Inequalities and Geometric random variables

Say X is Geometric(p). Then $P(X>7) = P(\text{first 7 trials fail}) = q^7$ where $q = 1-p$.

In general $P(X>j) = P(\text{first } j \text{ trials fail}) = q^j$

What about $P(X \geq 7) = P(X>6) = P(\text{first 6 trials fail}) = q^6$

In general $P(X \geq j) = q^{j-1}$

$P(X \leq 7) = 1 - P(X>7) = 1 - q^7$

In general,

$P(X \leq j) = 1 - P(X>j) = 1 - q^j$

$P(X<7) = 1 - P(X \geq 7) = 1 - q^6$

More generally,

$P(X<j) = 1 - P(X \geq j) = 1 - q^{j-1}$