

This quiz is due on Wednesday, April 29, at the end of our class period.

1. Prove by Mathematical Induction:  $\forall n \in \mathbb{N}, 1 + 3 + 3^2 + \dots + 3^n = \frac{1}{2}(3^{n+1} - 1)$ .

2. (a) Carefully explain why  $f = \{(x, y) : x, y \in \mathbb{Z}, 2x + y > 5\}$  is not a function.

(b) Carefully explain why  $f : \mathbb{Z} \rightarrow \mathbb{Z}$  given by  $f(x) = x^2 + 1$  is not one-to-one.

3. Let  $f : \mathbb{Z} \rightarrow \mathbb{Z}^{\text{even}}$  be given by  $f(x) = 2x$ . Prove  $f$  is a bijection.