

## Math 7H - Unit 7

### Day 3 - Theoretical Probability

#### Lesson Objectives:

- I can develop a probability model and use it to find probabilities of events.
- I can compare probabilities from a model to observed frequencies.

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

For rolling a number cube, the sample space was {1,2,3,4,5,6}. For flipping a coin, the sample space is {heads, tails}.

Suppose two number cubes are rolled. Find the probability of an odd sum. Hint: make a table showing the sample space when rolling two number cubes.  $P(\text{odd sum}) = \frac{18}{36} = \frac{1}{2}$

+	1	2	3	4	5	6
1	2	3	4	5	6	7
2	3	4	5	6	7	8
3	4	5	6	7	8	9
4	5	6	7	8	9	10
5	6	7	8	9	10	11
6	7	8	9	10	11	12

A game is considered "fair" if every player has the same probability of winning, meaning that all of the possible outcomes are equally likely.



The spinner is equally likely to land on 1 or 2. The spinner is fair.



The spinner is more likely to land on 1 than on either 2 or 3. The spinner is *not* fair.

We will spend some more time with this tomorrow. :)

The probability of an event is a ratio that compares the number of favorable outcomes to the number of possible outcomes.

$$P(\text{event}) = \frac{\text{number of favorable outcomes}}{\text{number of possible outcomes}}$$

Suppose a coin is flipped. What is the probability of getting heads?

$$P(\text{Heads}) = \frac{1}{2}$$

Suppose a number cube is rolled. What is the probability of rolling a three?

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

Suppose a number cube is rolled. What is the probability of rolling an even number?

$$P(\text{even}) = \frac{3}{6} = \frac{1}{2}$$

The probability in the previous examples is called theoretical probabilities. Theoretical probability is what should occur.

The letters in the word JOHNSON are placed in a hat. You randomly choose a letter from the hat. What is the theoretical probability of choosing a vowel?

$$P(\text{vowel}) = \frac{3}{10}$$

The theoretical probability that you randomly choose a red marble from a bag is 5/8. If there are 40 marbles in the bag, how many are red?

$$P(\text{red}) = \frac{5}{8} \cdot 40 = 25$$

Suppose a 6-sided number cube is rolled. What is the probability of rolling a 4 or a 5?

$$P(4 \text{ or } 5) = \frac{2}{6} = \frac{1}{3}$$

Suppose two number cubes are rolled. Find the probability of rolling two identical numbers.

$$P(\text{doubles}) = \frac{6}{36} = \frac{1}{6}$$

## Homework

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Rewrite Test Questions Unit 2A (14)

#### \* Individual Think Time \*



#### What to do if you get stuck...

- Reread the problem. Did you write it down correctly?
- Reread your notes. Is there a problem similar that we did together in class?
- Find a problem similar in your book. Try this one to see if it helps.
- Skip the problem until the end of Individual Think Time. Then ask an "educated" question of a neighbor or Mrs. Call.

Today we're working by...

