

Worksheet 2 Review

March 20, 2020

Question 1

- a. A solution is $x = Aizah$ and $y = Aizah$.

There is more than one possible answer, and another solution is $x = Carlos$ and $y = Carlos$

- b. One counter-example is $x = Aizah$ and $y = Betty$.

Another counter-example is $x = Flo$ and $y = Ellen$.

- c. The statement is true. For any employees, if the employee is in

1. Sales Department, Aizah can be chosen.
2. HR Department, Carlos can be chosen.
3. Design Department, Ellen can be chosen.

- d. Not true. There is an employee in all department.

A counter example to this statement is $x = Carlos$ and $y = Ellen$.

Question 2

- a. $\exists f : \mathbb{R} \rightarrow \mathbb{R}, f(x) = 10$.

- b. $\forall y \in \text{Codomain}(\mathbb{R}), \exists x \in \text{Domain}(\mathbb{R}), f(x) = y$.

- c. A counter example is $f(x) = -1$. There is no value in domain that can be mapped to the value in codomain.

Question 3

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

b. $\forall n \in \mathbb{N}, n > 3 \Rightarrow n > 1$

c. Every integer that is greater than 10 or less than -40 is not equal to 0

$$\forall n \in \mathbb{Z}, n > 10 \vee n < -40 \Rightarrow n \neq 0$$

Every employee who is in the same department as Doug is rich.

$$\forall x \in E, \text{SameDept}(x, \text{Doug}) \Rightarrow \text{Rich}(x)$$