

**CS 173: Discrete Structures, Spring 2009**  
**Quiz 1 (Wednesday 11 February)**

**NAME:**

**NETID:**

This quiz has 3 pages containing 7 questions, totalling 25 points. You have 20 minutes to finish. Showing your work may increase partial credit in case of mistakes.

- (1 point) Give the day and time when your assigned discussion section meets. State explicitly if you have switched sections very recently.
- (4 points) Compute the following quantities.
  - $\lfloor -3.7 \rfloor =$
  - $-7 \bmod 3 =$
- (4 points) Give a closed-form expression for the following summation.

$$\sum_{k=2}^{n+1} k =$$

4. (7 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)  $0 \mid 14$

(b)  $5 \mid -15$

(c)  $n^{m^n} = n^{mn}$

(d)  $\neg(p \rightarrow q) \equiv p \rightarrow \neg q$

(e)  $-3 \equiv 4 \pmod{7}$

(f) Zero is neither even nor odd.

(g) The statement “ $\forall x \in \mathbb{N}, x < 0 \rightarrow x^2 < 0$ ” is false.

5. (3 points) Complete the following definition, using precise mathematical English and/or notation.

An integer  $p$  is odd if and only if

6. (3 points) Negate the following statement, rephrasing so that each “not” is on an individual (non-complex) proposition.

For all integers  $x$  and  $y$ ,  $x < y$  implies that both  $x^2 < y^2$  and  $x - y < 0$ .

7. (3 points) State the Fundamental Theorem of Arithmetic.