

$$P(\text{exactly } k \text{ heads in } n \text{ flips}) = \binom{n}{k} p^k (1-p)^{n-k}$$

$$P(0 \text{ heads or } 1 \text{ head or } \dots \text{ or } n \text{ heads}) \\ = \sum_{k=0}^n \binom{n}{k} p^k (1-p)^{n-k} = (p + (1-p))^n \text{ by Binom. Th.} \\ = 1^n = 1$$

Independence & conditioning are orthogonal.
concepts