1. Write each of the statements below using symbols:

   (a) For every ϵ greater than 0 there exists a δ greater than 0 such that if the absolute value of $x-y$ is less than δ, then the absolute value of $f(x)-f(y)$ is less than ϵ.

   (b) If x is an element of a set S, then there is an element y in S with the property that there is an integer n such that $a \cdot y^n = x$ for any a in S.

   Symbolic statement:

   (a)

   (b)

2. Find a counterexample to each of the following claims:

   (a) Let $S \subseteq \mathbb{Z}$ be an infinite set. Then $\forall n \in S \; \exists \; m \in S$ such that $n+m \in S$.

   (b) $(\forall x \in \mathbb{R})(\exists n \in \mathbb{Z})$ s.t. $(|n-x| < \frac{1}{10})$

   (c) $(\forall a, b \in \mathbb{R})(a \cdot b > a)$

   Counterexample:

   (a)

   (b)

   (c)

3. Find the negation of each of the statements below:

   (a) Every good boy does fine.

   (b) $(\forall n \in \mathbb{N})(\exists x \in A)(nx < 1)$

   (c) $(\exists M \in \mathbb{R})(\forall x \in \mathbb{R})(|f(x))| \leq M)$

   Negation:

   (a)

   (b)

   (c)