

Tutorial Sheet 7 (Predicates & Quantifiers)

1. Let $P(x)$ denote the statement " $x < 4$ ". What are the truth values of the following?
(a) $P(0)$ (b) $P(4)$ (c) $P(6)$
2. If L is the set of letters in the word "newelpost" and P is the propositional function on L defined by $P(x) =$ " x is a vowel" find the truth set of P .
3. Let $P(x)$ be the statement " x spends more than five hours every weekday in a class", where the universe of discourse for x is the set of all computer science students at your college. Express each of the following quantifications in English.
(a) $\exists x P(x)$ (b) $\forall x P(x)$ (c) $\exists x \sim P(x)$ (d) $\forall x \sim P(x)$
4. Let $P(x)$ be the statement " $x = x^2$ ". If the universe of discourse is the set of integers, what are the truth values of the following?
(a) $P(0)$ (b) $P(1)$ (c) $P(2)$ (d) $P(-1)$ (e) $\exists x P(x)$ (f) $\forall x P(x)$
5. If P and Q are propositional functions on Z defined by $P(x) =$ " $x < 0$ " and $Q(x) =$ " $x < 5$ ", find the truth set of the propositional function $\sim P \wedge Q$.