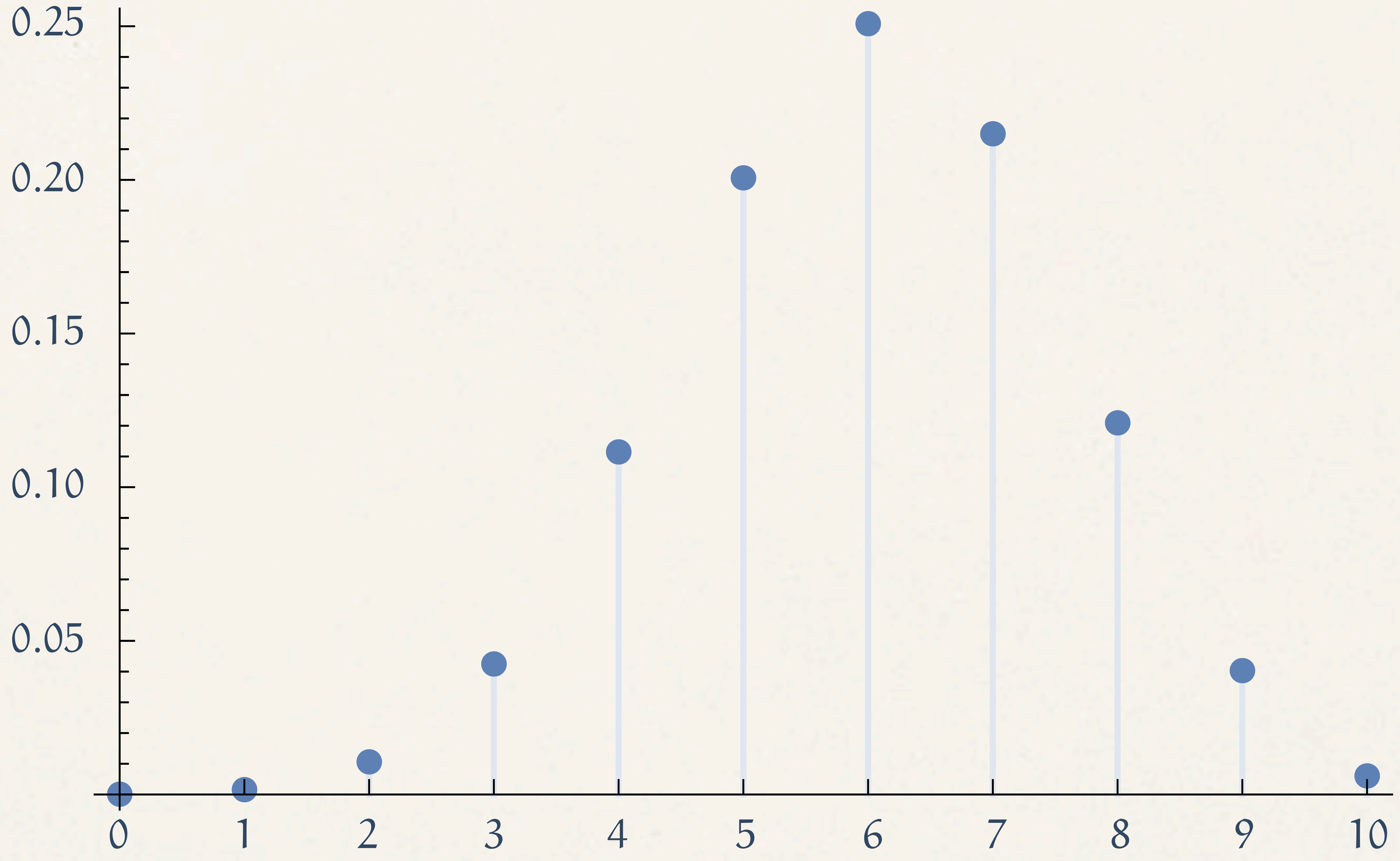
Expectation: a probabilistic centre of mass

$$b(k) = b_n(k;p) = \binom{n}{k} p^k q^{n-k} \qquad (k = 0, 1, \dots, n)$$

$n = 10; \ p = 0.6$



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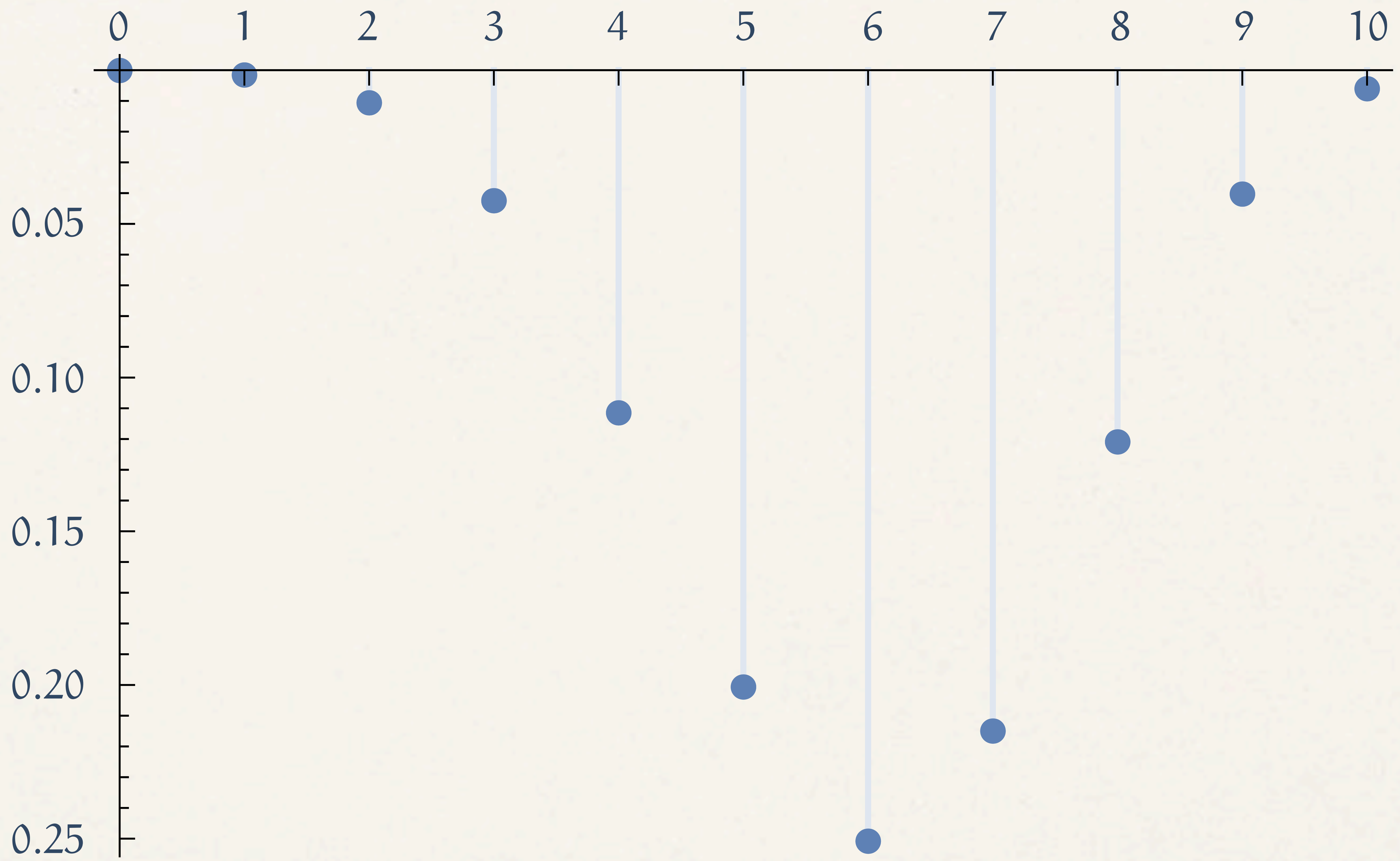

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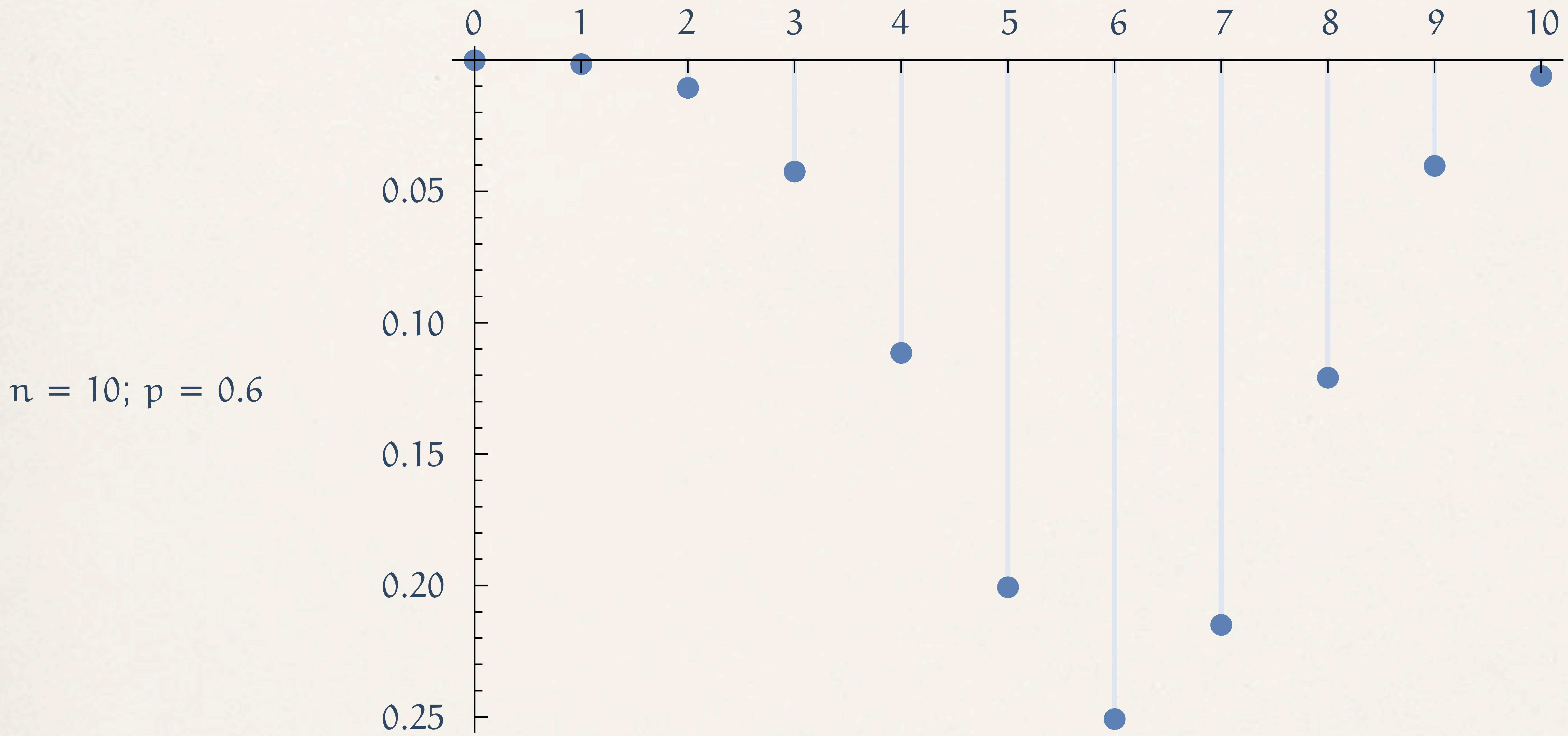

$$\mu = 0 \cdot b(0) + 1 \cdot b(1) + \cdots + k \cdot b(k) + \cdots + n \cdot b(n)$$

Expectation: a probabilistic centre of mass

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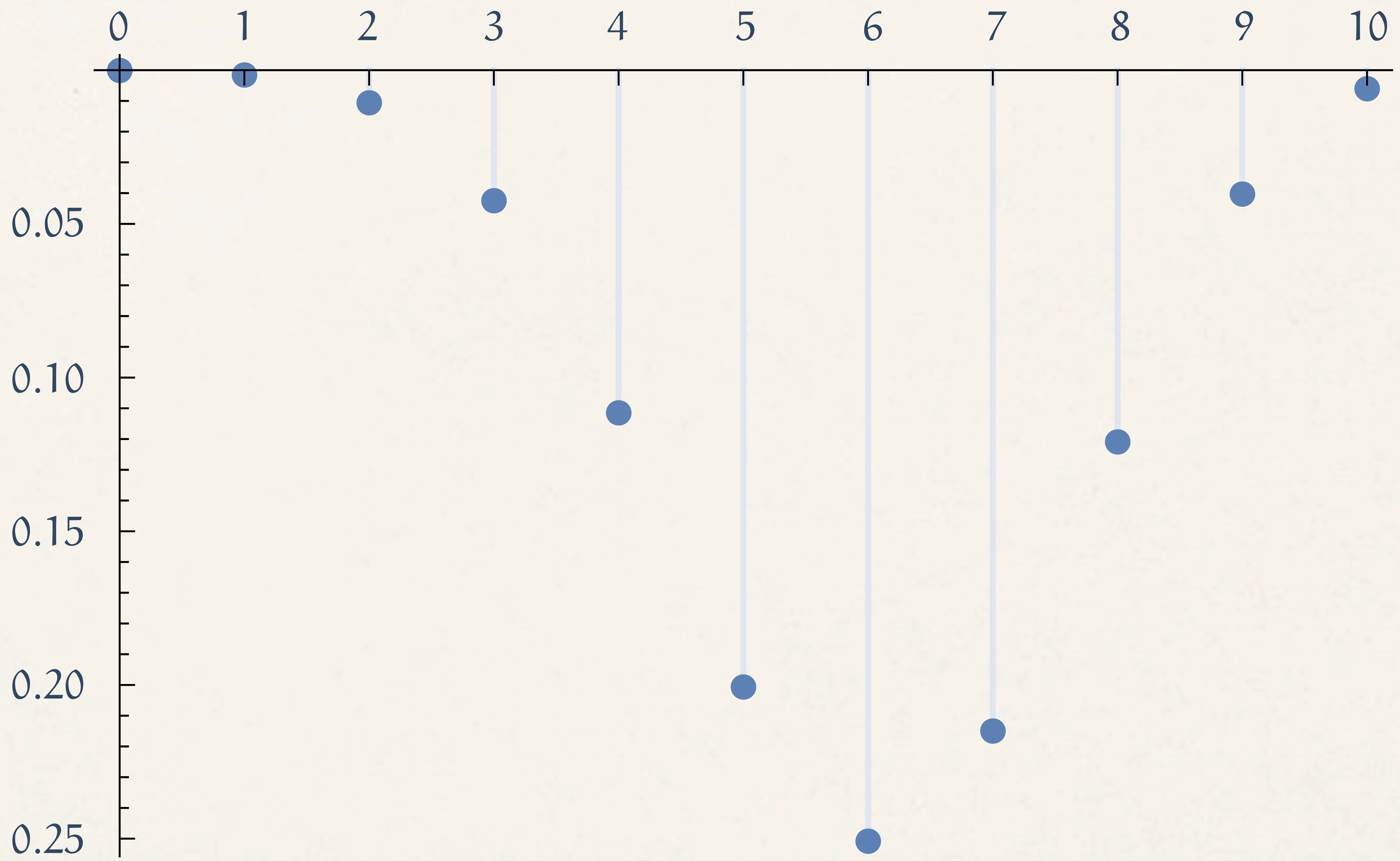
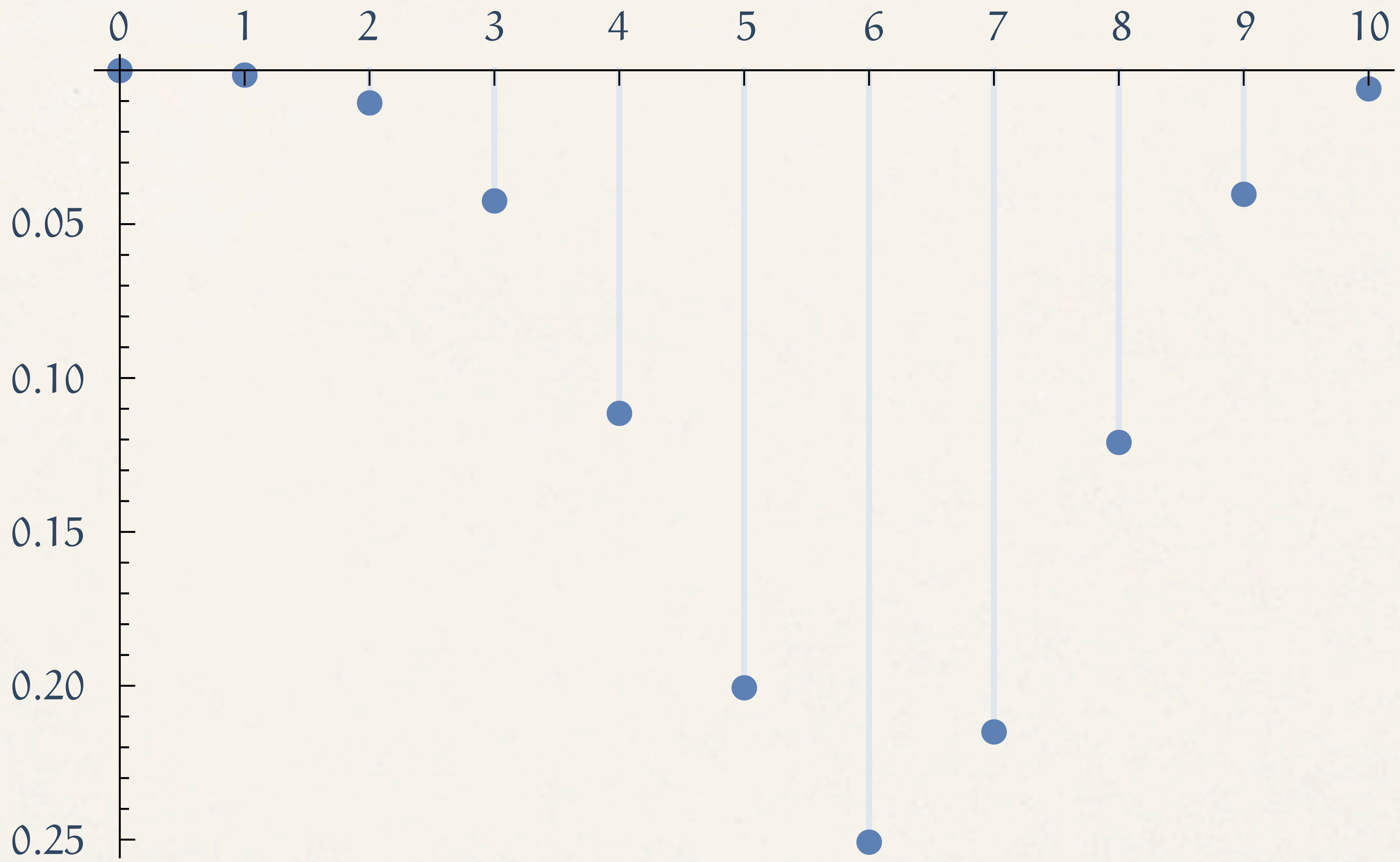


$$\mu = 0 \cdot b(0) + 1 \cdot b(1) + \cdots + k \cdot b(k) + \cdots + n \cdot b(n) = \sum_k k \cdot b_n(k;p)$$

Expectation: a probabilistic centre of mass

$$b(k) = b_n(k;p) = \binom{n}{k} p^k q^{n-k} \qquad (k = 0, 1, \ldots, n)$$

$n = 10;\ p = 0.6$



mean, expected value

The expectation of S_n

$$\mu = 0 \cdot b(0) + 1 \cdot b(1) + \cdots + k \cdot b(k) + \cdots + n \cdot b(n) = \sum_k k \cdot b_n(k;p) =: \mathbf{E}(S_n)$$