Second Hint for Problem 232

We can apply the formula of Problem 226 to get

$$
\begin{aligned}
\bigcup_{i=1}^{n} A_i \;&=\; \left| \left(\bigcup_{i=1}^{n-1} A_i \right) \cup A_n \right| \\
&=\; \left| \bigcup_{i=1}^{n-1} A_i \right| + |A_n| - \left| \left(\bigcup_{i=1}^{n-1} A_i \right) \cap A_n \right| \\
&=\; \left| \bigcup_{i=1}^{n-1} A_i \right| + |A_n| - \left| \bigcup_{i=1}^{n-1} A_i \cap A_n \right| \qquad (*)
\end{aligned}
$$