Howard University Math Department

Instructions:

PLEASE PROVIDE STEP BY STEP EXPLANATIONS

WRITING ONLY ANSWERS WILL NOT GET FULL CREDIT

Time Limit 30 minutes

Please read the questions carefully before answering

1. (15 points) Check whether the following relation defined on the set of positive integers is reflexive, symmetric, transitive, antisymmetric, and partial order:

   $xRy \iff x$ divides y. In other words, y/x is also an integer.

2. (15 points) How many 5-letter strings can be formed from the letters ABCDE if repetitons are allowed? How many can be formed from the letters ABCDE if repetitons are not allowed? How many starting with the letter A can be formed from the letters ABCDE if repetitons are not allowed?

3. (10 points extra credit) If the integers from 1 to 9 are partitioned as the union of the disjoint sets $\{1, 4, 7\}, \{2, 5, 8\}, \{3, 6, 9\}$ what are the equivalence classes? What is the equivalence relation?