

1. Sam ordered a baked potato at a restaurant. The waiter offered him butter, cheese, sour cream, and chives as toppings. How many ways could he have his potato?
- 4
  - 5
  - 8
  - \* 16
2. Let  $S = \{1, 3, 5, 7\}$  and  $T = \{2, 5, 7\}$ . Which one of the following is a subset of  $T$  but not a subset of  $S$ ?
- \*  $\{2, 5\}$
  - $\{1, 2, 5\}$
  - $\{1, 3, 7\}$
  - $\{2, 3\}$
3. Let  $U = \{\text{all people}\}$ ,  $C = \{\text{all people who like chocolate ice cream}\}$ ,  $S = \{\text{all people who like strawberry ice cream}\}$ , and  $V = \{\text{all people who like vanilla ice cream}\}$ . Describe the set  $(C \cup V) \cap S'$  in words.
- All people who like chocolate, strawberry, and vanilla ice cream.
  - \* All people who like chocolate or vanilla, but not strawberry ice cream.
  - All people who like chocolate and vanilla, but not strawberry ice cream.
  - All people who don't like strawberry ice cream.
4. 100 people were surveyed. 90 of them have a VCR or a DVD player or both. We know 55 of them have a VCR and 65 of them have a DVD player. Which one of the following statements is **FALSE**?
- \* a) There are 20 people who have both a VCR and a DVD player.
  - b) There are 25 people who have a VCR but don't have a DVD player.
  - c) There are 35 people who have a DVD player but don't have a VCR.
  - d) There are 10 people who have neither a VCR nor a DVD player.
5. Let  $A, B$  be two sets. Which one of the following statements is **TRUE**?
- $(A \cup B)' = A' \cup B'$ .
  - $(A \cap B)' = A' \cap B'$ .
  - $A \cup B \subset A \cap B$ .
  - \*  $A \cap A' = \emptyset$ .
6. Let  $A, B$ , and  $C$  be three sets. If  $A \subset B$ , and  $B \cap C = \emptyset$ , then which one of the following is **TRUE**?
- $n(A) > n(B)$ .
  - \*  $n(A \cup C) = n(A) + n(C)$ .
  - $n(A \cap C) > 0$
  - $n(A \cup B) \leq n(A)$
7. Write the sample space for the following experiment: a die is rolled and a coin is flipped simultaneously.
- $\{1, 2, 3, 4, 5, 6, H, T\}$
  - \*  $\{(1, H), (1, T), (2, H), (2, T), (3, H), (3, T), (4, H), (4, T), (5, H), (5, T), (6, H), (6, T)\}$
  - $\{(1, H), (2, H), (3, H), (4, H), (5, H), (6, H)\}$
  - $\{(1, H), (1, T)\}$
8. If  $E$  and  $F$  are events, which one of the following statements is **FALSE**?
- $E \cup F$  occurs when  $E$  occurs or  $F$  occurs.
  - $E'$  occurs when  $E$  does not occur.
  - If  $E$  and  $F$  are mutually exclusive, it is always the case that  $P(E \cap F) = 0$ .
  - \* d) If  $E$  and  $F$  are mutually exclusive, it is always the case that  $P(E \cup F) = 1$ .
9. Two fair dice are rolled. Give the set corresponding to the following event: "The sum of the dice is less than or equal to 4."
- \* a)  $\{(1, 1), (1, 2), (2, 1), (2, 2), (1, 3), (3, 1)\}$
  - $\{(1, 1), (1, 2), (2, 1)\}$
  - $\{(1, 1), (1, 2), (2, 1), (2, 2)\}$
  - $\{(2, 2), (1, 3), (3, 1)\}$
10. Ten cards numbered 1 through 10 are placed in a box. If a card is drawn, what is the probability that the number is odd or less than 3?
- $\frac{1}{2}$
  - $\frac{2}{5}$
  - \*  $\frac{3}{5}$
  - $\frac{3}{10}$

11. If  $P(E) = 0.5$ ,  $P(F) = 0.7$ , and  $P(E \cup F) = 0.6$ , what is  $P(E \cap F)$ ?
- \* a)  $P(E \cap F) = 0.2$
  - b)  $P(E \cap F) = 0.4$
  - c)  $P(E \cap F) = 0.5$
  - d)  $P(E \cap F) = 0.6$
12. The odds **against** a team winning a game are 4:3. What is the probability that the team will win?
- a)  $\frac{3}{4}$
  - b)  $\frac{1}{2}$
  - c)  $\frac{4}{7}$
  - \* d)  $\frac{3}{7}$
13. Two fair dice are rolled. What is the probability that the first roll is a 3 or the second roll is a 5?
- a)  $\frac{1}{3}$
  - \* b)  $\frac{11}{36}$
  - c)  $\frac{5}{6}$
  - d)  $\frac{9}{36}$
14. Two fair dice are rolled. What is the probability that the sum is 10 given that the sum is greater than 8?
- \* a)  $\frac{3}{10}$
  - b)  $\frac{1}{3}$
  - c)  $\frac{2}{5}$
  - d)  $\frac{1}{5}$
15. Let  $E$  and  $F$  be independent events with  $P(E) = \frac{1}{4}$  and  $P(F) = \frac{1}{5}$ . Find  $P(E \cup F)$ .
- a)  $\frac{1}{20}$
  - b)  $\frac{4}{5}$
  - \* c)  $\frac{2}{5}$
  - d)  $\frac{9}{20}$
16. If two cards are drawn without replacement from an ordinary deck, what is the probability that both are spades?
- a)  $\frac{1}{16}$
  - b)  $\frac{1}{4}$
  - c)  $\frac{25}{52}$
  - \* d)  $\frac{1}{17}$
17. Four fair coins were tossed, and it is known that at least one was a head. Find the probability that all four were heads.
- \* a)  $\frac{1}{15}$
  - b)  $\frac{1}{16}$
  - c)  $\frac{15}{16}$
  - d)  $\frac{1}{2}$
18. For two events  $M$  and  $N$ , if  $P(M) = 0.2$ ,  $P(N|M) = 0.3$  and  $P(N|M') = 0.4$ , find out  $P(M|N)$ .
- a)  $\frac{2}{19}$ .
  - \* b)  $\frac{3}{19}$ .
  - c)  $\frac{4}{19}$ .
  - d) Can't be decided.
19. For mutually exclusive events  $E, F, G$ , we have  $P(E) = 0.5$ ,  $P(F) = 0.3$ ,  $P(G) = 0.2$ . And also  $P(Q|E) = 0.4$ ,  $P(Q|F) = 0.2$ ,  $P(Q|G) = 0.3$ . Find  $P(E|Q)$ .
- a)  $\frac{4}{8}$ .
  - \* b)  $\frac{5}{8}$ .
  - c)  $\frac{3}{4}$ .
  - d) Can't be decided.

20. A building contractor buys 70% of his cement from supplier A, 30% from supplier B. A total of 90% of the bags from A arrive undamaged, while 100% of the bags from B arrive undamaged. Give the probabilities that a damaged bag is from supplier A.
- a) 90%.
  - b) 95%.
  - \* c) 100%
  - d) Can't be decided.

EXAM II- FORM A

1. D
2. A
3. B
4. A
5. D
6. B
7. B
8. D
9. A
10. C
11. A
12. D
13. B
14. A
15. C
16. D
17. A
18. B
19. B
20. C