Outcomes with probability 0 can be discarded when working with discrete random variables.

Example: Flip a coin until 1st head appears

$S = \{H, TH, TTH, TTTH, \ldots, \underbrace{TTT\cdots T}_{j-1}H, \ldots, TTTT\ldots\}$

yields $X=1$, $X=2$, $X=3$, $X=4$, $\ldots$, $X=j$, ???

$X = ??$ ~~$+\infty$~~ not real number.

if X = # of flips needed

(1) assign another value to $X(TTT\ldots) = 7$ because $P(\{TTT\ldots\}) = 0$ this will not affect any of your probability calculations

(2) ignore that outcome.

Either solution should be OK when dealing with discrete random variables, at this level of sophistication.