

Math 223, Quiz 1 Solutions

Name: _____

- (1) (5 pts) Let $F(a, b)$ be the statement that a is friends with b and let the domain of x, y , and z be all students at Wellesley. Translate the following into English.

$$\exists x \forall y \forall z ((F(x, y) \wedge F(x, z) \wedge (y \neq z)) \implies \neg F(y, z))$$

Solution: The expressions after the quantifiers say that if students x and y are friends, and students x and z are friends, and furthermore, if y and z are not the same student, then y and z are not friends. With the quantifiers, we have that there exists a student x such that for all students y and all students z other than y , if x and y are friends and x and z are friends, then y and z are not friends. In other words,

There is a student at Wellesley none of whose friends are also friends with each other.