

# Worksheet 4 Review 2

April 11, 2020

## Question 1

- a.  $\exists n \in \mathbb{N}, n > 3 \wedge n^2 - 1.5n \geq 5$
- b. The variable is existentially quantified
- c. Because the variable is existentially quantified, the variable's value should be a *concrete* natural number
- d. **Statement:**  $\exists n \in \mathbb{N}, n > 3 \wedge n^2 - 1.5n \geq 5$

*Proof.* Let  $n = 5$ .

We will prove  $n > 3 \wedge n^2 - 1.5n \geq 5$ .

First, we need to prove  $n > 3$ .

The header tells us  $n = 5$ .

Using this fact, we can conclude  $n > 3$ .

Now, we need to show  $n^2 - 1.5n \geq 5$ .

Using the fact  $n = 5$ , we can calculate

$$\begin{aligned} n^2 - 1.5n &= 25 - 7.5 & (1) \\ &= 17.5 & (2) \\ &\geq 5 & (3) \end{aligned}$$

Finally, since  $n > 3$  and  $n^2 - 1.5n \geq 5$  are true, we can conclude  $n > 3 \wedge n^2 - 1.5n \geq 5$  are true.  $\square$

**Question 2**

**Question 3**