12-3 Additional Practice

Permutations and Combinations

1. When randomly choosing two coins from a cup of coins that contains a penny, a nickel, a dime, and a quarter, what is the probability of choosing a penny and a nickel?

   $\frac{1}{6}$, 0.167, or 16.7%

2. There are 5 runners in a race. If each runner has the same chance of winning, and they wear shirts with the letters P, Q, R, S, and T, what is the probability that the runners finish the race in the order P, Q, R, S, T?

   $\frac{1}{120}$

3. A basketball coach will choose 5 players from a group of 8 players to start the next game. How many different groups of starting players are possible?

   56

4. A group of 9 business leaders meets each week. Members take turns being the note-taker, the facilitator, and the speaker. In how many different ways can these positions be chosen from the members?

   504 ways

5. Three cards are randomly chosen at the same time from a set numbered from 1 to 7. What is the probability that the chosen cards are numbered 1, 2, and 3? Round to the hundredths place.

   about 0.03

6. A hiker has 2 pairs of hiking shoes, 3 shirts, and 2 pairs of shorts to choose from. How does the number of combinations of shoes, shirts, and shorts change as the hiker adds a new shirt to his collection? Explain.

   Sample answer: Each time the hiker adds a shirt to the collection, 4 additional combinations are possible. The initial number of combinations is $2 \cdot 3 \cdot 2 = 12$. When another shirt is added, the number of combinations becomes $2 \cdot 4 \cdot 2 = 16$.

7. You have a $1 bill, a $5 bill, a $10 bill, a $20 bill, a quarter, a dime, a nickel, and a penny. How many different total amounts of money can you make by choosing a combination of 6 of them? Explain.

   28; Number of ways is ${}_8C_6 = 28$.