Feb 8 Worksheet

1. Write the following as an English sentence and decide if it is true or false.

- $\forall x \in \mathbb{R}, x^2 > 0$
- $\exists n \in \mathbb{N}, \forall X \in \mathcal{P}(\mathbb{N}), |X| < n$
- $\exists m \in \mathbb{Z}, \forall n \in \mathbb{Z}, m = n + 5$

2. Identify the quantifiers in the following English sentences.

- Every person has two parents.
- There is a math course with no prerequisites.
- Every math course taught at UConn this semester has at least one enrolled student who is not a math major.

3. Translate the following statement into symbols:

- For every positive integer ϵ there is a positive number M for which $|f(x) - b| < \epsilon$ whenever $x > M$.

4. Negate the statement in part 3.

5. Let R be the region in the xy plane that lies on or above the parabola $y = x^2$. Which of the following are true:

- For all $(x, y) \in R$, $y \geq x^2$.
- For all $(x, y) \in R$, there exists $(x', y') \in R$ such that $y = y'$ and $x \neq x'$.
- For all $(x, y) \in R$, there exists $(x', y') \in R$ such that $x = x'$ and $y \neq y'$.