



Mind Your Own Business!

R App Inc. has been in business for a while and Athena and Rick have turned a profit. The two have always saved some of the money they made for extra things they wanted. "It would be nice to spend this money, but it's also smart to invest it to make even more money," Athena mentions. "But how can we predict if an investment is risky? I certainly don't want to lose any money!" replied Rick.

The pair decides to email their questions to Joe, an actuary, whose daily work involves using statistics to help predict risk. Joe suggests that Rick and Athena apply their knowledge of mathematical probability to help them make smart investment choices.



WORK THE MATH (Show your work on separate paper.)

Rick and Athena discover thousands of investment choices, but they limit their research to the following:

- A one-year bank certificate of deposit paying 1% simple interest annually. (The U.S. government protects the value of these accounts, and historically, no one has ever lost their money, even if the bank goes out of business.)
- Shares in a mutual fund, representing an investment in the stocks of the largest U.S. companies. Over the past 20 years, this has increased an average of 7%. In the past 20 years, there have been annual increases of more than 10% eleven times and losses worse than -10% three times.
- A share of a new company developing an app to chart the quickest path through school hallways. Rick estimates that there is a 99% chance that the company will not make money.

Suppose Athena has \$1,000 to invest:

1. What is the probability that the certificate could become worthless?
2. What is the probability that the mutual fund will lose more than 10% of its value in the next year?
3. Which investment would you choose? Explain your thinking.



Making reasonable predictions about the future gives Athena and Rick another app idea:

Because Iggy is so popular, the Limelights come up with a money-making idea to build upon his star status. They collect a few of his scales and plan to clone Iggy replicas to sell to the public for outrageous prices. The Limelights' investment advisor estimates that a \$100,000 investment will be necessary, and that the business has a 10% chance of making \$1,000,000 but a 90% chance of going bankrupt. What should the Limelights do?