

Section Overview



Probability

Lesson 11-5

Why? Probability is used to make plans and predictions. If a weather forecast gives a 30% chance of rain, then there is a 30% probability of rain, based on the study of meteorology and mathematical modeling.

Vocabulary	Definition	Example
Experiment	An activity in which results are observed	Spin a fair spinner that has 5 equal areas.
Outcome	A result of one trial of an experiment	4
Sample space	The set of all possible outcomes of an experiment	1, 2, 3, 4, 5
Event	Any set of one or more outcomes	Spinning a number greater than 2 1, 2, 3 , 4 , 5
Probability	A number from 0 (0%) to 1 (100%) that tells how likely an event is to happen	$P(\text{spinning a number greater than 2}) = \frac{3}{5} = 60\%$

The sum of the probabilities of all possible outcomes in an experiment is 1.

Experimental Probability

Lesson 11-6

Why? Insurance companies use experimental probability to compare the probabilities that drivers in various categories will be involved in accidents.

Experimental probability:

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

Example

If you roll a number cube 100 times and you roll a 3 on 18 of those trials, then the experimental probability of rolling a 3, based on this experiment is as follows: probability = $\frac{18}{100} = \frac{9}{50} = 0.18 = 18\%$.

Theoretical Probability

Lesson 11-7

Why? You use **theoretical probability** to find the chance of something occurring, without directly measuring its occurrence.

Theoretical Probability

$$\text{probability} = \frac{\text{number of outcomes in event}}{\text{number of possible outcomes}}$$



Sample Space

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

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

$$P(\text{odd}) = \frac{\text{possible odd numbers } \{1, 3, 5\}}{\text{possible outcomes } \{1, 2, 3, 4, 5\}} = \frac{3}{5}$$

Section Overview



Independent and Dependent Events

Lesson 11-8

Why? Understanding how one event affects another will help you plan.

Independent Events

The occurrence of one event **does not** affect the probability of the other.

Example:

Roll a number cube and toss a coin. Find the probability of rolling a number less than 3 and getting heads.

$$P(3, \text{heads}) = \frac{2}{6} \cdot \frac{1}{2} = \frac{1}{6} = 16\frac{2}{3}\%$$

Dependent Events

The occurrence of one event **does** affect the probability of the other.

Example:

Pick two marbles from a bag containing 4 red marbles and 1 blue marble without replacing the first. Find the probability of picking two red marbles.

$$P(\text{red, red}) = \frac{4}{5} \cdot \frac{3}{4} = \frac{12}{20} = 60\%$$

You can use probabilities to help make decisions and predictions in future events.