Exercises 1.4

1. Let P(x) denote the statement “x ≤ 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(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) ∃xP (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) ∀x(C(x) → F(x))

Exercises 1.5

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

a) ∀x∃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) ∃x∃yQ(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(Sarah Smith, [www.att.com](http://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.