

## Monte Carlo Monty

You are on a game show and there are three doors from which to choose. Behind one door is a check for \$1,000, behind another door is a check for 25 cents, and the last door has a check for 10 cents.

- Step 1) You get to pick a door.
- Step 2) After you pick, the game show host reveals what is behind a different door. The host always shows you one of the small amounts.
- Step 3) The host gives you a chance to stick with your original choice or switch to the other remaining door.
- Step 4) Your final choice is revealed and you find out which prize you have won.

The question is: Should you stick with the door you picked or should you switch to a different door?

### Exercises

- 1) Before you do any investigating, what is your initial guess? Should you stick? Should you switch? Does it matter? Explain.

The HP 39gs can play the part of the game show host and keep the results for you.

Turn on the HP 39gs and press the APLET key. Look for the HP applet **MONTE** (you may have to scroll). See your teacher if you don't have the applet. Once you have **MONTE**, highlight it and press the START menu key. Read the starting note and press the VIEWS key. Choose the option **One Trial**.

- 2) Did you win or lose? Record your result in the table below and repeat with **One Trial** until the table is filled. Use any strategy you want.

Trial	Strategy stick/switch	Result win/lose
1		
2		
3		
4		
5		

- 3) Are five trials enough for you to conclude that sticking or switching is best? Explain.

Now press the VIEWS key and highlight **Many Trials** in the menu. Do 100 trials in which you stick with your original choice. A door will be randomly chosen for you in each of the 100 trials.

4) How many times did you win with the original choice?

To compute the experimental probability of winning with the original choice, divide the number of wins by the number of trials. That is:

$$\text{Experimental Probability of Winning} = \frac{\text{Number of Wins}}{\text{Number of Trials}}$$

5) From this experiment, what is the experimental probability of winning with the original choice? Show your work.

Complete another experiment with 100 trials but this time use the switch strategy.

6) How many times did you win with the switch strategy?

7) From this experiment, what is the experimental probability of winning with the switch strategy? Show your work.

8) Do you think one strategy (stick or switch) is better than the other? If so, which one? What evidence do you have to support your choice?

9) Tanya and Sally are on your basketball team. During the season, Tanya made 150 free throws out of 250 tries and Sally made 200 free throws out of 350 tries. The game is tied, which player would you pick to shoot a free throw for your team? Why?