

HW-3 HINTS

1. The range of X is $-\infty < x < \infty$

But the range of Y is $0 \leq y \leq 1$

Y is a mixed R.V., with a delta function at $y=1$.

2. Assume n to be a positive integer value.

There will be 2 ranges of Y depending on the value of n . (either even or odd)

$E(X^n) = E(Y)$. Calculate both values and show that they are equal.

3. To get the mean and variance of M

Try finding $(1-q)E(X)$ first, then use that series to get $E(X)$.

$$\begin{aligned}\therefore (1-q)E(X) &= pq + pq^2 + pq^3 + pq^4 + \dots \\ &= p(\text{Sum of the geometric series})\end{aligned}$$

Solving we should get

$$E(X) = \frac{1}{p}$$

$$\text{Similarly } V(X) = E(X^2) - (E(X))^2 = \frac{1-p}{p^2}$$

Next, it can be proved that $N = M + K$, substitute this value to get PMF of N .

Find the mean & variance in a similar way as the (a) part.