Chapter 5
A Survey of Probability Concepts

True/False

1. A joint probability is a probability that measures the likelihood that two or more events will happen concurrently.

2. If there are two independent events *A* and *B*, the probability that *A* and *B* will occur is found by multiplying the two probabilities. Thus for two events *A* and *B*, the special rule of multiplication shown symbolically is:
P(*A* and *B*) = *P*(*A*) *P*(*B*).

Multiple Choice

3. The National Center for Health Statistics reported that of every 883 deaths in recent years, 24 resulted from an automobile accident, 182 from cancer and 333 from heart disease. Using the relative frequency approach, what is the probability that a particular death is due to an automobile accident?
A) 24/883 or 0.027
B) 539/883 or 0.610
C) 24/333 or 0.072
D) 182/883 or 0.206

4. If two events *A* and *B* are mutually exclusive, what does the special rule of addition state?
A) *P*(*A* or *B*) = *P*(*A*) + *P*(*B*)
B) *P*(*A* and *B*) = *P*(*A*) + *P*(*B*)
C) *P*(*A* and/or *B*) = *P*(*A*) + *P*(*B*)
D) *P*(*A* or *B*) = *P*(*A*) – *P*(*B*)

5. What does the complement rule state?
A) *P*(*A*) = *P*(*A*) – *P*(*B*)
B) *P*(*A*) = 1 – *P*(not *A*)
C) *P*(*A*) = *P*(*A*) • *P*(*B*)
D) *P*(*A*) = *P*(*A*)*X* + *P*(*B*)

6. Which approach to probability is exemplified by the following formula?
Probability of an Event =

$$\frac{Number\_of\_times\_event\_occurred\_in\_the\_past}{Total\_number\_of\_observations}$$

A) Classical approach
B) Empirical approach
C) Subjective approach
D) None of the above

7. A survey of top executives revealed that 35% of them regularly read Time magazine, 20% read Newsweek and 40% read U.S. News & World Report. Ten percent read both Time and U.S. News & World Report. What is the probability that a particular top executive reads either Time or U.S. News & World Report regularly?
A) 0.85
B) 0.06
C) 1.00
D) 0.65

8. Which approach to probability assumes that the events equally likely?
A) Classical
B) Empirical
C) Subjective
D) Mutually exclusive

9. When are two events mutually exclusive?
A) They overlap on a Venn diagram
B) If one event occurs, then the other cannot
C) Probability of one affects the probability of the other
D) Both (a) and (b)

10. The result of a particular experiment is called a(n)
A) observation.
B) conditional probability.
C) event.
D) outcome.

Multiple Choice

Use the following to answer questions 11-14:
A group of employees of Unique Services will be surveyed about a new pension plan. In-depth interviews with each employee selected in the sample will be conducted. The employees are classified as follows.

Classification	Event	Number of Employees
Supervisors	A	120
Maintenance	B	50
Production	C	1,460
Management	D	302
Secretarial	E	68

11. What is the probability that the first person selected is classified as a maintenance employee?
A) 0.20
B) 0.50
C) 0.025
D) 1.00
E) None of the above

12. What is the probability that the first person selected is either in maintenance or in secretarial?
A) 0.200

B) 0.015
C) 0.059
D) 0.001

13. What is the probability that the first person selected is either in management or in supervision?
A) 0.00
B) 0.06
C) 0.15
D) 0.21

14. What is the probability that the first person selected is a supervisor and in management?
A) 0.00
B) 0.06
C) 0.15
D) 0.21

Use the following to answer questions 15-19:
Each salesperson in a large department store chain is rated on their sales ability and their potential for advancement. The data for the 500 sampled salespeople are summarized in the following table.

		Potential for Advancement		
		Fair	Good	Excellent
Sales Ability	Below Average	16	12	22
	Average	45	60	45
	Above Average	93	72	135

15. What is the probability that a salesperson selected at random has above average sales ability and is an excellent potential for advancement?
A) 0.20
B) 0.50
C) 0.27
D) 0.75

16. What is the probability that a salesperson selected at random will have average sales ability and good potential for advancement?
A) 0.09
B) 0.12
C) 0.30
D) 0.525

17. What is the probability that a salesperson selected at random will have below average sales ability and fair potential for advancement?
A) 0.032
B) 0.10
C) 0.16
D) 0.32

18. What is the probability that a salesperson selected at random will have an excellent potential for advancement given they also have above average sales ability?
A) 0.27

B) 0.60
C) 0.404
D) 0.45

19. What is the probability that a salesperson selected at random will have an excellent potential for advancement given they also have average sales ability?
A) 0.27
B) 0.30
C) 0.404
D) 0.45

Use the following to answer questions 20-22:
A study of the opinion of designers with respect to the primary color most desirable for use in executive offices showed that:

Primary Color	Number of Opinions
Red	92
Orange	86
Yellow	46
Green	91
Blue	37
Indigo	46
Violet	2

20. What is the probability that a designer does not prefer red?
A) 1.00
B) 0.77
C) 0.73
D) 0.23

21. What is the probability that a designer does not prefer yellow?
A) 0.000
B) 0.765
C) 0.885
D) 1.000

22. What is the probability that a designer does not prefer blue?
A) 1.0000
B) 0.9075
C) 0.8850
D) 0.7725

23. If two events are independent, then their joint probability is
A) computed with the special rule of addition
B) computed with the special rule of multiplication
C) computed with the general rule of multiplication
D) computed with Bayes theorem

24. When applying the special rule of addition for mutually exclusive events, the joint probability is:
A) 1
B) .5
C) 0
D) unknown

25. A student received an "A" on the first test of the semester. The student wants to calculate the probability of scoring an "A" on the second test. Historically, the instructor knows that the joint probability of scoring "A"'s on the first two tests is 0.5. Also, historically, the probability that a student scores and "A" on the second test given that a student scored an "A" on the first test is 0.9. What is the probability that a student will score an "A" on the second test?
A) 0.50
B) 0.95
C) 0.55
D) 0.90

26. When an event's probability depends on the likelihood of another event, the probability is a
A) conditional probability.
B) empirical probability.
C) joint probability.
D) Mutually exclusive probability.

27. The result of a particular experiment is called a(n)
A) observation.
B) conditional probability.
C) event.
D) outcome.

28. The probability of two or more events occurring concurrently is called a
A) conditional probability.
B) empirical probability.
C) joint probability.
D) tree diagram.
E) none of the above.

29. Which approach to probability assumes that the events equally likely?
A) Classical
B) Empirical
C) Subjective
D) Mutually exclusive

30. An experiment may have:
A) Only one result
B) Only two results
C) Two or more results
D) None of the above

Answers:
1. True, 2. True,
3. A, 4. A, 5.B, 6. B, 7.D, 8.A, 9.B, 10.D, 11.C, 12.C, 13.A, 14.A, 15.C, 16.B, 17.A, 18.D, 19.B, 20.B, 21.C, 22.B, 23.B, 24.C, 25.C, 26. A, 27.D, 28.C, 29.A, 30.C,