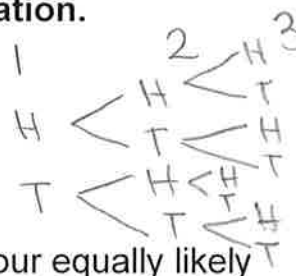


12.1 Sample Space and Probability

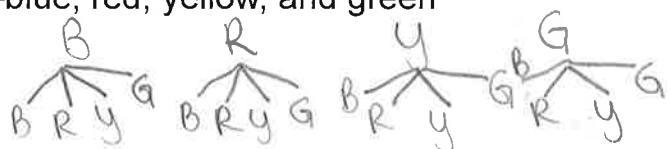
Key

List the possible outcomes for the situation.

1. tossing a coin three times



2. spinning a spinner twice that contains four equally likely colors—blue, red, yellow, and green



3. spinning the spinner mentioned in Exercise 2 followed by tossing a coin



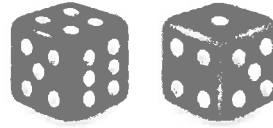
In an experiment, three coins are flipped.
List the possible outcomes in the sample space of the experiment.



- HHH
- HTT
- HHT
- HTH
- TTH
- THT
- TTH
- TTT

12.1 Sample Space and Probability

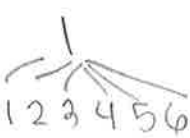
List the possible outcomes in the sample space of the experiment.



a. One six-sided die is rolled.

1 2 3 4 5 6

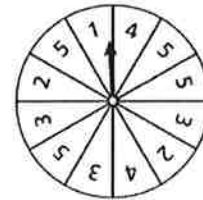
b. Two six-sided dice are rolled.



In an experiment, a spinner is spun.

a. How many ways can you spin a 1? 2? 3? 4? 5?

1; 2; 3; 2; 4



b. List the sample space.

1, 2, 2, 3, 3, 3, 4, 4, 5, 5, 5, 5

c. What is the total number of outcomes?

12

12.1 Sample Space and Probability

In an experiment, a bag contains 2 blue marbles and 5 red marbles. Two marbles are drawn from the bag.



a. How many ways can you choose two blue? a red then blue? a blue then red? two red?

BB-2 RB-10 BR-10 RR-20

b. List the sample space.

c. What is the total number of outcomes?

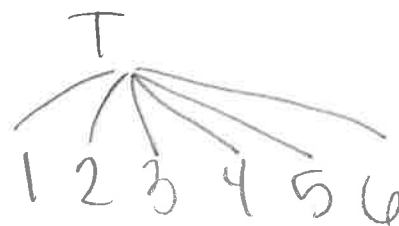
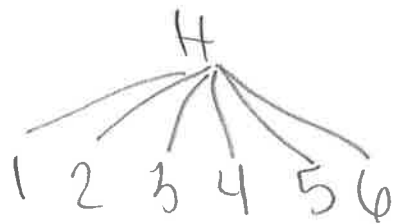
42

Find the number of possible outcomes in the sample space. Then list the possible outcomes.

1. You flip two coins.

HH TH
HT TT

2. You flip two coins and roll a six-sided die.



Probability is the measure of how likely an event is to occur. Probabilities are written as fractions or decimals from 0 to 1 or as percents from 0% to 100%.

Each possible result of a probability experiment or situation is called an outcome.

The sample space is the set of all possible outcomes.

An event is an outcome or a set of outcomes.

Equally likely outcomes have the same chance of occurring.

Favorable outcomes are outcomes for a specified event. (ex: rolling a 3, rolling an even number, rolling a number other than 2, etc.)

The theoretical probability of an event is the ratio of the number of favorable outcomes to the total number of outcomes. (Probability it SHOULD happen)

$$P(\text{event}) = \frac{\text{number of favorable outcomes}}{\text{number of outcomes in the sample space}}$$

12.1 Sample Space and Probability

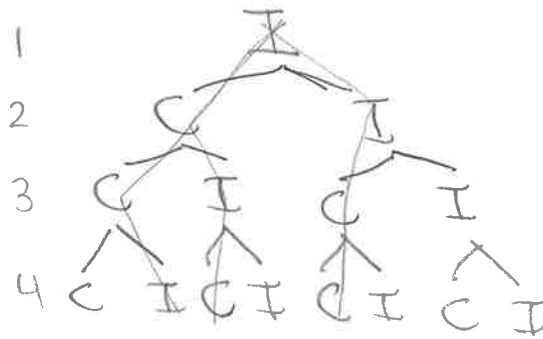
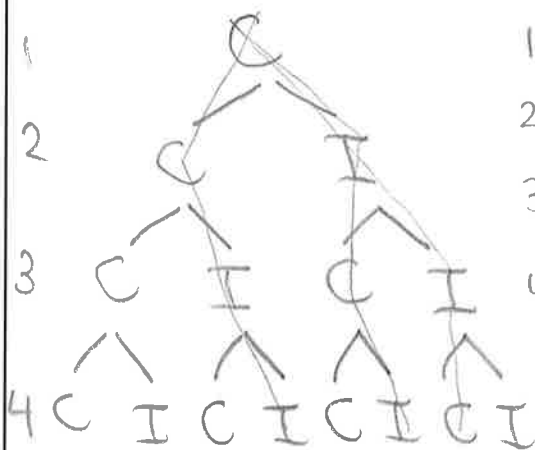
$$P(\text{rolling a 3}) = \frac{1}{6}$$

$$P(\text{rolling a number less than 4}) = \frac{3}{6} = \frac{1}{2}$$

A student taking a quiz randomly guesses the answers to four true-false questions.

What is the probability of the student guessing exactly two correct answers?

C = correct I = incorrect



$$\frac{6}{16} = \boxed{\frac{3}{8}} \quad \begin{array}{l} 0.375 \\ 37.5\% \end{array}$$

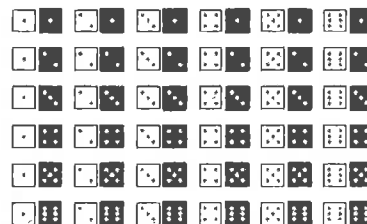
12.1 Sample Space and Probability

The complement of event E , is the set of all outcomes **NOT** in event E .

$$P(A) + P(\bar{A}) = 1 \quad \text{or} \quad P(\bar{A}) = 1 - P(A)$$

$$P(\text{not rolling a 3}) = \frac{5}{6}$$

When two six-sided dice are rolled, there are 36 possible outcomes, as shown. Find the probability of each event.



a. The sum is not 6.

$$\frac{36 - 5}{36} = \boxed{\frac{31}{36}}$$

b. The sum is less than or equal to 9.

$$\frac{36 - 6}{36} = \frac{30}{36} = \boxed{\frac{5}{6}}$$

12.1 Sample Space and Probability

1. If you roll two dice, what is the probability that the sum of the two dice will be 4.

$$\frac{3}{36} = \boxed{\frac{1}{12}}$$

2. What is the probability that the sum is 7?

$$\frac{6}{36} = \boxed{\frac{1}{6}}$$

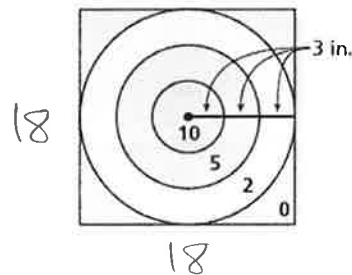
3. What is the probability that the difference is 6?

$$\frac{0}{36} = \boxed{0}$$

4. What is the probability that the sum is greater than 1?

$$\frac{36}{36} = \boxed{1}$$

You throw a dart at the board shown. Your dart is equally likely to hit any point inside the square board. Are you more likely to get 10 points or 0 points?



$$\pi r^2$$

$$10 : \frac{9\pi}{324} \approx 0.09$$

$$0 : \pi(9)^2 = 81\pi$$

$$\frac{324 - 81\pi}{324} \approx \frac{69.5}{324} \approx 0.21$$

0 points

12.1 Sample Space and Probability

3. You flip a coin and roll a six-sided die. What is the probability that the coin shows tails and the die shows 4?

Find $P(\bar{A})$.

4. $P(A) = 0.45$

$$1 - 0.45 = \boxed{0.55}$$

5. $P(A) = \frac{1}{4}$

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

6. $P(A) = 1$

$$1 - 1 = \boxed{0}$$

7. $P(A) = 0.03$

$$1 - 0.03 = \boxed{0.97}$$

8. In Example 4, are you more likely to get 10 points or 5 points?

10 : 0.09

5 : $\frac{36\pi - 9\pi}{324} = \frac{27\pi}{324} = 0.26$

5 pts

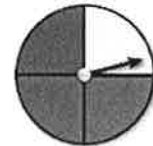
9. In Example 4, are you more likely to score points (10, 5, or 2) or get 0 points?

2 : $\frac{81\pi - 36\pi}{324} = \frac{45\pi}{324} = 0.43$

0 : 0.20

$0.09 + 0.26 + 0.43 = 0.78$ more likely to get points

Each section of the spinner shown has the same area. The spinner was spun 20 times. The table shows the results. For which color is the experimental probability of stopping on the color the same as the theoretical probability?



Spinner Results			
red	green	blue	yellow
5	9	3	3

Theor. Prob = $\frac{1}{4}$

$\frac{5}{20}$

$\frac{9}{20}$

$\frac{3}{20}$

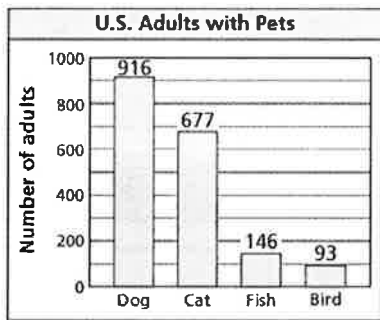
$\frac{3}{20}$

↓
 $\frac{1}{4}$

Red

12.1 Sample Space and Probability

In the United States, a survey of 2184 adults ages 18 and over found that 1328 of them have at least one pet. The types of pets these adults have are shown in the figure. What is the probability that a pet-owning adult chosen at random has a dog?



$$\frac{\text{Dog}}{\text{total}} = \frac{916}{1328} = \frac{229}{332}$$

0.69
69%

10. In Example 5, for which color is the experimental probability of stopping on the color greater than the theoretical probability?

$$\frac{9}{20} = 0.45 \rightarrow \text{Green}$$

11. In Example 6, what is the probability that a pet-owning adult chosen at random owns a fish?

$$\frac{144}{1328} = \frac{73}{664}$$

0.11
11%

Homework

Pg. 672 #3 - 10, 13, 15 - 20, 22