

12-3 Study Guide and Intervention

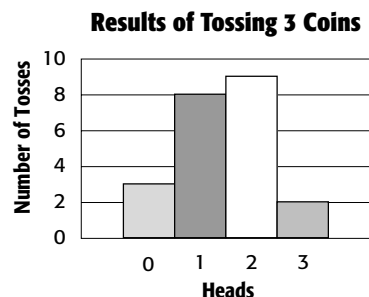
6SDAP3.2

Experimental and Theoretical Probability

Probabilities based on the outcomes obtained by conducting an experiment are called **experimental probabilities**. Probabilities based on known characteristics or facts are called **theoretical probabilities**. Theoretical probability tells you what *should* happen in an experiment.

Examples

Kuan is conducting an experiment to find the probability of getting 0, 1, 2, or 3 heads when tossing three coins on the floor. The results of his experiment are given at the right.



- 1 Based on the results in the bar graph, what is the probability of getting 3 heads on the next toss?

There were 22 tosses and 2 of those had 3 heads. The experimental probability is $\frac{2}{22}$ or $\frac{1}{11}$.

- 2 Based on the experimental probability, how many times should Kuan expect to get 3 heads in the next 55 tosses?

Kuan should expect to get 3 heads about $\frac{1}{11} \cdot 55$ or 5 times.

- 3 What is the theoretical probability of getting 3 heads on a toss?

The theoretical probability is $\frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2}$ or $\frac{1}{8}$.

The experimental probability and the theoretical probability seem to be consistent.

Exercises

Use the table that shows the results of spinning a game spinner 50 times.

Color	Number of Times
green	18
red	24
blue	8

- Based on the results in the table, what is the probability of spinning green?
- Based on the results, how many green spins would you expect to occur in 300 spins?
- What is the theoretical probability of spinning green?
- Based on the theoretical probability, how many green spins would you expect to occur in 300 spins?
- Compare the theoretical probability to the experimental probability.

