

1. A coin is tossed, a die is rolled, and a card is drawn from a deck. How many possible outcomes does this experiment have?

$$2 \cdot 6 \cdot 52 = \boxed{624}$$

- 2a. How many different two-element subsets does the set {A, E, I, O, U} have?

$$5C_2 = \boxed{10}$$

- b. How many different two-letter "words" can be made using the letters from the set in part 'a'?

$$5P_2 = \boxed{20} \quad \text{OR} \quad \underline{5} \cdot \underline{4} = 20$$

3. An airline company overbooks a particular flight and seven passengers are "bumped" from the flight. If 120 passengers are booked on the flight, in how many ways can the airline choose the seven passengers to be bumped?

$$120C_7 = \boxed{5.949 \times 10^{10}}$$

4. A quiz has ten true-false questions and five multiple-choice questions with four choices for each. In how many ways can this test be completed?

$$2^{10} \cdot 4^5 = \boxed{1,048,576}$$

5. If you must answer only eight of ten questions on a test, how many ways do you have of choosing the questions you will omit?

$$10C_2 = \boxed{45}$$

6. Find the number of permutations of the letters of the word "OAKBROOK."

$$\frac{8!}{3! \cdot 2!} = \boxed{3360}$$

3 O's 2 K's

7. A fair two-sided coin is tossed 10 times. What is the probability of getting:

a. exactly 3 heads? (7 tails)

$$\frac{10C_3}{2^{10}} = \frac{120}{1024} = .117$$

b. no tails?

$$\frac{1}{2^{10}} = .000977$$

c. at least 9 heads? 9H or 10H

$$\frac{10C_9 + 1}{2^{10}} = \frac{11}{1024} = .0107 = 1.07\%$$

d. 5 heads in a row (then anything for the other 5 rolls)

$$\frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} = \frac{1}{2^5} = \frac{1}{32} = .03125 = 3.125\%$$

8. From a well-shuffled deck of 52 cards, two cards are dealt. Find the probability of getting:

a. two face cards

$$\frac{12C_2}{52C_2} = .0498$$

b. two tens

$$\frac{4C_2}{52C_2} = .004525$$

b. two diamonds

$$\frac{13C_2}{52C_2} = .0588$$

d. two face cards or two diamonds

$$\frac{12C_2 + 13C_2 - 3C_2}{52C_2} = .1063$$

e. two face cards or two tens

$$\frac{12C_2 + 4C_2}{52C_2} = .0543$$

f. one face card and one ten

$$\frac{12C_1 \cdot 4C_1}{52C_2} = .0362$$

9. A box contains 3 red and 5 green holiday pencils. One lucky student will get to randomly select two pencils without replacement. Find the probability that:

a. both pencils are the same color.

$$\frac{3C_2 + 5C_2}{8C_2} = .4643$$

b. one pencil is red and the other is green.

$$\frac{3C_1 \cdot 5C_1}{8C_2} = .5357$$