A.P. Statistics
Assignment 3.10

Remember to show your thinking through your work.

For numbers 1 and 2, explicitly state the 5 steps of a simulation and carry out the simulation. For the first problem, use the random digit table. For the second problem, use your calculator.

1) A basketball player makes 80% of her free throws. Recently during a very close game, she shot 5 free throws near the end of the game and missed 3 of them. The fans booed. What is the probability of her missing 3 (or more) free throws out of 5? Set up and conduct a simulation (using the random digits below) with 10 repetitions.

83234602784360127630126087268768056651093246461081275417450174912432174 6
80176498174807164087128074087834027462374162074864814863108573856087126 7
16262256874658738723487984729694817984619845981265981651246004338043044 0

2) A nuclear reactor facility has two separate safety systems in place to prevent a nuclear meltdown. They prevent meltdown by shutting down the reactor when the temperature reaches the danger level. The first system shuts down the reactor 80% of the time when the danger level is reached. The second system (which is completely separate from the first) shuts down the reactor 90% of the time when the danger level is reached.
   a. Use your calculator to do 10 repetitions with the first system alone. Theoretically it should successfully shut it down 16 out of 20 times.

   b. Use your calculator to do 10 repetitions with the second system alone. Theoretically it should successfully shut it down 18 out of 20 times.

   c. Use your calculator to do 20 repetitions with the first and second systems working together. The reactor will successfully shut down if one or both systems works.

3) Show all your work. Indicate clearly the methods you use, because you will be graded on the correctness of your methods as well as on the accuracy of your results and explanation

3. 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 3 times. (That is, run 3 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 3 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