

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 $\text{var}(Y)=2$?

- A 24
- B 18
- C 12
- D 6

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

6. Suppose $E(X)=15$, $\text{var}(X)=9$. 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 $E(X)=15$, $\text{var}(X)=9$. 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 $\text{var}(2X+3Y-Z)$ can be simplified to?

- A $4\text{var}(X) + 9\text{var}(Y) + \text{var}(Z) + 12\text{cov}(X,Y) - 4\text{cov}(X,Z) - 6\text{cov}(Y,Z)$
- B $4\text{var}(X) + 9\text{var}(Y) + \text{var}(Z) + 12\text{cov}(X,Y) + 4\text{cov}(X,Z) + 6\text{cov}(Y,Z)$
- C $4\text{var}(X) + 9\text{var}(Y) - \text{var}(Z) + 12\text{cov}(X,Y) - 4\text{cov}(X,Z) - 6\text{cov}(Y,Z)$
- D $4\text{var}(X) + 9\text{var}(Y) + \text{var}(Z) + 12\text{cov}(X,Y) + 6\text{cov}(X,Z) + 4\text{cov}(Y,Z)$

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

9. If $X \sim \text{normal}(2, 4)$ then:

- A $2X + 1 \sim \text{normal}(5,17)$
- B $2X+1 \sim \text{normal}(5, 9)$
- C $2X + 1 \sim \text{normal}(2,4)$
- D $2X + 1 \sim \text{normal}(4, 16)$

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

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