126. Solution: C

Using the notation of the problem, we know that \( p_0 + p_1 = \frac{2}{5} \) and \( p_0 + p_1 + p_2 + p_3 + p_4 + p_5 = 1. \)

Let \( p_n - p_{n+1} = c \) for all \( n \leq 4 \). Then \( p_n = p_0 - nc \) for \( 1 \leq n \leq 5 \).

Thus \( p_0 + (p_0 - c) + (p_0 - 2c) + \ldots + (p_0 - 5c) = 6p_0 - 15c = 1. \)

Also \( p_0 + p_1 = p_0 + (p_0 - c) = 2p_0 - c = \frac{2}{5}. \) Solving simultaneously \( \begin{cases} 6p_0 - 15c = 1 \\ 2p_0 - c = \frac{2}{5} \end{cases} \)

\[ 6p_0 - 3c = \frac{6}{5} \implies -6p_0 + 15c = -1. \] So \( c = \frac{1}{60} \) and \( 2p_0 = \frac{2}{5} + \frac{1}{60} = \frac{25}{60}. \) Thus \( p_0 = \frac{25}{120}. \)

We want \( p_4 + p_5 = (p_0 - 4c) + (p_0 - 5c) = \frac{17}{120} + \frac{15}{120} = \frac{32}{120} = 0.267. \)


127. Solution: D

Because the number of payouts (including payouts of zero when the loss is below the deductible) is large, we can apply the central limit theorem and assume the total payout \( S \) is normal. For one loss there is no payout with probability 0.25 and otherwise the payout is \( U(0, 15000). \)

\[ E[X] = 0.25 \times 0 + 0.75 \times 7500 = 5625, \]

\[ E[X^2] = 0.25 \times 0 + 0.75 \times (7500^2 + \frac{15000^2}{12}) = 56,250,000, \] so the variance of one claim is \( Var(X) = E[X^2] - E[X]^2 = 24,609,375. \)

Applying the CLT,

\[ P[1,000,000 < S < 1,200,000] = P\left[ -1.781741613 < \frac{S - (200)(5625)}{\sqrt{(200)(24,609,375)}} < 1.069044968 \right] \]

which interpolates to 0.8575-(1-0.9626)=0.8201 from the provided table.