Problem 12. Negate the following statement in a meaningful way.

\[
\text{For every } x \in \mathbb{Q}, \text{ there exists } y \in \mathbb{N} \text{ such that } \sin(xy) = 1 \text{ or } \cos(x + y) = \frac{1}{2}.
\]

Problem 13. As a definition, we say that a function \( f(x) \) is continuous at \( x = a \) if for every \( \epsilon > 0 \), there exists \( \delta > 0 \) such that if \( |x - a| < \delta \), then \( |f(x) - f(a)| < \epsilon \). In a meaningful way, state what it means for a function \( f \) to not be continuous at the point \( x = a \).

Problem 14. Let \( a, b, c \in \mathbb{Z} \). Show that if \( a|b \) and \( b|c \), then \( a|c \).