Math 200 - Quiz 8

April 14, 2010

Name key

Score _____

Show all work. Supply explanations when necessary.

1. (1 point) Is the following statement true or false? If false, supply a counterexample. If true, supply an example.

   If $d \mid a$, then $d \mid a^2$.

   TRUE, IF $d \mid a$ THEN d DIVIDES ANY MULTIPLE OF a AND a^2 IS A MULTIPLE OF a.

   EX $2 \mid 4$ AND $2 \mid 16$.

2. (2 points) Test the number 12353142 for divisibility by 2, 3, 4, 6, 8, and 9.

   D BY 2: YES. LAST DIGIT IS 2 AND $2 \mid 2$.

   D BY 4: NO. $4 \nmid 42$

   D BY 8: NO. THE NUMBER IS NOT EVEN DIVISIBLE BY 4.

   D BY 3: YES. SUM OF DIGITS IS 21 AND $3 \mid 21$.

   D BY 9: NO. " " " " " " $9 \nmid 21$.

   D BY 6: YES. THE NUMBER IS DIVISIBLE BY BOTH 2 & 3.

3. (2 points) Devise and prove a test for divisibilty by 20.

   AN INTEGER IS DIVISIBLE BY 20 IF AND ONLY IF THE LAST TWO DIGITS FORM A NUMBER DIVISIBLE BY 20.

   PROOF: $20 \mid 100$ AND THEREFORE 20 DIVIDES ANY MULTIPLE OF 100. ANY NUMBER CAN BE WRITTEN AS A MULTIPLE OF 100 PLUS A ONE- OR TWO-DIGIT NUMBER. IF THAT ONE- OR TWO-DIGIT # IS DIVISIBLE BY 20, THE ENTIRE NUMBER IS.