**3**. [0 points] The Smashing Squash are at an event signing autographs. They realized that they can model the length of the line waiting to get into the store as a function $J(t)$, where $t$ is the number of hours after they arrived, using the following information.

- When they first arrived at the event the line was 12 feet long.
- The line then grew at a constant rate of 18 feet per hour until the line was 120 feet long. At this time, the venue stopped allowing people to come and so the line stopped growing in length.
- From that time on, the line decreased in length at a constant rate.
- Two hours after the line stopped growing, it was 98 feet long.
- The Squash left 14 hours after arriving. *Note that $J(t)$ is defined only while the band is at the event.*

**a**. [3 points] How many hours had the band been signing before the line stopped growing?

*Solution:*
The line's length after $t$ hours is $12 + 18t$, so we want to know when $12 + 18t = 120$. We then solve for $t$.

**Answer:** **6** hours

**b**. [2 points] What is the domain of $J(t)$ in the context of this problem? Use either inequality or interval notation.

*Solution:* **Answer:** Domain: **[0,14]**

**c**. [6 points] Give a formula for $J(t)$ that is valid on its entire domain.

*Solution:*
We have the formula on the first part already, $12 + 18t$. For the second part, we find the slope between the points $(6, 120)$ and $(8, 98)$, which is $-11$. Then we use point-slope form with the point $(6, 120)$ for this piece.

**Answer:**

$$J(t) = \begin{cases} 12 + 18t & \text{for } 0 \leq t \leq 6 \\ 120 - 11(t - 6) & \text{for } 6 < t \leq 14 \end{cases}$$