(Z) + 12cov(X,Y) - 4cov(X,Z) - 6cov(Y,Z)
D 4var(X) + 9var(Y) + var(Z) + 12cov(X,Y) + 6cov(X,Z) + 4cov(Y,Z)

ANS: B PTS: 1 DIF: Hard TOP: Variance of sums of random variables

9. If X ~ normal(2, 4) then:

A 2X + 1 ~ normal(5,17)
B 2X+1 ~ normal(5, 9)
C 2X + 1 ~ normal(2,4)
D 2X + 1 ~ normal(4, 16)

ANS: A PTS: 1 DIF: Moderate TOP: The standard normal distribution

10. For a particular sample, the confidence interval is calculated as which of the following?

A $\left[\bar{y} - c.\frac{s}{\sqrt{n}}, \bar{y} + c.\frac{s}{\sqrt{n}}\right]$
B $\left[\bar{y} + c.\frac{s}{\sqrt{n}}, \bar{y} - c.\frac{s}{\sqrt{n}}\right]$
C $\left[\bar{y} - c.\frac{s}{n}, \bar{y} + c.\frac{s}{n}\right]$
D $\left[\bar{y} + c.\frac{s}{n}, \bar{y} - c.\frac{s}{n}\right]$

ANS: A PTS: 1 DIF: Easy TOP: Confidence intervals for the mean from a normally distributed population

11. What is a type I error?

A Failure to reject H_0 when it is actually false.
B Rejecting H_0 when it is true.
C Failure to reject H_0 when it is actually true.
D Rejecting H_0 when it is false.

ANS: B PTS: 1 DIF: Easy TOP: Hypothesis testing

12. What is a type II error?

A Failure to reject H_0 when it is actually false.
B Rejecting H_0 when it is true.
C Failure to reject H_0 when it is actually true.
D Rejecting H_0 when it is false.

ANS: A PTS: 1 DIF: Easy TOP: Hypothesis testing

13. What is the rejection rule for a positive one-tail hypothesis test?

A $t < c$
B $t > c$
C $|t| < c$
D $|t| > c$

ANS: B PTS: 1 DIF: Easy TOP: Testing hypotheses about the mean in a normal population

14. In general, what do small *p*-values indicate?

A Small probabilities
B Type I errors
C Evidence for H_0
D Evidence against H_0

ANS: D PTS: 1 DIF: Easy TOP: Computing and using *p*-values

15. A discrete random variable is one that takes on only a finite number of values.

ANS: T PTS: 1 DIF: Easy TOP: Discrete random variables

16. For a continuous random variable, the P(X=3.5)=0.

ANS: T PTS: 1 DIF: Easy TOP: Continuous random variables

17. The numbers of goals kicked in an AFL game is dependent on the number of goals kicked in previous games.

ANS: F PTS: 1 DIF: Easy TOP: Joint distributions and independence

18. The mean and median can be the same.

ANS: T PTS: 1 DIF: Easy TOP: Another measure of central tendency: the median