

$$\textcircled{1} \quad p(X=8) = \binom{10}{8} \times \left(\frac{1}{5}\right)^8 \times \left(\frac{4}{5}\right)^{10-8}$$

$$= \frac{10!}{8!2!} \times \left(\frac{1}{5}\right)^8 \times \left(\frac{4}{5}\right)^2$$

$$= \frac{10 \times 9}{2} \times \frac{4^2}{5^{10}} = 45 \times 16 \times \frac{1}{5^{10}} = \frac{9 \times 16}{5^9} = \frac{144}{5^9}$$

Вне ответа д)

$$\textcircled{2} \quad p(X \geq 1) = 1 - p(X=0)$$

$$p(S) = \frac{m}{n+8} \quad p(E) = \frac{8}{n+8}$$

$$p(X=0) = \binom{n}{0} \times (p(S))^0 \times (p(E))^{12}$$
$$= \left(\frac{8}{n+8}\right)^{12}$$

$$\Leftrightarrow p(X \geq 1) \geq 0,99 \Leftrightarrow 1 - p(X=0) \geq 0,99$$

$$\Leftrightarrow p(X=0) \leq 0,01 \Leftrightarrow \left(\frac{8}{n+8}\right)^{12} \leq 0,01$$

$$\Leftrightarrow \frac{8}{n+8} \leq (0,01)^{1/12}$$

$$\Leftrightarrow (n+8) \geq \frac{8}{(0,01)^{1/12}} \Leftrightarrow n \geq \frac{8}{(0,01)^{1/12}} - 8 = 3,74$$

Вне ответа б)

$$\begin{aligned} \textcircled{3} \quad P(X \geq 5) &= P(X=5) + P(X=6) + P(X=7) + P(X=8) + P(X=9) + P(X=10) \\ &= 1 - P(X=0) - P(X=1) - P(X=2) - P(X=3) - P(X=4). \end{aligned}$$

$$P(X=0) = (0,4)^{10} \approx 10^{-4}$$

$$P(X=1) = 10 \times (0,6) \times (0,4)^9 \approx 0,0016$$

$$P(X=2) = \frac{10 \times 9}{2} \times (0,6)^2 \times (0,4)^8 \approx 0,0106$$

$$P(X=3) = \frac{10 \times 9 \times 8}{3 \times 2} \times (0,6)^3 \times (0,4)^7 \approx 0,0425$$

$$P(X=4) = \frac{10 \times 9 \times 8 \times 7}{4 \times 3 \times 2} \times (0,6)^4 \times (0,4)^6 \approx 0,1115$$

$$\begin{aligned} \text{Donc } P(X \geq 5) &= 1 - 10^{-4} - 0,0016 - 0,0106 - 0,0425 - 0,1115 \\ &= 0,8337 \end{aligned}$$

Donc Réponse e)

$$\textcircled{4} \quad P(6 \leq X \leq 15) = P(X=6) + P(X=7) + P(X=8) + \dots + P(X=15).$$

ou bien $0,24373407$

Donc réponse b)