Simulation Problems Worksheet Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_

AP Statistics

1. The chance of contracting strep throat when coming into contact with an infected person is estimated as 0.15. Suppose the four children of a family come into contact with an infected person. Conduct a simulation to answer the following questions. Use the random number table below and conduct 20 trials. Clearly identify each trial on the table.
   1. Using your results, estimate the average number of children who will get the disease.
   2. What is the probability of two of the children getting the disease?
   3. What is the probability of at least two of the children getting the disease?

31151 64727 88795 93736 22189 47004

48304 77410 78871 98387 44647 18072

65194 58586 78232 57097 01430 00304

32036 23671 65929 97613 94452 56211

85446 13656 32155 84455 38125 50339

82178 19650 41283 13944 13736 02627

41929 60613 73840 53838 90804 94332

1. Suppose the probability that an exploratory oil well will strike oil is about 0.2. Conduct a simulation to answer the following questions. Assume that the outcome (oil or no oil) for any one exploratory well is independent of outcomes from other wells. Use the random number table below and conduct 20 trials. Clearly identify each trial on the table.
   1. Estimate the average number of wells that need to be drilled in order to strike oil.
   2. What is the probability that it will take fewer than 3 attempts to strike oil?
   3. What is the probability that it will take exactly 6 wells to strike oil?

47169 80410 03333 73856 85627 54351

36653 55390 20439 48605 45513 05458

76361 47409 14914 55280 70533 52960

20579 87054 59998 90071 67554 91237

96994 65965 73235 49260 45309 24660

92048 08676 72653 87342 19084 33780

37592 96361 18246 36121 14888 23329

08032 20831 98314 93521 24035 43186

3. A certain professor has eight keys, but he never recalls which one fits his office door lock. He tries one key at a time, each time choosing one of the keys at random from his pocket. (All the keys look the same but he **does not** put a key back in his pocket once he has tried that key.) Conduct a simulation to answer the following questions. Use the random number table below and conduct 20 trials. Clearly identify each trial on the table.

* 1. What is the expected number of tries needed for him to find the correct key?
  2. What is the probability it will take more than 4 tries to find the right key?

64831 78558 25961 07610 75464 85326

34336 39840 24371 53548 01485 57845

11792 38659 92620 48253 05370 80411

65985 43392 21100 08763 37469 66583

52822 48990 03648 34861 54680 64791

31645 45552 78255 64794 21228 69707

38804 45687 85320 54654 76156 01853

97115 91205 92396 97645 18911 76701

29815 81029 06361 86378 33931 09331

4) **Shooting Foul Shots** A basketball player shoots with a two-thirds accuracy record. That is, he has scored a basket on two out of every three attempts. He is given a free throw from the foul line and is given a second shot only if he has scored a basket on the first shot. In this one-and-one situation, he can score 0,1,or 2 points. Design a simulation, using a single die, for this player’s score on a trip to the free throw line. Conduct 15 trials.

After doing the above steps answer, use the simulation to answer the following:

1. What is the average number of points per trip to the free throw line?
2. What number of points occurs the most often?
3. For what fraction of the trips to the free throw line did the player shoot twice?

5) **Kid Meal Problem:** A fast food chain has a new promotion in its Kid’s Meals. It is giving out one of seven different Power Rangers in each of its meals. If the action figures are given out randomly in each meal, about how many Kid’s Meals, on average, would one have to buy to collect all 7 different Power Rangers? Use your calculator to conduct 15 trials to answer the question.