



Name _____ Date _____

Theoretical Probability (pages 515–518)

Theoretical probability is the ratio of the number of ways an event can occur to the number of possible outcomes. For example, the theoretical probability of rolling a 1 on a number cube is $\frac{1}{6}$. That's because only one side of a number cube shows a 1, the **event** you are trying to get, while there are six total sides, or possible **outcomes**. The set of all possible outcomes (in this case there are six) is called the **sample space**.

Finding Theoretical Probability	$P(\text{event}) = \frac{\text{number of ways the event can occur}}{\text{number of possible outcomes}}$
Complementary Events	Complementary events are two events in which either one or the other must take place, but they cannot both happen at the same time. The sum of their probabilities is 1. An example of complementary events is rolling an even or odd number when you roll a number cube. $P(\text{event}_1) + P(\text{event}_2) = 1$

EXAMPLE

A student council representative is to be chosen from a class containing 12 boys and 16 girls. What is the probability that a girl will be chosen?

$\frac{16}{28}$ ← number of ways to choose a girl

28 ← number of possible representatives in the class

Therefore, $P(\text{a girl being chosen to be on the student council}) = \frac{16}{28}$ or $\frac{4}{7}$

Try These Together

There are 5 equally likely outcomes on a spinner, numbered 1, 2, 3, 4, and 5.

1. Find $P(\text{even number})$ for the spinner.

HINT: How many outcomes are even numbers, compared to the total number of outcomes?

2. Find $P(\text{odd number})$ for the spinner.

HINT: How many outcomes are odd numbers, compared to the total number of outcomes?

PRACTICE

A number cube is marked with 1, 2, 3, 4, 5, and 6 on its faces. Suppose you roll the number cube one time. Find the probability of each event.

3. $P(4)$

4. $P(4, 5, \text{ or } 6)$

5. $P(3 \text{ or } 5)$

6. $P(1, 2, \text{ or } 3)$



7. **Standardized Test Practice** On a science test, 75% of the students got Bs. What is the probability that a particular student did not get a B?

A 25%

B 10%

C 50%

D 75%

Answers: 1. $\frac{1}{6}$ 2. $\frac{5}{6}$ 3. $\frac{2}{6}$ 4. $\frac{3}{6}$ 5. $\frac{2}{6}$ 6. $\frac{3}{6}$ 7. A