Lesson 9-3

Example 1

SPORTS A standard deck of playing cards is used to simulate a baseball game. During the game, players draw a card at random. Spade number cards greater than 6 represent triples. Home runs are represented by either a 4 or a jack.

a. Find P(spade and a number greater than 6)

b. Find P(4 or jack)

Solution

There are 52 possible outcomes

a. There are 4 outcomes in which spades are greater than 6: 7, 8, 9 and 10 of spades.

So, P(spade and number greater than 6) $= \frac{4}{52}$ or $\frac{1}{13}$.

The probability that the card will be a spade and a number greater than 6 is $\frac{1}{13}$.

b. A card cannot be both a 4 and a jack at the same time, so the events are mutually exclusive.

$$\begin{aligned} P(\text{4 or jack}) &= P(4) + P(\text{jack}) \\ &= \frac{4}{52} + \frac{4}{52} \\ &= \frac{8}{52} \text{ or } \frac{2}{13} \end{aligned}$$

The probability that the card will be a 4 or a jack is $\frac{2}{13}$.

Example 2

GAMES You draw a card at random from a standard deck of playing cards. Find the probability that the card is a heart or a queen.

Solution

These are not mutually exclusive events, because a card can be both a heart and a queen.

There are 13 hearts, so $P(\text{hearts}) = \frac{13}{52}$.

There are 4 queens , so $P(\text{queen}) = \frac{4}{52}$.

However, 1 heart is a queen. $P(\text{heart and queen}) = \frac{1}{52}$.

$$P(\text{heart or queen}) = \frac{13}{52} + \frac{4}{52} - \frac{1}{52}$$
$$= \frac{16}{52} \text{ or } \frac{4}{13}$$

The probability that the card is a heart or a queen is $\frac{4}{13}$.

Example 3

You select a marble from a jar without looking. You know $\frac{1}{6}$ of the marbles are red and $\frac{1}{6}$ are blue. What is the probability you will select neither the red nor the blue marble?

Solution

Find the probability of selecting a red or blue.

$$P(\text{red or blue}) = \frac{1}{6} + \frac{1}{6} = \frac{2}{6} = \frac{1}{3}$$

Find the probability of not selecting red or blue.

$$\begin{aligned} P(\text{not red or not blue}) &= 1 - P(\text{red or blue}) \\ &= 1 - \frac{1}{3} \\ &= \frac{2}{3} \end{aligned}$$

The probability that you will not select the red or the blue marbles is $\frac{2}{3}$.