

MATH 1300, Mathematical Explorations

Monty Hall

Activity

- Describe problem, give out handout with description, and let students work at tables for a while, thinking about the problem.
- Have a class debate about what the probabilities are, get some guesses, take a vote, talk a bit about what a probability is and how we could test it
- Have them simulate using cups and checkers. Collect and tally data and discuss results:
 - Is this a proof?
 - Is this more or less convincing than an argument?
 - Does anyone have a proof/explanation for this?
 - Would this strategy actually help you on the game show in real life?
 - Is there a way to list all the outcomes of the game and count the wins?
 - What makes this so hard to wrap our minds around?
- Two choices not equal to 50-50
- Discuss Marilyn vos Savant story: American with highest recorded IQ in Guinness book of world records. “intelligence entails so many factors that attempts to measure it are useless”
- Problem was popularized when a reader wrote to Maryilyn vos Savant in her column in Parade magazine “Ask Marilyn”. She gave the correct answer $2/3$. Received over 10,000 angry letters in response, over 1000 of which were Ph.D’s.
- Things people have said since:
 - “no other statistical puzzle comes so close to fooling all the people all the time,”
 - “even Nobel physicists systematically give the wrong answer, and that they insist on it, and they are ready to berate in print those who propose the right answer.”
 - Proportionality Principle
- Discuss The Proportionality Principle: If various alternatives are equally likely, and then some event is observed, the updated probabilities for the alternatives are proportional to the probabilities that the observed event would have occurred under those alternatives.
 - Roommate in the shower - example from Monty Fall PDF
 - Other exmples
- Apply principle to Monty Hall

– Present Monty Fall Problem

- Does the original problem depend on the specific actions/intentions of the host?
- Can we apply the principle to this one?

References and resources

Monty Hall Handout

Monty Fall PDF

[Monty Hall and the Game Show Stick Or Switch Onion Puzzle](#)

Follow-on activities

Combinations, Probability, and Small Numbers

Reasoning about Probability