

**Counting the OR situation with the Principle of Inclusion and Exclusion**

$$n(A \cup B) = n(A) + n(B) - n(A \cap B)$$

$$n(A \cup B) = n(A) + n(B) \text{ if } A \text{ and } B \text{ are disjoint sets}$$

1. One card is drawn from a standard deck of 52 cards. In how many ways could you draw:
  - a. 6 or a 7
  - b. A black card or a 4
  - c. An 8 or a black 5
  - d. A club or a red card
  - e. A heart or a 6
  - f. A red card or a king
  - g. A diamond or a jack
  
2. Mrs. Gamble invited 10 relatives to dinner: her father, 3 aunts, 2 uncles, 1 sister, 2 male cousins and 1 female cousin. Everyone is arriving separately. There is a knock on the door. How many different people could it be if the person knocking is:
  - a. A sister or an aunt
  - b. A sister or a cousin
  - c. A sister or her father
  - d. An aunt or a cousin
  - e. A female or a cousin
  - f. A male or a cousin
  
3. Sixty people were interviewed in a predominantly French speaking community and were asked to indicate in which language(s) they were fluent. The results showed that 45 spoke French, 20 spoke English and 15 spoke both French and English. How many individuals spoke French or English?
  
4. Marbles numbered from 1 to 15 are placed in a bag. In how many ways can you draw a marble from the bag and get:
  - a. An even number or a multiple of 3
  - b. A multiple of 4 or a multiple of 5
  - c. A prime number or an even number
  - d. A number less than 12 or a number greater than 7
  - e. An odd number or a multiple of 5

**Answer Key:**

1. a. 8  
b. 28  
c. 6  
d. 39  
e. 16  
f. 28  
g. 16

2. a. 4  
b. 4  
c. 2  
d. 6  
e. 7  
f. 6

3. 50

4. a. 10  
b. 6  
c. 12  
d. 15  
e. 9