

Lesson 12-3

Example 1 Theoretical and Experimental Probability

What is the theoretical probability of rolling a 4 with a number cube and flipping tails with a coin?

The theoretical probability is $\frac{1}{6} \cdot \frac{1}{2} = \frac{1}{12}$.

Example 2 Theoretical and Experimental Probability

The results of an experiment in which a number was rolled and a coin was flipped are given at the right. According to the experimental probability, is rolling a 4 and flipping heads likely to occur on the next trial?

Examine the table. Out of 100 trials, rolling a 4 and flipping heads only occurred 2 times. So, the experimental probability of rolling a 4 and flipping heads is $\frac{2}{100}$ or $\frac{1}{50}$.

Thus, it is not likely to occur on the next trial.

Results	Number of Trials
H1	10
H2	12
H3	4
H4	2
H5	6
H6	20
T1	6
T2	7
T3	11
T4	12
T5	3
T6	7

Example 3 Real-World Example

MARKETING Four hundred shoppers at the mall were asked whether they purchased greeting cards or wrapping paper in the last year. Of these, 300 purchased greeting cards and 150 purchased wrapping paper. What is the experimental probability that a shopper at the mall purchased wrapping paper in the last year?

There were 400 people surveyed and 150 purchased wrapping paper in the last year. The experimental probability is $\frac{150}{400}$ or $\frac{3}{8}$.

Example 4 Use Probability to Predict

GARDENING Over the last 5 years, the probability that pumpkin seeds planted by Elizabeth produced pumpkins is $\frac{3}{4}$. Is this probability experimental or theoretical?

Explain.

This is an experimental probability since it is based on what happened in the past.

If Elizabeth wants to have 60 pumpkin-bearing plants, how many seeds should she plant?

This problem can be solved using a proportion.

$$\frac{3}{4} = \frac{60}{x}$$

Solve the proportion.

$$\frac{3}{4} = \frac{60}{x}$$

Write the proportion.

$$3 \cdot x = 4 \cdot 60$$

Find the cross products.

$$3x = 240$$

Multiply.

$$\frac{3x}{3} = \frac{240}{3}$$

Divide each side by 3.

$$x = 80$$

Elizabeth should plant 80 seeds.