AP Statistics Name_____-
HW 5.1 Part B WS Date_____Hour_____

1) Explain what's wrong with each of the following simulation designs:
   a) A roulette wheel has 38 colored slots – 18 red, 18 black, and 2 green. To simulate one spin of the wheel, let numbers 00 to 18 represent red, 19 to 37 represent black, and 38 to 40 represent green.

   b) About 10% of U.S. adults are left-handed. To simulate randomly selecting one adult at a time until you find a left-hander, use two digits. Let 01 to 10 represent being left handed. Move across a row in Table D, two digits at a time, skipping any numbers that have already appeared, until you find a number between 01 and 10. Record the number of people selected.

2) Determine whether the following simulation design is valid, justify your answer:
   a) According to a recent poll, 75% of American adults regularly recycle. To simulate choosing a random sample of 100 US adults and seeing how many of them recycle, roll a 4-sided die 100 times. A result of 1, 2, or 3 means the person recycles; a 4 means that the person doesn't recycle.

   b) An archer hits the center of the target with 60% of her shots. To simulate having her shoot 10 times, use a coin. Flip the coin one for each of the 10 shots. If it lands heads, then she hits the center of the target. If the coin lands tails, she doesn't.

3) The Transportation Security Administration (TSA) is responsible for airport safety. On some flights, TSA officers randomly select passengers from an extra security check prior to boarding. One such flight had 76 passengers- 12 in first class, and 64 in coach class. Some passengers were surprised when none of the 10 passengers chosen for screening were seated in first class. We can use a simulation to see if this result is likely to happen by chance.

a) State the question of interest using the language of probability.

b) Describe the method you would use to imitate one repetition of the process? Be sure to define your variables!

c) Use the following line of random digits below to perform one repetition. Mark directly on or above them to show how you determined the outcomes of the chance process. State your results.

71487 09984 29077 14863 61683 47052 62224 51025

d) In 100 repetitions of the simulation, there were 15 times when none of the 10 passengers chosen was seated in 1st class. What conclusion would you draw?

This is an actual Free Response Question from the 2001 AP Test.

4) Every Monday a local radio station gives coupons away to 50 people who correctly answer a question about a news fact from the previous day's newspaper. The coupons given away are numbered from 1 to 50, with the first-person receiving coupon 1, the second person receiving coupon 2, and so on, until all 50 coupons are given away. On the following Saturday, the radio station randomly draws numbers from 1 to 50 and awards cash prizes to the holders of the coupons with these numbers. Numbers continue to be drawn without replacement until the total amount awarded first equals or exceeds $300. If selected, coupons 1 through 5 each have a cash value of $200, coupons 6 through 20 each have a cash value of $100, and coupons 21 through 50 each have a cash value of $50. (

   a) Explain how you would conduct a simulation using the random number table provided below to estimate the distribution of the number of prize winners each week.

   b. Perform your simulation three times. (That is, run three trials of your simulation.) Start at the leftmost digit in the first row of the table and move across. Make your procedure clear so that someone can follow what you did. You must do this by marking directly on or above the table. Report the number of winners in each of your three trials.

72749 13347 65030 26128 49067 02904 49953 74674 94617 13317

81638 36566 42709 33717 59943 12027 46547 61303 46699 76423

38449 46438 91579 01907 72146 05764 22400 94490 49833 09258