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TURMA: Engenharia Civil

Semana 11 - Exercício 1

$X \sim Geo(0,75) \longrightarrow p = 0,75$, $p \in (0,1)$

FDP: $P(X=k) = p(1-p)^k$

$P(X=k) = 0,75(1-0,75)^k$

$P(X=k) = 0,75 \cdot (0,25)^k$, $k = 0,1,2,\ldots$

a) $P(X=4) = ?$

$P(X=4) = 0,75 \cdot (0,25)^4$

$\boxed{P(X=4) \cong 0,002930}$

b) $P(X<4) = ?$

$P(X<k) = 1-(1-p)^k$

$P(X<4) = 1-(0,25)^4$

$\boxed{P(X<4) \cong 0,996094}$

c) $P(X \leq 4) = P(X<4) + P(X=4)$

$P(X \leq 4) = 0,996094 + 0,002930$

$\boxed{P(X \leq 4) \cong 0,999024}$

d) $P(6 \leq X < 9) = P(X < 9) - P(X < 6)$

$P(6 \leq X < 9) = 1 - (1 - 0{,}75)^9 - 1 - (1 - 0{,}75)^6$

$P(6 \leq X < 9) \cong 0{,}999996 - 0{,}99976$

$$\boxed{P(6 \leq X < 9) \cong 0{,}000236}$$

e) $P(\overbrace{X \geq 10}^{m+k} \mid \overbrace{X \geq 6}^{m})$ $\quad m = 6$ $\quad R = 10 - 6$

$R = 4$

$P(X \geq m+k \mid X \geq m) = P(X \geq k)$

$P(X \geq 10 \mid X \geq 6) = P(X \geq 4) = 1 - P(X < 4)$

$P(X \geq 10 \mid X \geq 6) = 1 - 0{,}996094$

$$\boxed{P(X \geq 10 \mid X \geq 6) \cong 0{,}003906}$$