Question

Staff car park at hospital has 330 spaces and parking is for permit holders. 85% of permit holders will be at hospital at a given day and 380 permits are issued. Calculate probability that on a given day at least one of the permit holders won't get a parking space.

Solution

Using the normal approximation X to the binomial distribution Y with

$$p = 0.85 \, , n = 380$$

we have

$$\mu = np = 323$$

$$\sigma = \sqrt{np(1-p)} = 6.96$$

$$P(Y \geq 331) = P(X > 330.5) = P\left(X > \frac{330.5 - 323}{6.96}\right) = P(X > 1.078) = 0.1405$$

Answer: 0.1405