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Exercise: Memorylessness of the geometric

(2/2 points)

Let X be a geometric random variable, and assume that $\mathbf{var}(X) = 5$.

a) What is the conditional variance $\mathbf{var}(X - 4 \mid X > 4)$?

$\mathbf{var}(X - 4 \mid X > 4) =$ 5 ✔ **Answer:** 5

b) What is the conditional variance $\mathbf{var}(X - 8 \mid X > 4)$?

$\mathbf{var}(X - 8 \mid X > 4) =$ 5 ✔ **Answer:** 5

Answer:
a) The conditional distribution of $X - 4$ given $X > 4$ is the same geometric PMF that describes the distribution of X. Hence $\mathbf{var}(X - 4 \mid X > 4) = \mathbf{var}(X) = 5$.

b) In the conditional model (i.e., given that $X > 4$), the random variables $X - 4$ and $X - 8$ differ by a constant. Hence they have the same variance and the answer is again 5.

You have used 1 of 2 submissions