STEP: Distributions (1 page; 6/7/23)

(1) Useful device for determining $Var(X)$:

$$E(X^2) = E[X(X-1)] + E(X) \ \ [\text{as } r(r-1) \text{ divides into } r!]$$

(2) Independence of discrete and continuous variables

The condition for independence of the discrete variable Y (taking integers values n) and the continuous variable Z is that

$$P(Y = n \text{ and } z_1 < Z < z_2) = P(Y = n).P(z_1 < Z < z_2)$$

(see STEP 2021, P3, Q11)