

1. A person owns a dog; the dog has 9 puppies. You want to buy 3 of these puppies. How many different sets of 3 puppies can you buy?
2. In this problem the universal set is the set of all positive whole numbers. Let  $A$  be the set of all even numbers, let  $B$  be the set of numbers greater than 10 and less than 20, and let  $C$  be the set of numbers greater than 5 and less than 10. Describe the set  $(A' \cap B) \cup C$ , either in words or in a list. Use appropriate notation.
3. The probability I go out to eat tomorrow is  $1/3$ . The probability I enjoy my dinner is  $4/5$ . Assuming that my going out to eat is independent of whether or not I enjoy my dinner, what is the probability that I go out to eat but do not enjoy my dinner?
4. Suppose a baseball player has a 30% probability of getting a hit each time he bats, and that each at bat is independent of past or future at bats. If he bats 150 times, what is the probability he gets exactly 50 hits?
5. One thousand people live in a town. Of those, 507 have high-speed internet access in their homes, 658 have cable TV in their homes, and 219 have neither high-speed internet access nor cable TV. How many people have both cable TV and high-speed internet access?
6. 3 Scrabble tiles with the letter "A" on them, 2 Scrabble tiles with the letter "N" on them, and 1 Scrabble tile with the letter "B" on it are arranged randomly from left to right across a table. What is the probability they spell "BANANA"?
7. There are 20 marbles in a bag. 10 are red, 6 are white, 2 are green, and 1 is purple.
  - (a) Suppose you randomly draw a marble from the bag. What is the probability you do not draw a purple marble?
  - (b) Suppose you draw 500 marbles from the bag, replacing each one as you draw. How many green marbles should you expect to draw?
  - (c) Suppose you randomly draw 2 marbles from the bag without replacement. What is the probability that the two marbles you draw are the same color?
  - (d) If you randomly draw 6 marbles from the bag simultaneously, what is the probability that you draw 4 red and 2 white marbles?
8. You play a game where you roll one 4-sided die and one 6-sided die. (The 4-sided die has the numbers 1 to 4 on it, and the 6-sided die has the numbers 1 to 6 on it.) If the number you roll with the 6-sided die is greater than the number you roll with the 4-sided die, you win \$24. Otherwise you win \$0. What cost makes this a mathematically fair game?