1. 10 points Suppose that we toss a sequence of coins, where $P\{\text{heads}\} = p$ for some $p \in (0, 1)$. Let $X$ be the position of the first heads. Define the function $f(z) \stackrel{\text{def}}{=} \min\{z, 10\}$, and define $Y \stackrel{\text{def}}{=} \min\{X, 10\}$.

(a) 3 points Graph $f$.

(b) 7 points Compute the probability mass function of $Y$. 
(a) \( f(z) = z \) for \( z \leq 10 \), and \( f(z) = 10 \) for \( z \geq 10 \).

(b) 
\[
p_Y(j) = \begin{cases} 
(1 - p)^{j-1}p & \text{if } j \in \{1, 2 \ldots 10\} \\
(1 - p)^9 & \text{if } j = 10 \\
0 & \text{else}
\end{cases}
\]