Exercises: Determine the domain. For each of the folowing quantified statements taken randomly from mathematics textbooks, **determine a plausible domain.** Some of the domains are implicit.

Exercise (1). (Well-ordering principle) Every nonempty subset of $\mathbb{N}$ has a smallest element.

The plausible domain is $\{X \subseteq \mathbb{N}\, |X| \leq 1\}$

Exercise (2). Every finite connected graph G has a spanning tree.

The set of all finite connected graphs.

Exercise (3). A tree with n vertices has exactly $n - 1$ edges.

The set of all trees.

Exercise (4). Every finite acyclic graph has at least one sink and at least one source.

The set of all finite acyclic graphs

Exercise (5). If u and v are different vertices of a digraph G, and if there is a path in G from u to v, then there is an acyclic path u to v.

The domain is the set of vertices in digraph G.

More translation practice: the implicit domain is $\mathbb{Z}$. Each of the following statements is implicitely quantified: that is, each is a "for all" statement, with domain $\mathbb{Z}$. For each of the following:
(i) translate into symbols
(ii) Write the negation of the statement in words
(iii) Write the contraposition of the original statement in words
(iv) Which are true?

Exercise (1). If a divides b, then ac divides bc for any c.