Math 301
Quiz 9

Show all work in a neat and organized fashion. Clearly indicate your answers.
10 points possible.

1. Define $f : \mathbb{Z} \to \mathbb{Z}$ by $f(x) = x + 8$.

(a) (3 pts.) Prove f is one-to-one.

(b) (3 pts.) Prove f is onto $\mathbb{Z}$.

(c) (1 pt.) Define $g : \mathbb{Z} \to \mathbb{Z}$ by $g(x) = x^2 - 1$. Find $g \circ f$.

2. (3 pts.) Prove the following statement by induction.

$$(1 - \tfrac{1}{4})(1 - \tfrac{1}{9}) \ldots (1 - \tfrac{1}{n^2}) = \tfrac{n+1}{2n} \qquad \text{for all integers } n \geq 2$$