PSSA Open Ended Prep - Linear Inequalities

Please read the given situation carefully. Then, answer each question that follows. If you are asked to EXPLAIN something, please do so using COMPLETE SENTENCES!

Situation:

Edward is a vendor at the Reading Phillies’ home games. He sells hot dogs for $3 each and sodas for $2 each. If he has at least $120 in sales for any game, he gets a bonus. The inequality below represents what Edward must sell in order to get his bonus.

\[ 3x + 2y \geq 120 \] (where \( x \) = # of hot dogs, \( y \) = # of sodas)

Part A) Graph the inequality on the coordinate plane.

![Graph of the inequality](image)

**Boundary Line:**

\[ 3x + 2y = 120 \]

- **Check Point**:
  - \((0, 0)\)
  - \(3(0) + 2(0) = 0 \leq 120\)
  - \(0 \leq 120\)
  - **TRUE**!
Part B) If Edward only sold 25 hot dogs, how many sodas must he have sold in order to have gotten his bonus? **Show all work.**

\[
\begin{align*}
3x + 2y &\geq 120 \\
3 \cdot 25 + 2y &\geq 120 \\
75 + 2y &\geq 120 \\
-75 &
\end{align*}
\]

\[
\begin{align*}
2y &\geq 45 \\
\frac{2y}{2} &\geq \frac{45}{2} \\
y &\geq 22.5
\end{align*}
\]

\[\text{at least 23 sodas}\]

Part C) If Edward sold 43 sodas, how many hot dogs must he have sold in order to have gotten his bonus? **Show all work.**

\[
\begin{align*}
3x + 2y &\geq 120 \\
3x + 2 \cdot 43 &\geq 120 \\
3x + 86 &\geq 120 \\
-86 &
\end{align*}
\]

\[
\begin{align*}
3x &\geq 34 \\
\frac{3x}{3} &\geq \frac{34}{3} \\
x &\geq 11.3
\end{align*}
\]

\[\text{at least 12 hot dogs}\]

Part D) In terms of determining possible combinations of hot dog and soda sales...**EXPLAIN** any benefits to creating a graph like you did in Part A.

Having the graph of the inequality allows us to quickly check or find possible solutions by using ordered pairs ... rather than having to go through a calculation.