

Section Overview

Probability

Lesson 8-1

Why? The future is unknown, so every day you make decisions based on informal probabilities. A particular outcome is either certain, impossible, or somewhere in between.

Probability is the measure of how likely an event is to occur.

$$\begin{aligned} P(\text{certain event}) &= 1 \\ P(\text{impossible event}) &= 0 \\ 0 &\leq P(\text{event}) \leq 1 \end{aligned}$$

Impossible	Unlikely	As likely as not	Likely	Certain
0	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	1
0	0.25	0.5	0.75	1
0%	25%	50%	75%	100%

Experimental Probability

Lesson 8-2

Why? The probability of an event can be calculated based on previous experiences. When a store decides how much of a product to stock based on past sales, that is an example of a real-world application of experimental probability. Experimental probability is also a very useful tool for scientists.

Experimental Probability

$$\text{probability} \approx \frac{\text{number of times an event occurs}}{\text{total number of trials}}$$

Theoretical Probability and Sample Spaces

Lessons 8-3, 8-4

Why? You use **theoretical probability** to find the chance of something occurring, without directly measuring its occurrence. The set of all possible outcomes in an experiment is called the **sample space**. Knowing the sample space can help you determine a theoretical probability.

Theoretical Probability

$$\text{probability} = \frac{\text{number of ways the event can occur}}{\text{total number of equally likely outcomes}}$$



Sample Space

The sample space for spinning the spinner is 1, 2, 3, 4, and 5.

What is the probability of spinning an odd number on the spinner?

$$P(\text{odd}) = \frac{\text{number of odd sections}}{\text{total number of sections on spinner}} = \frac{3}{5}$$