MA 2312 Quiz 5

DO ALL QUESTIONS. YOUR GRADE WILL BE ASSESSED ON YOUR EXPLANATION OF THE ANSWER AND NOT JUST THE ANSWER ITSELF.

Name: ___________________________________

1. Use the Principle of Mathematical Induction to prove that $4 \mid (9n - 5n)$ for all $n \geq 0$.

2. Use mathematical induction to prove that every amount of postage of six cents or more can be formed using 3-cent and 4-cent stamps.
3. A club with 20 women and 17 men needs to form a committee of size six. How many committees are possible if the committee must have three women and three men?

4. Suppose that a “word” is any string of seven letters of the alphabet, with repeated letters allowed. How many words begin with A or B?

5. You pick cards one at a time without replacement from an ordinary deck of 52
playing cards. What is the minimum number of cards you must pick in order to guarantee that you get (a) a pair (for example, two kings or two 5s) (b) three of a kind (for example, three 7s).

6. A computer is programmed to print subsets of \( \{1,2,3,4,5\} \) at random. If the computer prints 40 subsets, prove that some subset must have been printed at least twice.