Lesson 2-6

Example 1 Find Probabilities of Simple Events

a. Find the probability of rolling a number greater than 4 on a die.

There are 6 possible outcomes. Two of the outcomes are favorable. That is, two of the six outcomes are greater than 4.

$\leftarrow$ 2 numbers greater than 4 $\rightarrow$

Sample space: 1, 2, 3, 4, 5, 6 $\quad \frac{2}{6}$

$\leftarrow$ 6 total possible outcomes $\rightarrow$

So, P(number greater than 4) = $\frac{2}{6}$ or $\frac{1}{3}$

b. An iscosahedron has 20 sides numbered 1 through 20. The die is rolled once. Find *P*(multiple of 5).

There are 4 multiples of 5 on the die and 20 total numbers.

$P(\text{multiple of } 5) = \frac{4}{20}$ $\leftarrow$ number of favorable outcomes

$\leftarrow$ number of possible outcomes

$= \frac{1}{5}$ or 0.20 Simplify.

The probability of rolling a multiple of 5 is $\frac{1}{5}$ or 20%.

c. An iscosahedron has 20 sides numbered 1 through 20. The die is rolled once. Find *P*(not a multiple of 3).

There are 14 numbers that are not multiples of 3.

$P(\text{not a multiple of } 3) = \frac{14}{20}$ $\leftarrow$ number of favorable outcomes

$\leftarrow$ number of possible outcomes

$= 0.70$ Divide.

The probability of rolling a number that is not a multiple of 3 is $\frac{7}{10}$ or 70%.

d. A card is selected at random from a standard deck of cards. Find *P*(king or jack)

There are 4 ways to select a king and 4 ways to select a jack. So there are 4 + 4 or 8 ways to select a king or a jack.

$P(\text{king or jack}) = \frac{8}{52}$ $\leftarrow$ number of favorable outcomes

$\leftarrow$ number of possible outcomes

≈ 0.15 Divide.

The probability of selecting a king or a jack is $\frac{2}{13}$ or about 15%.

Example 2 Odds of an Event
A bag contains 4 blue marbles, 6 red marbles, and 8 yellow marbles. One marble is chosen at random. Find the odds of choosing a blue marble.
There are 18 possible outcomes, 4 are successes and 14 are failures.

Sample space: 4 blue, 6 red, 8, yellow

4 marbles are blue $\rightarrow$ 4
14 marbles are not blue $\rightarrow$ 14

So, the odds of selecting a blue marble is $\frac{2}{7}$ or 2:7.

Example 3 Odds Against an Event
Find the odds against rolling a 5.
There is one 5 on a die and 6 – 1 or 5 numbers that are not five.

odds against a 5 = $\frac{5}{1}$ $\leftarrow$ number of ways to not roll a 5
$\leftarrow$ number of ways to roll a 5

The odds against rolling a 5 on one die is 5:1.

Example 4 Probability and Odds
The probability for a baseball player to get a hit is 70%. What are the odds that he will get a hit at his next at bat?
The probability that he will get a hit is 70%, so the probability that he will not get a hit is 30%.
odds of getting a hit = 70:30 or 7:3
The odds that he will get a hit at his next at bat is 7:3.