Recall the example where Audrey wants to meet left-handed people. She assumes that people are each 10% likely to be left-handed, and people's left-or-right handedness is independent from person to person. We already studied the number of people she needs to meet until the first left-handed person. Now let's consider the number of people she needs to meet until the 7th left-handed person. Write X as the number of people needed, then X has the same distribution as $X_1+X_2+\ldots+X_7$, where the X_i's are independent Geometric($p = 1/10$) random variables.

So

$$E(X) = E(X_1+X_2+\ldots+X_7) = E(X_1)+E(X_2)+\ldots+E(X_7) = 10+10+\cdots+10 = 7(10) = 70.$$

Could also just used $E(X) = r/p = (7)/(1/10) = 70$.

What about the variance? Since the X_i's are independent,

$$\mathrm{Var}(X) = \mathrm{Var}(X_1 + \ldots + X_7) = \mathrm{Var}(X_1) + \ldots + \mathrm{Var}(X_7) = \frac{9/10}{(1/10)^2} + \ldots + \frac{9/10}{(1/10)^2} = 630.$$

Could also have just used the formula directly, $\mathrm{Var}(X) = \frac{rq}{p^2}$.