CSC236 Worksheet 5 Solution

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Question 1

a. **Rough Works:**

For convenience, define $H(n) : n \log_3 n$. I will use simple induction to prove $\forall n \in \mathbb{N}$, $n > 0 \Rightarrow H(n) = R(n)$.

1. Base Case ($n = 1$)

Let $n = 1$.

Then,

$$\begin{aligned} H(n) &= n \log_3 n && (1)\\ &= 1 \cdot 0 && (2)\\ &= 0 && (3)\\ &= R(n) \qquad \text{[By def.]} && (4) \end{aligned}$$

Thus, $H(1)$ is verified.

2. Inductive Step