

Exercises 1.4

1. Let $P(x)$ denote the statement " $x \leq 4$." What are these truth values?

a) $P(0)$

3. Let $Q(x, y)$ denote the statement " x is the capital of y ." What are these truth values?

a) $Q(\text{Denver, Colorado})$

5. Let $P(x)$ be the statement " x spends more than five hours every weekday in class," where the domain or x consists of all students. Express each of these quantifications in English.

a) $\exists x P(x)$

7. Translate these statements into English, where $C(x)$ is " x is a comedian" and $F(x)$ is " x is funny" and the domain consists of all people.

a) $\forall x (C(x) \rightarrow F(x))$

Exercises 1.5

1. Translate these statements into English, where the domain for each variable consists of all real numbers.

a) $\forall x \exists y (x < y)$

3. Let $Q(x, y)$ be the statement “ x has sent an e-mail message to y ,” where the domain for both x and y consists of all students in your class. Express each of these quantifications in English.

a) $\exists x \exists y Q(x, y)$

5. Let $W(x, y)$ mean that student x has visited website y , where the domain for x consists of all students in your school and the domain for y consists of all websites. Express each of these statements by a simple English sentence.

a) $W(\text{Sarah Smith}, \text{www.att.com})$

9. Let $L(x, y)$ be the statement “ x loves y ,” where the domain for both x and y consists of all people in the world. Use quantifiers to express each of these statements.

a) Everybody loves Jerry.

b) Everybody loves somebody.