CS 173: Discrete Structures, Fall 2009
Quiz 1 (Wednesday 16 September)

NAME:

NETID:

This quiz has 2 pages containing 6 questions, totalling 20 points. You have 20 minutes to finish. Showing your work may increase partial credit in case of mistakes.

1. (1 point) Give the day and time when your assigned discussion section meets. State explicitly if you have switched sections recently.

2. (4 points) Compute the following quantities.

   (a) $\text{lcm}(21, 35) =$

   (b) $2^{\lfloor -2.8 \rfloor} =$

3. (4 points) Give a closed-form expression for the following summation. Show your work.

   $\sum_{k=-2}^{n} \frac{1}{2^k} =$

4. (5 points) Are the following equivalences, formulas, and claims correct? Write "yes" next to the ones that work for all input values. Write "no" next to the ones that fail in some cases.

   (a) $3 \mid 0$

   (b) $0 \in \mathbb{N}$

   (c) For any real number x, $\lfloor x \rfloor < \lceil x \rceil$.

   (d) -3 is prime.

   (e) $-13 \mid -26$

5. (3 points) State the contrapositive of the following statement, using logical equivalences to put it into a form where each "not" is on an individual (non-complex) proposition. Show your work.

   If John is a muggle and Ellen is a Wizard, then the crystal is not blue.

6. (3 points) Complete the following definition, using precise mathematical English and/or notation. Your definition must not use the mod, remainder, or similar operators.

   If x and y are integers, $x \mid y$ if and only if ...