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Experimental Probability in Big Ideas Math**

What is Experimental Probability?

Experimental probability is a measure of how likely an event is to occur based on repeated trials of an experiment.

What is the Big Idea of Probability?

Probability measures the likelihood of an event occurring. It ranges from 0 (impossible) to 1 (certain).

Theoretical Probability

The theoretical probability of an event is the ratio of the number of favorable outcomes to the total number of possible outcomes.

Finding Experimental Probability in Math

1. Perform the experiment multiple times.
2. Count the number of times the desired outcome occurs.
3. Divide the number of favorable outcomes by the total number of trials.

Example:

If you roll a die 10 times and get a "6" three times, the experimental probability of rolling a "6" is 3/10 or 0.3.

Experimental Probability in GCSE

In GCSE (General Certificate of Secondary Education), experimental probability is used to estimate the likelihood of an event occurring based on data collected through experiments or simulations.

4 Types of Probability

- **Classical:** Based on theoretical outcomes
- **Empirical:** Based on experimental results
- **Subjective:** Based on personal beliefs
- **Axiomatic:** Based on mathematical axioms

Why Probability is Tricky

Probability can be difficult to understand because:

- It deals with uncertain events.
- The same event can have different probabilities depending on the context.
- It involves concepts like independence and conditional probability.

Calculating Probability

The probability of an event A is P(A) = number of favorable outcomes / total number of outcomes

Theoretical Probability of a Spinner Landing on Blue

If a spinner has 6 equal sections, each labeled a different color, the theoretical probability of landing on blue is 1/6.

Experimental Probability of Rolling a 4

If you roll a die 15 times and get a "4" twice, the experimental probability of rolling a "4" is 2/15 or approximately 0.133.

Theoretical Probability of Spinning a Number Greater Than 3

If the spinner has numbers from 1 to 6, the theoretical probability of spinning a number greater than 3 is 1/2.

Solving Theoretical Probability

1. Identify the favorable outcomes.
2. Determine the total number of possible outcomes.
3. Calculate the probability as P(A) = favorable outcomes / total outcomes.

Theoretical Probability of Landing on a 6

If a dice has 6 sides, the theoretical probability of landing on a "6" is 1/6.

Examples of Probability in Math

- Finding the probability of getting a certain number on a dice roll
- Estimating the probability of rain based on historical weather data
- Calculating the probability of a successful experiment

Experimental Probability and Theoretical Probability

- Experimental probability is determined from repeated trials of an experiment.
- Theoretical probability is calculated based on the outcomes and assumptions of the experiment.

Calculating Probability Frequency

Probability frequency is the number of times an event occurs divided by the total number of trials.

Experimental Frequency

Experimental frequency is the actual number of times an event occurs in an experiment.

Calculating Probability in GCSE Maths

Probability in GCSE Maths can be solved using various techniques, including:

- Tree diagrams
- Probability tables

- Venn diagrams
- Conditional probability

3 Rules of Probability

- The probability of an event cannot be negative.
- The probability of an impossible event is 0.
- The probability of a certain event is 1.

Big Ideas in Statistics and Probability

Big ideas in statistics and probability include:

- Data collection and analysis
- Randomness and variation
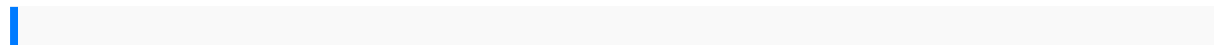- Probability models

Predictions Using Experimental Probability

Experimental probability can be used to make predictions about future events by estimating the likelihood of their occurrence based on past data.

Predicting Using Probability

Probability can be used to make predictions by calculating the likelihood of different outcomes based on the available information.

Finding Experimental Probability of a Compound Event

To find the experimental probability of a compound event (two or more events occurring together), multiply the probabilities of each individual event.

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