MHF 3202, Dr. Block, Quiz 3 with answers, Spring 2020

1. (3 points) Write the following as an English sentence. Say whether it is true or false.

$$\forall x \in \mathbb{R}, \exists n \in \mathbb{N}, x^n \geq 0$$

Answer: For every real number x there is a natural number n such that $x^n \geq 0$.

2. (3 points) Translate the following sentence into symbolic logic.

There exists a real number a for which $a + x = x$ for every real number x.

Answer: $\exists a \in \mathbb{R}, \forall x \in \mathbb{R}, a + x = x$

3. (4 points) Negate the following sentence. Note that x is a variable.

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

Answer: There exists a positive number ϵ such that for every positive number M there exists a number x which satisfies $x > M$ and $|f(x) - b| \geq \epsilon$.

Alternate Answer: There exists a positive number ϵ with the property that for every positive number M there exists $x > M$ with $|f(x) - b| \geq \epsilon$.