Inductive Definitions

1. Give an inductive definition for the set

   $$\text{TRIPLEPLUSONE} = \{1, 4, 13, 40, 121, 364, 1093, 3280, 9841, 29524, 88573, \ldots\}.$$

2. Consider the set $X \subseteq \mathbb{N}$ defined as follows.

   (a) $2 \in X$ and $5 \in X$.
   (b) If $n \in X$ and $k \in X$ and $n \neq k$ then $(n+k) \in X$.
   (c) Nothing is in X unless its membership can be established from the above.

   Give three elements of $\mathbb{N}$ which are elements of X, and three elements of $\mathbb{N}$ which are not elements of X, explaining for each one why it is or is not an element.

   Can you give a complete description of the set X?