8 Sweets from a certain manufacturer are sold in packets. Thirty per cent of the sweets are orange, and these are randomly distributed amongst the packets. Each packet contains 15 sweets.

The number of orange sweets in a randomly chosen packet is denoted by X.

(a) Find the following probabilities.

(i) $P(X = 4)$ **[1]**

(ii) $P(X \geqslant 4)$ **[2]**

(b) (i) Write down an expression for $P(X = r)$. **[1]**

(ii) Explain the connection between the expression in part **(b)(i)** and the binomial expansion of $(0.7 + 0.3)^n$, for a specific value of n which should be stated. **[2]**