Let 'Em Roll™ Simulation – Student Guide

To begin this activity, open the Fathom document
PRICE_IS_RIGHT_LARGE_SAMPLE.ftm

Experimental Probability

Case 1: *Use experimental probabilities of winning a car on the Let 'Em Roll™ game assuming the contestant has three rolls to estimate the theoretical probability.*

Step1: To simulate playing the Let 'Em Roll™ game 5000 times, click on the AFTER 3 ROLLS case table as in Figure 1. Choose **Collection > New Cases.** Enter 5000 and click OK.)

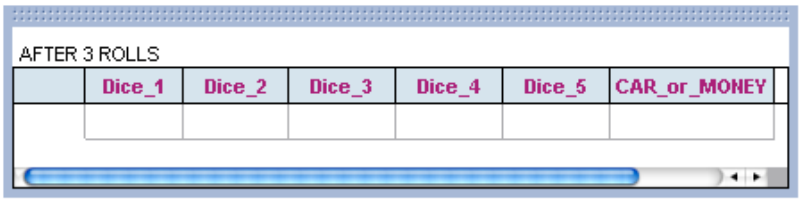

Figure 1

Step 2: Using this sample, determine the percentage of cars won. Drag a summary table off of the shelf as in Figure 2. Drag the attribute **CAR_OR_MONEY** from the after 3 rolls case table into the summary table so that it is below the down arrow.)

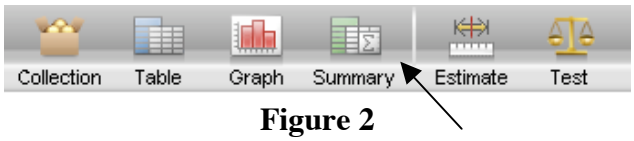

Figure 2

Percentage of cars won = _____ (1st sample)

Step 3: Determine the percentage of cars won using a new sample of size 5000 (Choose **Collection > Rerandomize**.)

Percentage of cars won = _____ (2nd sample)

Step 4: Create two more samples of size 5000 (Repeat the instructions from step 3 twice.)

Percentage of cars won = _____ (3rd sample)

Percentage of cars won = _____ (4th sample)

1. What is a good estimate for the theoretical probability of winning a car on the Let 'Em Roll™ game given three rolls?

2. How will the probability change by having two rolls as opposed to three rolls? Explain.

Case 2: *Use experimental probabilities of winning a car on the Let 'Em Roll™ game assuming the contestant has two rolls to estimate the theoretical probability.*

Step1: To simulate playing the Let "Em Roll™ game 5000 times, click on the AFTER 2 ROLLS case table as in Figure 3. Choose **Collection > New Cases.** Enter 5000 and click OK.

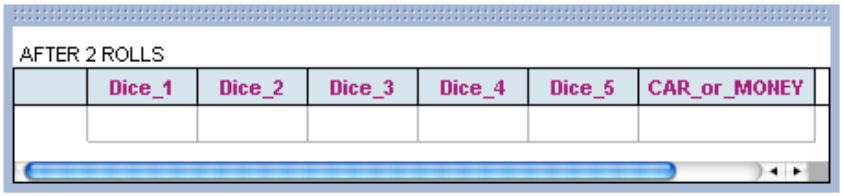

Figure 3

Step 2: Using this sample, determine the percentage of cars won. (Drag a summary table off of the shelf as in Figure 2. Drag the attribute **CAR_OR_MONEY** from the AFTER 2 ROLLS case table into the summary table so that it is below the down arrow.)

Percentage of cars won = _____ (1st sample)

Step 3: Determine the percentage of cars won using a new sample of size 5000 (Choose **Collection > Rerandomize**.)

Percentage of cars won = _____ (2nd sample)

Step 4: Create two more samples of size 5000 (Repeat the instructions from Step 3 twice.)

Percentage of cars won = _____ (3rd sample)

Percentage of cars won = _____ (4th sample)

3. What is a good estimate for the theoretical probability of winning a car on the Let 'Em Roll™ game given two rolls?

Theoretical Probability

Case 1: *Calculate the theoretical probability of winning a car on the Let 'Em Roll™ game assuming the contestant has three rolls.*

1. Rolling a Let 'Em Roll™ die once, calculate the probability of getting a "CAR".

2. Rolling a Let 'Em Roll™ die twice, calculate the probability of **NOT** getting a "CAR" on the first roll and getting a "CAR" on the second roll. (Hint: Think independent events!)

3. Rolling a Let 'Em Roll™ die three times, calculate the probability of **NOT** getting a "CAR" on the first roll and **NOT** getting a "CAR" on the second roll and getting a "CAR" on the third roll. (Hint: Think independent events!)

4. Using the probabilities in Numbers 1, 2 and 3, calculate the probability of rolling a Let 'Em Roll™ die and getting a "CAR" on the first roll or getting a "CAR" on the second roll or getting a "CAR" on the third roll. (Think mutually exclusive events!)

5. Using the probability in Number 4, calculate the probability of winning a car on the Let 'Em Roll™ game given 3 rolls. (Rolling dice #1, dice #2, dice #3, dice #4, and dice #5 are all independent events.)

4. Is the answer for the theoretical probability close to the estimate you obtained earlier from the experimental probabilities? Explain.

Case 2: *Calculate the theoretical probability of winning a car on the Let 'Em Roll™ game assuming the contestant has two rolls.*

1. Using a similar strategy as in case 1, calculate the probability of winning a car on the Let 'Em Roll™ game given two rolls.

5. Is your answer for the theoretical probability close to the estimate you obtained earlier from the experimental probabilities? Explain.