

Do The Math: Like Your Life Depends On it

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Sherlock Holmes: Does Mary Survive?

Sketch Mary's motion:

What are the variables?

What information do you need to know & how can we find it?

Possible solution:

You've been entered into The Game. Instead of using your own cunning and skill, however, **random chance** controls your **fate**. Survive all three rounds and live. There is one twist that might offer you an advantage. You get to pick which game you want to enter.

Do you want to enter DEADLY DIE or FATAL CARDS?

DEADLY DIE

Round 1: Roll a die. ONE side is fatal: "1"
Roll anything but the number 1 and you survive to round 2.

Round 2: Roll a die. TWO sides are fatal: "1" and "2"
Roll anything but the number 1 or 2 and you survive to Round 3.

Round 3: Roll a die. THREE of the numbers are fatal: "1" , "2" , "3"
Roll any of the three and you're done.
Roll anything but those numbers and you survive the game.

Theoretical probability of **surviving** *Deadly Die*:

You've been entered into The Game. Instead of using your own cunning and skill, however, **random chance** controls your **fate**. Survive all three rounds and live. There is one twist that might offer you an advantage. You get to pick which game you want to enter.

Do you want to enter DEADLY DIE or FATAL CARDS?

FATAL CARDS

You're given a suit of cards. Pair up with a neighbor who can administer the rounds. Then switch.

Round 1: You pick one card. Two of the 13 cards are fatal: 2 and 3
Pick either of the fatal cards and you're done.
Pick any other card and you survive to round 2.

Round 2: The cards from Round 1 are replaced.
Two more cards are now fatal.
There are now four fatal cards: 2, 3, 9, and 10.
You pick one card.
Pick any of the four fatal cards and you're done.
Pick any other card besides those four and you survive to round 3.

Round 3: The cards from Round 2 are replaced.
Two more of the cards are now fatal.
There are now six fatal cards: 2, 3, 9, 10, J, A
You pick one card.
Pick any of those six cards and you're done.
Pick any other card besides those six and you SURVIVE!

Probability of **surviving** *Fatal Cards*:

One Versus Many

Devise and carry out an experiment to test the theory

- What are the variables?
- What information do you need to know & how can we find it?
-

One Versus Many

Option 1: By Myself!! One person builds an object with n pieces and runs the distance formed by n people.

| # people/ # of blocks | time |
|-----------------------|------|
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Option 2: Team Work: n people build an object with n pieces while passing the object down a line formed by n people.

| # people/ # of blocks | time |
|-----------------------|------|
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Pit and the Pendulum

What variables affect the period of a pendulum?

Constants:

Data Collection:

| Length | Period (sec) | | | |
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Analysis