Question 5-6

bournauli trials

for success p & for failure q

we can say that $q = 1-p$

now, it will have a sample space of
(2^n 0's or 1's)
Probability of k success event
$P(K) = n_{C_k} \; p^k \; q^{n-k}$

now, for t time &
δ is time in which its arrival is
negative

$\delta = t/n$

now, if δ is event

$\lambda t = pn$

$\therefore p = \dfrac{\lambda t}{n}$

So, since $p = \dfrac{\lambda t}{n}$ & failure $q = \left(1 - \dfrac{\lambda t}{n}\right)$

Poisson

For k chance

$$p(k) = {}^{n}C_{k} \left(\frac{\lambda t}{n}\right)^{k} \left(1 - \frac{\lambda t}{n}\right)^{n-k}$$

for $n \to \infty$

$$p(k) = \frac{(\lambda t)^{k} e^{-\lambda t}}{k!}$$

which is poisson distribution

classic form.

$$p(0) = e^{-\lambda t}$$