NAME _____ DATE _____ SCORE _____

Test Chapter 16 *(continued)*

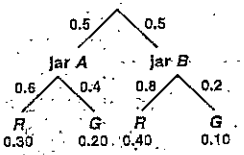
In Exercises 17 and 18, five cards are dealt from a standard deck of playing cards. What is the probability (in combination form) that the hand contains:

17. At least one red queen? $\frac{{}_2C_1 \cdot {}_{50}C_4 + {}_2C_2 \cdot {}_{50}C_3}{{}_{52}C_5}$ or $1 - \frac{{}_{50}C_5}{{}_{52}C_5}$

18. No queens? $\frac{{}_{48}C_5}{{}_{52}C_5}$

In Exercises 19, 20, and 21, Jar *A* contains 3 red balls and 2 green balls. Jar *B* contains 8 red balls and 2 green balls. A fair coin is tossed. If it shows heads, a ball is randomly picked from Jar *B*. If it shows tails, a ball is randomly chosen from Jar *A*.

19. Make a tree diagram showing the probabilities of each jar and the probabilities of choosing a red ball or a green ball.



20. Find the probability of choosing a red ball.

21. If a red ball is chosen, find the probability that it came from Jar *A*.

22. Find the expected payoff.

payoff	7	2	−4
probability	0.2	0.5	0.3

23. Two dice are rolled. If the numbers showing have a difference of less than 2, then Player *A* receives five dollars from Player *B*. Otherwise, Player *B* receives four dollars from Player *A*. Is this game fair?

ANSWERS

17. (See question) (6)
18. (See question) (6)
19. (See graph) (6)
20. 0.7 (5)
21. $\frac{3}{7}$ (6)
22. 1.2 (5)
23. yes (6)

☆ OPTIONAL

1. ***Challenge*** $P(A \text{ or } B \text{ or } C) =$ _____
(Hint: The answer is NOT $P(A) + P(B) + P(C)$.)

$$P(A \text{ or } B \text{ or } C) = P(A) + P(B) + P(C) - P(A \text{ and } B) - P(A \text{ and } C) - P(B \text{ and } C) + P(A \text{ and } B \text{ and } C)$$

2. ***Writing.*** A certain fair coin was flipped 100 times, and each time it came up heads. Explain why the probability of getting heads on the next flip, thereby resulting in an unusual string of 101 heads, is $\frac{1}{2}$.

Answers may vary. Since coin flips of a fair coin are all independent of one another, the probability of getting heads on any flip is always $\frac{1}{2}$. It doesn't matter how many heads have occurred previously.

ANSWERS

1. (See question)
2. (See question)

NAME _____ DATE _____ SCORE _____

Test Chapter 16

Directions: Write answers in the spaces provided.

Complete the following with the best answer.

1. The probability of an event is always less than or equal to _____.
2. If the odds of a team winning is 6 to 5, then the probability of the team winning is _____.
3. *A* and *B* are independent events if and only if $P(B|A) =$ _____.
4. An experiment involving repeated independent trials, each having two possible outcomes, can be modeled by the _____ probability theorem.
5. If the expected value of a game is _____, then the game is called a fair game.

In Exercises 6, 7 and 8, three letters are chosen at random without replacement from the word COMPUTER. What is the probability of choosing:

6. All vowels?
7. No vowels?
8. Exactly one vowel?

In Exercises 9, 10, and 11, two cards are dealt from a standard deck.
Event *H* is "first card is a heart."
Event *A* is "first card is an ace."
Event *S* is "second card is a spade."

9. Find $P(H \text{ or } A)$.
10. Find $P(S|H)$.
11. Decide if the events *H* and *A* are independent. Show your work.

$P(H) = \frac{1}{4}$; $P(A) = \frac{1}{13}$; and $P(H \text{ and } A) = \frac{1}{52}$.

Since $P(H) \cdot P(A) = P(H \text{ and } A)$, they are independent.

In Exercises 12, 13, and 14, three people are each asked to think of an integer between 1 and 5, inclusive.

12. What is the probability that all think of "2"?
13. What is the probability that none thinks of "2"?
14. What is the probability that exactly one thinks of "2"?
15. What is the probability of getting no more than one question wrong by guessing all the answers on a six-question true-false test?
16. A four-digit number between 1000 and 9999, inclusive, is randomly chosen. What is the probability that it contains no even digits?

ANSWERS

1. 1 (2)
2. $\frac{6}{11}$ (2)
3. $P(B)$ (2)
4. binomial (2)
5. 0 (2)
6. $\frac{1}{56}$ (3)
7. $\frac{5}{28}$ (3)
8. $\frac{15}{28}$ (4)
9. $\frac{4}{13}$ (5)
10. $\frac{13}{51}$ (5)
11. (See question) (5)
12. $\frac{11}{125}$ (5)
13. $\frac{64}{125}$ (5)
14. $\frac{48}{125}$ (5)
15. $\frac{7}{64}$ (5)
16. $\frac{5}{72}$ (5)

(continued)