

Reading and Comprehension Questions for Chapter 2

1. An experiment that can be repeated many times under identical conditions yet have different outcomes is called a random experiment.

True False

True – see Section 2-1.

2. The sample space of a random experiment contains all of the possible outcomes.

True False

True – see Section 2-1.2.

3. Sample spaces are only discrete.

True False

False – see Section 2-1.2.

4. In a random experiment in which items are selected from a batch, if items are replaced before the next one is selected, we are sampling without replacement.

True False

False – see Section 2-1.2.

5. Tree diagrams can be used to construct sample spaces.

True False

True – see Section 1-1.2.

6. An event is a subset of the sample space of a random experiment.

True False

True – see Section 2-1.3.

7. Two events E_1 and E_2 are mutually exclusive if $E_1 = E_2$.

True False

False – see Section 2-1.3.

8. If there are 6 digits in an automobile license tag, and each digit must be one of the 10 integers 0, 1, ..., 9, then there are 10^6 possible license tags.

True False

False – the answer is 6^{10} ; see Section 2-1.4.

9. If a sample space consists of N possible outcomes that are equally likely, the probability of each outcome is $1/N$.

True False

True – see Section 2-2.1.

10. For a discrete sample space the probability of an event is the sum of all of the probabilities of the outcomes associated with the event.

True False

True – see Section 2-2.1

11. If S is the sample space of a random experiment and E is any event, the axioms of probability are:

- a. $P(S) = 1$
- b. $0 \leq P(E) \leq 1$
- c. For any two events E_1, E_2 with $E_1 \cap E_2 = \emptyset$, $P(E_1 \cup E_2) = P(E_1) + P(E_2)$
- d. All of the above
- e. None of the above.

Answer is d – see Section 2-2.2.

12. The axioms of probability can be used to assign probabilities to events.

True False

False – see Section 2-2.2.

13. The addition rule of probability is $P(A \cup B) = P(A) + P(B) - P(A \cap B)$.

True False

True – see Equation 2-5.

14. If A and B are mutually exclusive, then $P(A \cup B) = P(A) + P(B) - P(A \cap B)$.

True False

False – see Equation 2-8.

15. The probability of an event B given the knowledge that the outcome will be in event A is called the conditional probability of event B given A .

True False

True – see Section 2-4.

16. The conditional probability of event B given A is $P(B | A) = P(A \cap B) / P(A)$, $P(A) > 0$.

True False

True – see Equation 2-9.

17. The multiplication rule of probability states that $P(A \cap B) = P(B | A)P(A) = P(A | B)P(B)$.

True False

True – see Equation 2-10.

18. The total probability rule is $P(A \cap B) = P(B | A)P(A)$.

True False

False – see Equation 2-12.

19. Two events A and B are independent with $P(A) = P(B) = 0.5$. The $P(A \cap B)$ is :

- a. 0.50
- b. 0.75
- c. 0.20
- d. 0.25

Answer is d; see Equation 2-13.

20. Bayes' theorem states that $P(A | B) = \frac{P(B | A)P(A)}{P(B)}$.

True False

True – see Equation 2-15.

21. Random variables can be either discrete or continuous.

True False

True - see Section 2-8.