Section Overview

Professional Development

Compound Events — Lesson 12-5

Why? There are counting methods to help determine the probabilities of multiple events.

Assume that the births of boys and girls are equally likely. If a family is going to have 4 children, what is the probability that exactly 2 will be girls? (B = boy, G = girl)

A **compound event** consists of two or more single events.

There are **16** possible ways for the gender birth order to occur.

BBBB BBBG BBGB BBGG
BGBB BGBG BGGB BGGG
GBBB GBBG GBGB GBGG
GGBB GGBG GGGB GGGG

There are **6** possible ways that there could be exactly 2 girls.

BBGG BGBG BGGB
GGBB GBGB GBBG

The probability of exactly 2 girls out of 4 births is as follows:

$$P(\text{exactly two girls}) = \frac{\text{6 ways event can occur}}{\text{16 possible outcomes}} = \frac{3}{8} = 37.5\%$$

Making Predictions — Lesson 12-6

Why? Insurance companies use probabilities to make predictions about life expectancy.

If you roll a number cube 24 times, how many times can you expect to roll a 5?

$P(\text{rolling a } 5) = \frac{1}{6}$ Use the probability to set up a proportion.

$$\frac{1}{6} = \frac{x}{24}$$
$$6 \cdot x = 1 \cdot 24$$
$$6x = 24$$
$$x = 4$$

Independent and Dependent Events — Extension

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.

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