

7th Grade
May 20, 2021

Today we will:

- Review notes
- Do examples

HOMEWORK:

None



What is Theoretical Probability?

Theoretical Probability is the likelihood that an event will happen. The probability of an event is the ratio of favorable outcomes to the number of possible outcomes.

$$P(\text{event}) = \frac{\text{favorable}}{\text{possible}} \quad \text{OR} \quad P(\text{event}) = \frac{\text{want}}{\text{total}}$$

The probability of an event is always between 0 and 1 or 0% and 100%

A probability can never be below 0% and probability can never be above 100%.

What is Experimental Probability?

Experimental Probability is the ratio of the _____ number of times an event occurs to the _____ number of trials

$$P(\text{event}) =$$

The frequency table below represents data collected from rolling a die fifty times.

Number	1	2	3	4	5	6
Frequency	7	5	10	9	11	8

- 1) What is the experimental probability of rolling a number greater than 3?
- 2) What is the theoretical probability?

A student rolled a pair of fair, six-sided, dice sixty times and recorded the sums in the frequency table below.

2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	

- 1) What is the experimental probability of rolling a sum of 10?

- 4) What is the theoretical probability?

	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

What is Theoretical Probability?

Theoretical Probability is the likelihood that an event will happen. The probability of an event is the ratio of favorable outcomes to the number of possible outcomes.

$$P(\text{event}) = \frac{\text{favorable}}{\text{possible}} \quad \text{OR} \quad P(\text{event}) = \frac{\text{want}}{\text{total}}$$

The probability of an event is always between 0 and 1 or 0% and 100%

A probability can never be below 0% and probability can never be above 100%.

What is Experimental Probability?

Experimental Probability is the ratio of the actual number of times an event occurs to the total number of trials

$$P(\text{event}) = \frac{\# \text{ occurrences}}{\text{total trials}}$$

The frequency table below represents data collected from rolling a die **fifty times**

Number	1	2	3	4	5	6
Frequency	7	5	10	9	11	8

that shows on the die
 ↳ how many times that # showed up

- 1) What is the experimental probability of rolling a number greater than 3?

$$7 > 3 \Rightarrow 9 + 11 + 8 = \frac{28}{50} = \frac{14}{25} = 56\%$$

- 2) What is the theoretical probability?

$$\frac{3}{6} = \frac{1}{2} = 50\%$$

7 > 3 showed up more than expected

A student rolled a pair of fair, six-sided, dice **sixty times** and recorded the sums in the frequency table below.

2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	

1) What is the experimental probability of rolling a sum of 10?


$$\frac{5}{60} = \frac{1}{12} \approx 8.3\%$$

4) What is the theoretical probability?

	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

$$\frac{3}{36} = \frac{1}{12} \approx 8.3\%$$

I rolled a sum of 10 the expected # of times.


 Name _____
 Unit _____ Lesson _____ Due Date _____

Theoretical vs Experimental Probability Examples

WE DO:

A coin is tossed 30 times, and it comes up heads 18 times. Find the experimental probability of tossing heads for this experiment. Then compare the experimental probability with the theoretical probability.

E is higher than what I expected.

$$E = \frac{18}{30} = 60\%$$

$$T = \frac{15}{30} = 50\%$$

Of two hundred adults surveyed, 85 said that they were planning to go on vacation over spring break.

What is the experimental probability that an adult was planning on going on vacation over spring break?

$$E = \frac{85}{200} = \frac{17}{40} = 42.5\%$$

$$\frac{4}{9} = \frac{12}{27}$$

Suppose 250 adults were surveyed. How many would be expected to go on vacation over spring break?

** use proportions **

$$\frac{85}{200} = \frac{x}{250} \quad (85 \times 250) \div 200 \approx 106$$

YOU DO:

5 The table shows the results of an experiment in which Alexis spun the spinner shown 20 times. (Example 1)

- What is the experimental probability of the spinner landing on 4?
- What is the experimental probability of the spinner landing on 3?
- What is the theoretical probability of the spinner landing on 3? Compare it to the experimental probability.

Result	Frequency
1	IIII
2	IIII
3	IIII
4	IIII



(a) $\frac{6}{20} = \frac{3}{10} = 30\%$

(b) $\frac{5}{20} = 25\%$

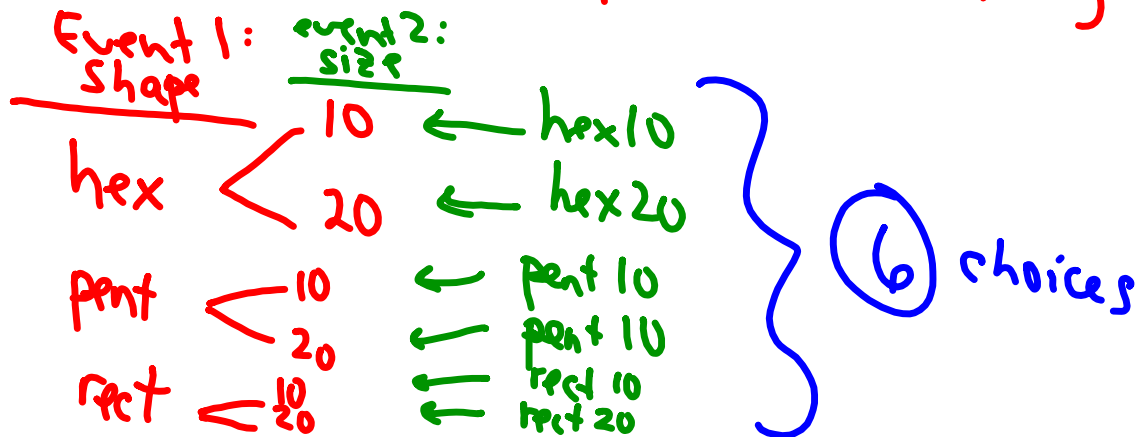
(c) $\frac{1}{4} \approx 25\%$
They are equal!



Compound events: 10-8 May 20

A pet store sells aquariums in three shapes, hexagon, pentagon, and rectangle, and two sizes, 10 gallons and 20 gallons. How many different fish tanks can be made from the different shapes and sizes?

Probability tree: Shows all possibilities of a compound event happening.



Students are assigned a temporary password the first time they visit the computer lab. Temporary passwords consist of a letter (A, B, or C), followed by a number (1 or 2), followed by a letter (X, Y, or Z). How many different temporary passwords are there?

* Fundamental Counting principle:
multiply the numbers of each possible outcome

$$3 \times 2 \times 3 = 18 \text{ passwords}$$