

Task [2]

Q1:

Determine the truth value of each of these statements if the domain consists of all integers.

- a) $\forall n(n + 2 > n)$
- b) $\exists n(n = -n)$
- c) $\forall n(4n \leq 5n)$
- d) $\exists x(x^3 = -1)$
- e) $\forall x(2x > 3x)$
- f) $\forall n(n^2 \geq 0)$
- g) $\exists n(n^2 = 2)$
- h) $\forall n(n^2 > n)$

Q2:

Let $Q(x)$ be the statement " $x + 2 > 3x$." If the domain consists of all integers, what are these truth values?

- a) $Q(0)$
- b) $Q(-2)$
- c) $Q(3)$
- d) $\exists x Q(x)$
- e) $\forall x Q(x)$
- f) $\exists x \neg Q(x)$
- g) $\forall x \neg Q(x)$

Q3:

Assume $A(x)$ be the statement " x has a jacket," $B(x)$ be the statement " x has a shoes," and $C(x)$ be the statement " x has a t-shirt." Express each of these statements in terms of quantifiers and logical connectives. Let the domain consist of all students in your class.

- a) A student in your class has a jacket, a shoes, but not a t-shirt.

- b) All students in your class have a jacket, a shoes, and a t-shirt.
- c) Some student in your class doesn't has a jacket, a shoes, and a t-shirt.
- d) No student in your class has a shoes, a jacket, and a t-shirt.

Q4:

Translate each of these statements into logical expressions using predicates, quantifiers, and logical connectives. Let the domain consist of all people.

- a) Someone in your class can speak English.
- b) Everyone in your class is friendly.
- c) There is a person in your class who was not born in London.
- d) No student in your class has taken a course in C# programming.