

(9 pts)

- (1) [+3] Letting \mathbb{P} be the set of all prime numbers (note that $1 \notin \mathbb{P}$) and $2\mathbb{Z}$ be the set of all even integers, express the following statement using logical symbols: “There exists an even integer that can be written as the sum of two primes in two different ways.”
- (2) [+3] Prove or disprove the following: $\forall n \in \mathbb{Z} \cdot (n < \sqrt{10}) \vee (n > 3)$.
- (3) [+3] Consider the following two logical statements:
- (a) $\forall \epsilon > 0 \cdot \forall x, y \in \mathbb{R} \cdot \exists \delta > 0 \cdot (|x - y| < \delta) \Rightarrow (|(3x - 4) - (3y - 4)| < \epsilon)$
- (b) $\forall \epsilon > 0 \cdot \exists \delta > 0 \cdot \forall x, y \in \mathbb{R} \cdot (|x - y| < \delta) \Rightarrow (|(3x - 4) - (3y - 4)| < \epsilon)$

Explain the difference between (a) and (b).