P1:

Let X be a d.r.v. with p.m.f given by

$$p(x)=\begin{cases}\frac{1}{3}\ , x=0\\ \frac{2}{3}\ ,\ x=2\end{cases}$$

Find the mean and variance of X.

Solution:

Here $p(0)=\frac{1}{3}$ and $p(2)=\frac{2}{3}$

Then

$$E(X)=\sum_x x\,p(x)=0\times\frac{1}{3}+2\times\frac{2}{3}=\frac{4}{3}$$

and

$$E(X^2)=\sum_x x^2\,p(x)=0^2\times\frac{1}{3}+2^2\times\frac{2}{3}=\frac{8}{3}$$

$$\therefore V(X)=E(X^2)-\big(E(X)\big)^2=\frac{8}{3}-\frac{16}{9}=\frac{8}{9}$$

Thus, mean is equal to $\frac{4}{3}$ and variance is equal to $\frac{8}{9}$.