

10.1 Sample Spaces and Probability

a) How many ways can a 1 be spun? 2? 3? 4? 5?

$$\frac{1}{12}; \frac{2}{12} = \frac{1}{6}; \frac{3}{12} = \frac{1}{4}$$

b) List the sample space.

1, 2, 3, 4, 5

c) What is the probability of spinning a 1? 3? 5?

$$\frac{1}{12} \quad P(1) = \frac{1}{12}$$

$$P(3) = \frac{1}{4}$$

$$P(5) = \frac{4}{12} = \frac{1}{3}$$



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Vocabulary

A **probability experiment** is an action, or trial that has varying results.

The possible results are called the **outcome(s)**.

The collection of one or more outcomes is called an **event**.

The set of all possible outcomes is called the **sample space**.

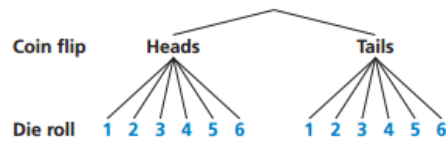
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Possible Ways to List Sample Space:

List

H1 H2 H3 H4 H5 H6
 T1 T2 T3 T4 T5 T6

Heads, 1 Heads, 2 Heads, 3 Heads, 4 Heads, 5 Heads, 6
 Tails, 1 Tails, 2 Tails, 3 Tails, 4 Tails, 5 Tails, 6



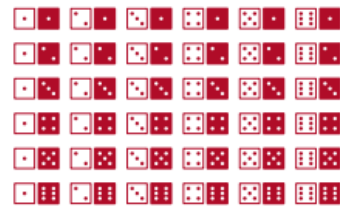
Tree Diagram

Number correct	Outcome
0	IIII
1	CIII ICII IICI IIIC
2	IICC ICIC ICCI CIHC CICI CCII
3	ICCC CICC CCIC CCCI
4	CCCC

exactly two correct →

Table/Chart

Visual Pictures



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Probability

Probability of an event is the percent chance that the event happens. If all outcomes are equally likely then it is called **theoretical probability**.

If the probability is based on repeated trial outcomes it is called **experimental probability**.

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Formulas

$$\text{Theoretical probability} = \frac{\text{Number of favorable outcomes}}{\text{Total number of outcomes}}$$

$$\text{Experimental probability} = \frac{\text{Number of successes}}{\text{Number of trials}}$$

This is the probability that the event will NOT occur ever.

$P(\bar{A})$
 $P(A^c)$

Probability of the Complement of an Event

The probability of the complement of event A is

$$P(\bar{A}) = 1 - P(A). \text{ OR } P(A^c)$$

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Write the sample space.

Describe the type of probability.

theoretical or experimental

Answer the probability question for each.

Example:

Spin a spinner containing the numbers 1, 2, 3, 4 and flipping a coin. What is the likelihood of spinning a 4? 5? Complement of 2?

1H 1T
2H 2T

3H 3T
4H 4T

$$P(4) = \frac{2}{8} = \frac{1}{4}$$

$$P(5) = 0$$

$$P(2^c) = 1 - P(2)$$

$$1 - \frac{1}{4} = \frac{3}{4}$$

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10.1 Sample Space and Probability without activity with work

HW: pg. 542:

A: 11, 21, 23, 25, 27, 29 - 34

B: 1, 5, 7, 9, 11, 13, 15, 17, 19, 29 - 34

C: 1 - 19 (o), 29 - 34

ANSWERS:

30. $\frac{x^7}{3}, x \neq 0, y \neq 0$ 32. $\frac{12}{5}, x \neq 0, y \neq 0$ 34. $\frac{3x^2 + 2x - 13}{x^6 + 9x^4}$

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