In the inductive step, there is also the case that $\alpha$ is $(\neg \gamma)$ (that is, $\star$ is $\neg$ and $\beta$ is missing).

The proof for property A is the same; for B, remove “$\beta$” wherever it occurs. For C, take $|\beta|$ to be zero, which eliminates some cases.

Also, under property C (whether $\beta$ is present or not), some cases for $\beta'$ are incomplete or missing.

If $\beta'$ is absent, then $\star'$ is the first symbol of $\beta$; by hypothesis, this cannot be a connective.

Similarly, in the case that $|\beta'| = |\beta| + 1$ (i.e., $y$ is empty), $\star'$ is the first symbol of $\gamma$ — again not a connective, by the hypothesis.