



**Task 1: Let's simulate:**

We can simulate this situation using a 20-sided die. Let each number represent 5 cents (\$0.05), so if you roll 13 that represents \$0.65.

Roll your die twice and sum the two numbers for a total amount.

Roll your die twice again nineteen more times. Let's just keep track of how many times you got exactly \$1.00 (a sum of 20) in your two rolls. (Note: we are **not** counting rolling 20 on the first roll as a success here – but if you want you can keep track of how often this happened too!)

How many times in your twenty trials did you get exactly \$1.00 (a sum of 20) in two rolls?

Combine your twenty trials with the twenty trials of your table members. Use this to create an estimate for the probability of getting a sum of 20 in exactly two rolls:

Let's sum all the data from the class to get a better estimate:

**Task 2: Let's calculate the theoretical probability this would happen:**

**So what is the probability that three players will all end up with a sum of 20 in exactly two rolls of the die?**

Given your answer to the previous problem, on average how many Price is Right shows would we have to watch before we expected to see this for the first time?

The Price Is Right has been on since 1972 with approximately 180 episodes annually. The “Showcase Showdown” began in 1975 and is played twice per episode. Use this information to determine how often we should expect to see all three contestants get exactly \$1.00.

**A follow-up question: We’ve assumed that the first player will automatically go for the \$1.00, but it is much more logical that this player will have a “threshold” value. This is the value they would “stick with” – in other words, if they spin this threshold or higher, then they will not spin a second time.**

What value would be your threshold?

Using your threshold amount, play against two of your table members (one as first player, one as second player, one as third). What assumptions do we need to make about the second and third players?

Play the “game” five times – how many times did the first player win?

**Open the applet/HTML page on the MyMA page for the class.**

In this simulation you enter your threshold (between 5 and 95), and how many times you would like to simulate. Choose a large number, say 100,000, for the number of times you want to simulate. Use this to fill in the chart below with your data:

<b>Threshold</b>	<b>Probability Player 1 wins</b>	<b>Probability Player 2 wins</b>	<b>Probability Player 3 wins</b>
<b>40 cents</b>			
<b>45</b>			
<b>50</b>			
<b>55</b>			
<b>60</b>			
<b>65</b>			
<b>70</b>			
<b>75</b>			
<b>80</b>			
<b>85</b>			
<b>90</b>			

Using your table above – what is the optimal strategy for Player 1?

Which player do you want to be when you get to the Showcase Showdown?