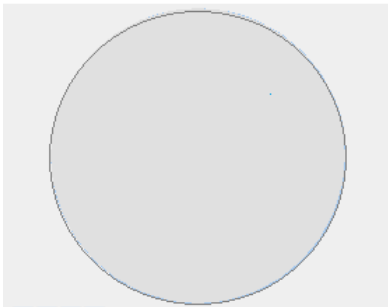


STAT 110: Practice Problem 1

Fall 2017

Researchers often use alternative-forced-choice procedures to assist in the evaluation of subjects they suspect are exaggerating their health issues. In one such case, a patient claimed to suffer from memory loss so severe that they couldn't remember what had happened only seconds earlier. To investigate this claim, researchers presented the subject with one of five objects: a black pen, a green highlighter, a yellow pencil, a red crayon, or an orange marker. After presentation of the object, the subject was asked to recall which of these five objects had been displayed (note: they weren't allowed to say, "I don't know" – they were forced to answer with one of the five options). This process was repeated a total of 30 times.

1. To what should you set the **Repeat** value on the spinner for this scenario? Explain your reasoning.
2. Sketch the spinner that you will use for your simulation below. Be sure to show both the outcomes that are possible on each trial and their associated probabilities.



3. What is the *expected* number of correct answers a subject would give if guessing on each of the 30 times they are presented with an object?
4. Using the examples from class to guide you, carry out a simulation study to determine what outcomes are likely (or unlikely) to occur if the subject is really guessing. In the end, you should have a graph showing the results of **1,000 trials** simulated under the assumption that the subject is guessing.

5. What does each dot on this plot represent? Be very specific!

6. Suppose that in the actual study, the subject was correct on 4 of the 30 trials. Based on this observed result, do you believe that the subject is really guessing (which they would have to do if they suffered from severe memory loss), or are you more convinced the subject may be exaggerating their problem? Explain your reasoning, and use the above dotplot in your explanation.

7. Now, suppose that in the actual study, the subject was correct on only 1 of the 30 trials. Based on this observed result, do you believe that the subject is really guessing (which they would have to do if they suffered from severe memory loss), or are you more convinced the subject may be exaggerating their problem? Explain your reasoning, and use the above dotplot in your explanation.