

Problem Set 1 Solution

March 14, 2020

Question 1

- a. $\forall t \in T, \text{Canadian}(t) \Rightarrow \neg \text{Stanley}(t)$
- b. $\forall t \in T, \exists d \in D, \neg \text{Canadian}(t) \wedge \text{BelongsTo}(t, d)$
- c. $\forall t \in T, \exists d \in D, \text{Stanley}(t) \wedge \text{BelongsTo}(t, d)$
- d. $\forall t \in T, \exists d \in D, \text{BelongsTo}(t, d) \Rightarrow \forall d' \in D, d' \neq d \wedge \neg \text{BelongsTo}(t, d')$
- e. $\forall t_1 \in T, \exists d \in D, \exists t_2 \in T, t_1 \neq t_2 \wedge (\text{BelongsTo}(t_1, d) \wedge \text{BelongsTo}(t_2, d)) \Rightarrow \forall t_3 \in T, t_3 \neq t_1 \wedge t_3 \neq t_2 \wedge \neg \text{BelongsTo}(t_3, d)$

Question 2

- a. $\forall x \in \mathbb{R}, f(-x) = f(x)$
 $\forall x \in \mathbb{R}, -f(-x) = f(x)$
- b. $\forall g, f : \mathbb{R} \rightarrow \mathbb{R}, \exists h : \mathbb{R} \rightarrow \mathbb{R}, \text{Odd}(f) \wedge \text{Odd}(g) \Rightarrow \text{Odd}(f) \times \text{Odd}(g) = \text{Even}(h)$
- c. $f = 0$ is a solution, since $-f(-x) = -(-0) = 0 = f(x)$ and $f(-x) = -0 = 0 = f(x)$

Question 3

Question 4