

Solutions

Each answer shows the steps, then the **result**.

2.1

- $E(X) = np = 8 \times 0.25 = 2$

2.2

- $E(X) = \frac{1}{p} = \frac{1}{0.2} = 5$

3.1 B

- $\text{Var}(X) = np(1 - p) = 12(0.5)(0.5) = 3$

3.2

(a)

- probabilities sum to 1: $0.1 + 0.3 + k + 0.2 = 1 \Rightarrow k = 0.4$

(b)

- $E(X) = 1(0.1) + 2(0.3) + 3(0.4) + 4(0.2) = 0.1 + 0.6 + 1.2 + 0.8 = 2.7$; $E(X^2) = 1(0.1) + 4(0.3) + 9(0.4) + 16(0.2) = 0.1 + 1.2 + 3.6 + 3.2 = 8.1$; $\text{Var}(X) = 8.1 - 2.7^2 = 8.1 - 7.29 = 0.81$

3.3

- $X \sim B(6, 0.5)$; $P(X = 4) = \binom{6}{4}(0.5)^6 = 15 \times \frac{1}{64} = \frac{15}{64} = 0.234$