Proof Portfolio Problem 8

As a reminder, you should pick only one of the following problems. Remember to start ASAP and see me if you need help.

The initial deadline for Problems 5-8 is Monday, March 23 (11:59PM). The final deadline is Friday, March 30 (11:59PM).

Conjecture 8A.[1] If A, B, and C are subsets of some universal set U then

$$A \times (B \cup C) = (A \times B) \cup (A \times C).$$

Conjecture 8B. Let $X = \{x \in \mathbb{Z} : x \equiv 2 \pmod 6\}$ and $Y = \{y \in \mathbb{Z} : 3 \mid y - 5\}$. Prove that one of these sets is a proper subset of the other (stating your result as a theorem).

Some LaTeX Notes:

For 8A:

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$A\times (B-C) = (A\times B) - (A\times C)$
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For 8B:

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$X = \{x \in\mathbb{Z} : x \equiv 2 \pmod{6} \}$
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and

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$Y = \{y\in\mathbb{Z} : 3 \mid y-5\}$
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(The

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makes the set braces appear.) You could also use

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if you are using my LaTeX file (instead of

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\mathbb{Z}
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[1] The symbol $\times$ is defined on page 256 of your text. For two sets X and Y, $X \times Y = \{(x, y) \mid x \in X \text{ and } y \in Y.\}$ Think of ordered pairs, like you're graphing on the Cartesian plane.