

Quiz 1

Instructions: Show your work and explain every step.

- (1) (2 points) Find the contrapositive of
If $a > 0$ and $b < 0$, then $ab < 0$.
- (2) (6 points) Find the negation of each of the following:
 - (a) $x^2 = 0$ if and only if $x = 0$.
 - (b) There exists an integer x such that for every integer y ,
 $x \leq y$.
 - (c) If $a > 0$ and $b < 0$, then $ab < 0$.
- (3) Prove or disprove the following (i.e. if the statement is true, prove it, and if the statement is false, write down a counterexample). Write down the method of proof you're using. The set $4\mathbb{Z}$ is the set of all integer multiples of 4.
 - (a) (3 points) If n is a prime number greater than 2, then n is odd.
 - (b) (3 points) $\sqrt{x+y} = \sqrt{x} + \sqrt{y}$, $\forall x, y \in \mathbb{R}$.
 - (c) (3 points) There exists an integer x such that for every integer y , $x \leq y$.
 - (d) (3 points) The set $4\mathbb{Z}$ has no smallest element.