Add on to homework 5:

8. Rewrite the following using $\forall$ and $\exists$.
   (a) For all integers x, we have x is odd or even. (Your answer should include a definition of even/odd using $\exists$.)
   (b) There exist two positive numbers such that their sum is negative.
9. Consider the statement "If a and b are real numbers with $a \neq 0$, then $ax + b = 0$ has a solution."
   (a) Rewrite this statement using symbolic notation $\forall$ and $\exists$.
   (b) Negate this statement, giving your answer both in symbolic notation, and in words.
10. Negate the following.
   (a) There exists a grey cat.
   (b) Every cat has an owner.
   (c) Some of the students in the class are not here today.
   (d) For all $x, y \in \mathbb{Z}_{>0}$ there exists $z \in \mathbb{Z}_{>0}$ such that $x = y + z$.
   (e) The number $\sqrt{x}$ is rational if x is an integer.
11. For each of the following,
   (i) restate in words;
   (ii) decide whether it's true or false; and
   (iii) prove or disprove accordingly.
   (a) $\forall x \in \mathbb{Z}, \exists y \in \mathbb{Z}(x^2 = y)$
   (b) $\forall y \in \mathbb{Z}, \exists x \in \mathbb{Z}(x^2 = y)$
   (c) $\exists x \in \mathbb{Z}, \forall y \in \mathbb{Z}(x^2 = y)$
   (d) $\exists y \in \mathbb{Z}, \forall x \in \mathbb{Z}(x^2 = y)$