Proof. 2.3.4b Prove $15|2^{4n} - 1$.

Assume $n = 0$.
We have $2^0 - 1 = 0$.
By Theorem 2.2a we know $15|0$.
Assume $n = k$ holds. This means

$$15|2^{4k} - 1. \tag{1}$$

Assume $n = k + 1$.
We have

$$\begin{aligned}
&2^4(k+1) - 1 \\
=&2^{4k+4} - 1 \\
=&16(2^{4k}) - 1 \\
=&16(2^{4k} - 1) - 1 + 16 \\
=&16(2^{4k} - 1) + 15.
\end{aligned}$$

We know $15|16(2^{4k} + 1)$ by (1) and $15|15$ by Theorem 2.2a.
By Theorem 2.2g, this implies $15|2^{4(k+1)} - 1$.
By FPMI we can imply $15|2^{4n} - 1 \, \forall \, n \geq 0$. $\square$