Math 320 Homework 1

Xander Naumenko

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Question 1. The statement is false. Let $n = 41$. Then $41^2 - 41 + 41 = 41^2$ which is clearly divisible by 41.

Question 2a. Let $x \in A \cap (B \cup C)$. Then $x \in A$, and $x \in B$ or $x \in C$ which implies either $x \in (A \cap B)$ or $x \in (A \cap C)$. In either case $x \in (A \cap B) \cup (A \cap C)$. Similarly, let $y \in (A \cap B) \cup (A \cap C)$. y is either in $A \cap B$ or $A \cap C$, in either case $y \in A \cap (B \cup C)$. Since both sets contain the other, they must be equal.