Worksheet 2 Solution

March 10, 2020

Question 1

a) $x = Aizah, y = Aizah$ is one solution.

Yes. There is more than one answer. Take example $x = Carlos, y = Carlos$

b) $x = Aizah, y = Betty$ is one solution.

Yes. There is more than one answer. Take example $x = Ellen, y = Flo$

c) The statement is true

x	y	$rich(x) \wedge sameDept(x, y)$
Aizah	Aizah	True
Betty	Aizah	True
Carlos	Carlos	True
Doug	Aizah	True
Ellen	Ellen	True
Flo	Ellen	True

d) False. Consider example $x = Ellen, y = Carlos$

Question 2

a) $\forall x \in \mathbb{R}, f(x) = 10$

b) $\forall y \in \mathbb{R}, \exists x \in \mathbb{R}, f(x) = y$ where $f : \mathbb{R} \to \mathbb{R}$

c) A counter example : $x^2 = -1$

Question 3

a) $S = \{\, n \mid \forall n \in \mathbb{N},\ n > 3 \,\}$

b) Predicate $P(n)$ is $n > 3$

c) $\forall x \in \mathbb{Z},\ (-40 < x) \wedge (x > 10) \Rightarrow x \neq 0$

$\forall x \in \mathbb{E},\ sameDept(x, Doug) \Rightarrow rich(x)$