Worksheet 7 Solution

March 16, 2020

Question 1

a. **Case 1** ($n \geq 1$)**:**

No more proof required. This is exactly what we want to show.

Case 2 ($\exists d \in \mathbb{N}, d \mid n \wedge d \neq 1 \wedge d \neq n$)**:**

Let $a = d$ and $b = k$.

Because we know $a \mid n$, and is written in form $n = ab, k \in \mathbb{Z}$, we can conclude that $k \mid n$.

Because we know $\forall n \in \mathbb{Z}^+$, and $d \in \mathbb{Z}, d \mid n \Rightarrow d \leq n$, $a \leq n$ and $b \leq n$.

Then the only combination where $n \mid a$ and $n \mid b$ are true is when $a = n$ and $b = 1$, and vice versa, by the fact that any lower value of a or b results in non-interger value.

Then it follows from the assumption $a \neq 1 \wedge a \neq n$ and $b \neq 1 \wedge b \neq n$ that $n \nmid a$ and $n \nmid b$

Question 2

Question 3