**Lesson 3.7 Classwork Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date\_\_\_\_\_\_\_\_\_\_\_**

You take a quiz with 6 multiple choice questions. Each question has 4 possible answers. Unfortunately, you forgot there was a quiz today, so you didn’t study at all – you have to guess at the answers. Design a simulation for this situation and determine the probability of getting at least half of the questions right.

**First, figure out the probabilities we’re working with.**

P(guessing right) = \_\_\_\_\_\_\_\_\_\_ P(guessing wrong) = \_\_\_\_\_\_\_\_\_\_\_

**Now we have to assign numbers to use in our simulation that will have the same ratio as these probabilities. Since there are 4 options, use the digits 1 – 4. Let one number represent the correct answer, and the other three will represent the wrong answers.**

\_\_\_\_\_ = right answer \_\_\_\_\_\_ = wrong answer

**Now we will run a random integer generator to simulate one try at the quiz. Since there are 6 questions on the quiz, we need 6 numbers. Run RandInt(1, 4, 6) – this will give us 6 numbers between 1 and 4.**

**To run the simulation again, press Enter. Run the simulation 10 times and write your results here:**

|  |  |  |
| --- | --- | --- |
| Trial # | Numbers | Number of Right Answers |
| 1 |  |  |
| 2 |  |  |
| 3 |  |  |
| 4 |  |  |
| 5 |  |  |
| 6 |  |  |
| 7 |  |  |
| 8 |  |  |
| 9 |  |  |
| 10 |  |  |

**What percentage of your trials had at least three answers correct? \_\_\_\_\_\_\_\_\_\_\_**

**To do this simulation properly, it must be run many more times!**

**3.7 Exercises**

**For each problem, set up a simulation, run at least 20 trials, and report your results:**

1. You take a quiz with 5 multiple choice questions. After you study, you estimate that you would have about an 80% chance of getting any individual question right. What are your chances of getting them all right?

2. Joe plays on the basketball team and over the course of the season, makes 71% of his free throws. In the championship game, he is fouled late in the game, with his team down by 1 point. What are his chances of making both free throws and winning the game?

3. A cereal company puts prizes in each box. There are 4 different prizes – 20% of the boxes have a blue bouncy ball, 30% of the boxes have a green bouncy ball, 40% of the boxes have a red bouncy ball, and only 10% of the boxes have a multi-colored sparkly bouncy ball. Design a simulation to determine the odds of getting four different bouncy balls if you buy four boxes at a time.

**4.**  Sam’s Wholesale Club sells a tub of Zany Zoo animal crackers. There are 6 different animal figures (zebra, elephant, monkey, kangaroo, lion and tiger) included in each tub. Design and conduct a simulation of at least 20 trials that can be used to estimate how many handfuls of animal crackers a person needs to take to collect each of the 6 animals if you select a handful of ten animal crackers at a time.

Refer to the guidelines above to design the simulation. Describe how to collect and interpret the data so that you have confidence in the estimation. Write your design in the space below.

Now, perform your simulation.

|  |  |  |  |
| --- | --- | --- | --- |
| Trial | Outcomes | Trial | Outcomes |
| 1 |  | 11 |  |
| 2 |  | 12 |  |
| 3 |  | 13 |  |
| 4 |  | 14 |  |
| 5 |  | 15 |  |
| 6 |  | 16 |  |
| 7 |  | 17 |  |
| 8 |  | 18 |  |
| 9 |  | 19 |  |
| 10 |  | 20 |  |

What predictions can be made based on the results of the simulation?

**5.** Bel Air High School Football team is to play its rival C. Milton Wright in a three game series. The two teams are evenly matched. Design and conduct a simulation of at least 20 trials that can be used to estimate the likelihood of Bel Air winning the series, in other words, winning at least two of the three games. Refer to the simulation guidelines to design the simulation. Describe how to collect and interpret the data so that you have confidence in the estimation. Write your design in the space below.

Now run your simulation:

|  |  |  |  |
| --- | --- | --- | --- |
| Trial | Outcomes | Trial | Outcomes |
| 1 |  | 11 |  |
| 2 |  | 12 |  |
| 3 |  | 13 |  |
| 4 |  | 14 |  |
| 5 |  | 15 |  |
| 6 |  | 16 |  |
| 7 |  | 17 |  |
| 8 |  | 18 |  |
| 9 |  | 19 |  |
| 10 |  | 20 |  |

What predictions can be made based on the results of the simulation?