1) Ten eggs are drawn successively with replacement from a lot containing 10% defective eggs. Find the probability that there is at least one defective egg.

ns: Let X denote the number of defective eggs in the 10 eggs drawn. Since the drawing is done with replacement, the trials are Bernoulli trials.

Clearly, X has the binomial distribution with $n = 10$ and $p = \frac{10}{100} = \frac{1}{10}$

Therefore $q = 1 - p = \frac{9}{10}$

Now P(at least one defective egg)

$$= P(X \geq 1) = 1 - P(X = 0)$$

$$= 1 - {}^{10}C_0 \left(\frac{9}{10}\right)^{10}$$

$$= 1 - \frac{(9)^{10}}{(10)^{10}}$$