Statistics Assignment - 10

(1) $X \sim Bin(n, ps)$ marginally

Joint distribution:

$$P(X=i, Y=j) = {}^{i+j}C_i \, s^i (1-s)^j \, {}^{n}C_{i+j} \, p^{i+j} \times (1-p)^{n-i-j}$$

$$= \frac{n!}{i!\,j!\,(n-i-j)!} (ps)^i [p(1-s)]^j (1-p)^{n-i-j}$$

X and Y are not independent since $Y = 0$ when $X = n$ (extreme case).