

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 $\forall n \in \mathbb{Z}^+, \text{ and } l \in \mathbb{Z}, l \mid n \Rightarrow l \leq n, a \leq n$.

Then $n \mid a$ is true only when $a = n$ and $b = 1$, by the fact that any lower value of a results in non-integer value.

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

The same logic holds for $n \nmid b$.

Lastly, since $n = ab$, and $\forall x \in \mathbb{Z}, x \mid x, n \mid ab$.

Question 2

Question 3