MTH 331 – Statement 67

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Statement 67. $\{n \in \mathbb{Z} : 15 \mid n\} \cap \{n \in \mathbb{Z} : 2 \mid n\} \subseteq \{n \in \mathbb{Z} : 10 \mid n\}$

Proof. Let $n \in \mathbb{Z}$. Suppose $15 \mid n$ and $2 \mid n$. $\exists x \in \mathbb{Z}$ such that $n = 15x$

$$\begin{aligned} & n = 15x \\ \Leftrightarrow\ & n = 5(3x) \\ \Rightarrow\ & 5 \mid n \end{aligned}$$

$5 \mid n \wedge 2 \mid n \Rightarrow 10 \mid n$ (by statement 28) □