# An Introduction to Multiply Quantified Statements

When an open statement has more than one variable, each variable must be quantified. Many times, each variable is quantified *differently*. Below are some examples of **multiply quantified statements**.

- There is an $x \in \mathbb{R}$ such that for every $y \in \mathbb{R}$, $xy + 2x - 4y - 8 = y + 2$

- Given any $x > 0$, there exists a natural number $n$ such that $0 < \frac{1}{n} < x$.

- For every real number $\varepsilon > 0$, there is some natural number $N$ such that for all natural numbers $n \geq N$, $|a_n - L| < \varepsilon$.

- For any real number $x$, there is a $2 \times 2$ matrix $A$ with $\det A = x$.

- For some $b \in \mathbb{R}$, $a \leq b$ for all $a \in (0, 5)$.

**Question:** Given an open statement with more than one variable, does it matter which variable we quantify first?