Math 301 Quiz #6 - Take Home Name_____

This quiz is due Monday, April 6, by noon. If you do not turn it in during class, you may drop it off in my office, DA 219.

If you have questions about the problems on the quiz, you may ask me them, but, depending on the questions, I may refuse to answer all or part. **Your work must be completely your own. You are not permitted to discuss any of the problems on this quiz with any other person (except me) inside or outside of our class.**

1. Let R be the relation on $\mathbb{Z}$ given by ${}_aR_b$ if $a^2 \mid b$.

   (a) Prove that R is transitive.

   (b) Provide a counterexample to show that R is not symmetric.

2. For each set A and relation R given, circle all of the properties that R has.

   (a) $A = \{1, 2, 3\}, R = \{(1, 1), (1, 2), (2, 1), (2, 2), (3, 3)\}$.

   reflexive irreflexive symmetric antisymmetric transitive equivalence relation

   (b) $A = \{1, 2, 3\}, R = \{(1, 2), (2, 1)\}$.

   reflexive irreflexive symmetric antisymmetric transitive equivalence relation

   (c) $A = \mathbb{Z}, R$ is given by ${}_aR_b$ if $a < b$.

   reflexive irreflexive symmetric antisymmetric transitive equivalence relation

3. Find 3 different integers, k, so that $k \equiv 3 \pmod 7$