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Experimental Probability

| Notes | Video Links & Practice Space |
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| <p>Vocabulary</p> <p>Experimental Probability: The probability of an event based on _____ data from an experiment.</p> <p>Event: A set of possible _____ resulting from an experiment.</p> <p>Frequency: The _____ of times an outcome occurs.</p> <p>Theoretical probability: A number between 0 and ____ representing the _____ likelihood of an event.</p> | <p>Vocab (1:04)</p> |
| <p>Experimental Probability</p> <p>Experimental Probability = $\frac{\text{Number of times the event occurs}}{\text{Total number of trials}}$</p> <p>Simulations: an approximate _____ of a statistical experiment, often done with a computer program.</p> <p>Important - Remember a single trial does not affect the outcome of the next trial.</p> <p>Example: Flip a coin and get heads. That does not affect the second flip of the coin. Theoretically, I have a $\frac{1}{2}$ chance of getting heads every time I flip a coin.</p> | <p>Experimental Probability (1:06)</p> |

Practice



| Outcome | Frequency |
|---------|-----------|
| Red | 16 |
| Green | 3 |
| Purple | 11 |
| Yellow | 10 |

1. $P(\text{not red}) =$
2. $P(\text{yellow or purple}) =$

[Practice \(3:52\)](#)

3. Data collected on the number of hours students' study per week. What is the probability that students studied less than 3 hours?

| <u>Hours</u> | <u>Frequency</u> |
|--------------|------------------|
| 1 | 7 |
| 2 | 4 |
| 3 | 6 |
| 4 | 3 |

[Practice \(2:10\)](#)

4. Calculate the experimental probability for each outcome.

| Outcome | Heads | Tails |
|-----------|-------|-------|
| Frequency | 16 | 34 |

[Practice \(2:26\)](#)

Comparing Theoretical and Experimental Probability

| Outcome | 50 flips | 100 flips | 1000 flips |
|---------|----------|-----------|------------|
| Heads | 0.62 | 0.57 | 0.51 |
| Tails | 0.38 | 0.43 | 0.49 |

Law of large numbers: As more trials are run the experimental probability gets closer to the theoretical probability.

Theoretical probability of coin flip: $\frac{1}{2}$

[Comparing Theoretical and Experimental Probability \(0:53\)](#)

Practice

5. What is the theoretical probability of the spinner landing on green?



6. Using the experiment data below, what is the experimental probability of spinning green?

| <u>Colors</u> | <u>Frequency</u> |
|---------------|------------------|
| red | 2 |
| green | 6 |
| yellow | 4 |
| purple | 6 |

7. Compare the theoretical and experimental probability

Practice (3:21)

8. A bag of candy has 20 pieces. There are 6 cherry, 7 grape, 4 orange and 3 apple. Calculate the theoretical probability for each outcome.

9. An experiment was conducted with 40 trials and the data is given below. Calculate the experimental probability for each outcome.

| Outcome | Frequency |
|---------|-----------|
| cherry | 13 |
| grape | 11 |
| orange | 10 |
| apple | 6 |

10. How do the theoretical and experimental probabilities compare?

[Practice \(3:22\)](#)