

11-2 Reteaching

Probability

Probability is a measure of how likely a specific event is to occur. To find the *experimental probability* of a specific event, you conduct an experiment, or simulation of the experiment, multiple times. Each time you run the experiment or simulation, you are conducting a *trial*. You count the number of times the event you are looking for occurs. The experimental probability is the ratio of the number of times the event occurs to the number of trials.

$$P(\text{event}) = \frac{\# \text{ of times the event occurs}}{\# \text{ of trials}}$$

Problem

You toss a coin 12 times and record each result: H, T, T, H, H, H, T, H, T, H, T, H. What is the experimental probability of tails?

Step 1 Determine the total number of trials, the event you are looking for, and the number of times the event occurred during the trials.

One toss of the coin is one trial. You did 12 trials.

The event you are looking for is tails. Tails occurred 5 times.

Step 2 Use the formula for experimental probability.

$$P(\text{tails}) = \frac{\# \text{ of tails}}{\# \text{ of tosses}} = \frac{5}{12} \approx 0.42, \text{ or } 42\%$$

The experimental probability of tails is about 0.42.

Exercises

In a telephone survey of 150 households, 75 people answered “yes” to a particular question, 50 answered “no,” and 25 were “not sure.” Find each experimental probability.

1. $P(\text{yes}) = \frac{1}{2}$, or 50%

2. $P(\text{no}) = \frac{1}{3} \approx 0.33$, or 33%

3. $P(\text{not sure}) = \frac{1}{6} \approx 0.17$, or 17%

4. $P(\text{not yes}) = \frac{1}{2}$, or 50%

5. $P(\text{yes or no}) = \frac{5}{6} \approx 0.83$, or 83%

6. $P(\text{yes and not sure}) = 0$, or 0%

11-2 Reteaching (continued)

Probability

To find the *theoretical probability* of a specific event, count the number of desired events that occur in all outcomes. Then determine the number of all possible outcomes. The theoretical probability is the ratio of these two numbers.

$$P(\text{event}) = \frac{\# \text{ of outcomes with event}}{\# \text{ of outcomes}}$$

Problem

What is the theoretical probability of rolling a fair number cube and getting either a 4 or a 5?

Step 1 Determine the total number of possible outcomes and the number of outcomes in which the event you are looking for occurs.

There are six possible outcomes when you roll a number cube: 1, 2, 3, 4, 5, 6.

The event you are looking for occurs in two outcomes: 4 or 5.

Step 2 Use the formula for theoretical probability.

$$P(4 \text{ or } 5) = \frac{\# \text{ of ways to roll a 4 or 5}}{\# \text{ of possible rolls}} = \frac{2}{6} = \frac{1}{3} \approx 0.33, \text{ or } 33\%$$

The theoretical probability of getting a 4 or a 5 when you roll a number cube is $\frac{1}{3}$.

Exercises

Use the spinner at the right to find each theoretical probability.

7. $P(\text{the number is even})$
 $\frac{5}{12} \approx 0.42, \text{ or } 42\%$

8. $P(5)$
 $\frac{1}{12} \approx 0.08, \text{ or } 8\%$

9. $P(\text{the number is prime})$
 $\frac{5}{12} \approx 0.42, \text{ or } 42\%$

10. $P(\text{multiple of 3})$
 $\frac{1}{3} \approx 0.33, \text{ or } 33\%$

11. $P(\text{the number is less than 6})$
 $\frac{1}{3} \approx 0.33, \text{ or } 33\%$

12. $P(\text{not 5 and not 7})$
 $\frac{5}{6} \approx 0.83, \text{ or } 83\%$

