

**QUIZ #2 – MATH 2200
SPRING 2018**

1. Rewrite the following statement using nested quantifiers. (10 points)

Some student in this class will get all the problems correct on this quiz.

Solution: Either of the following are correct:

$P(x, y) =$ Student x got problem y correct on this quiz.

$\exists x \forall y P(x, y)$.

$Q(x) =$ Student x got all problems correct on this quiz.

$\exists x Q(x)$.

There are other correct formulations as well.

2. Give a proof that if $m^2 = n^2$ then either $m = n$ or $m = -n$. (10 points)

Hint: You may use the fact that if $ab = 0$, then $a = 0$ or $b = 0$.

Solution: Suppose that $m^2 = n^2$. Then $m^2 - n^2 = 0$ and hence $(m - n)(m + n) = 0$. By the hint we know that $m - n = 0$ or $m + n = 0$. In the first case $m = n$ and in the second $m = -n$. This is what we wanted so the proof is complete.