MATEMÁTICA DISCRETA - 2025.1 - PROVA 2 TIPO 2

① 6 CORES DIFERENTES (CAIXAS OU "CASAS")
PELO PRINCÍPIO DAS CASAS DE POMBO, O PIOR CASO É ELA PEGAR 6 MEIAS SEGUIDAS DE CORES DIFERENTES, ENTÃO ELA PRECISA PEGAR UMA 7ª MEIA (ITEM OU "POMBO") P/ GARANTIR QUE 2 SEJAM DA MESMA COR
RESP: 7 MEIAS

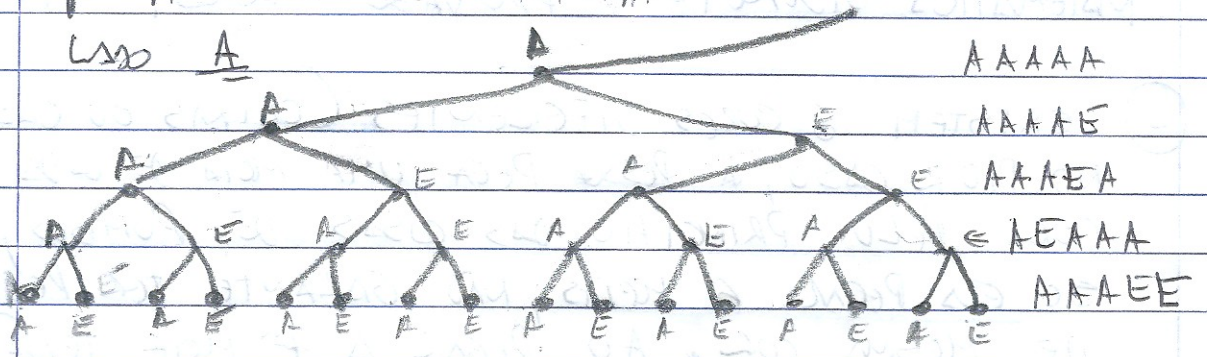
② $[C \cup (A \cap B)] \cap [(A \cap B) \cup C'] \cap (A' \cup B') = \emptyset$
$[(A \cap B) \cup C] \cap [(A \cap B) \cup C'] \cap (A' \cup B')$
$[(A \cap B) \cup (C \cap C')] \cap (A' \cup B')$
$[(A \cap B) \cup \emptyset] \cap (A' \cup B')$
$(A \cap B) \cap (A' \cup B')$
$(A \cap B) \cap (A \cap B)'$
$= \emptyset$

③ $|P|$ = PROGRAMAÇÃO $= 40$
$|U| = (UI/UX) = 35$ $\quad |P \cap U| = 15$ $\quad |U \cap I| = 10$
$|I| = (IA) = 30$ $\quad |P \cap I| = 12$ $\quad |P \cap U \cap I| = 5$
$|P \cup U \cup I| = |P| + |U| + |I| - |P \cap U| - |P \cap I| - |U \cap I| + |P \cap U \cap I|$
$|P \cup U \cup I| = 40 + 35 + 30 - 15 - 12 - 10 + 5 = 105 - 37 + 5$
$|P \cup U \cup I| = \underline{73}$

⑤ $F(m+5) = 3F(m) + 5F(m+4)$, PARA $m \geq 1$
$F(m+5) = F(m+4) + F(m+3)$
$= F(m+3) + F(m+2) + F(m+2) + F(m+1)$
$= F(m+2) + F(m+1) + F(m+1) + F(m) + F(m+1) + F(m) + F(m+1)$
$= F(m+2) + 4F(m+1) + 2F(m)$
$= F(m+1) + F(m) + 4F(m+1) + 2F(m)$
$= \underline{3F(m) + 5F(m+1)}$

4º A = ACERTA E = ERRA

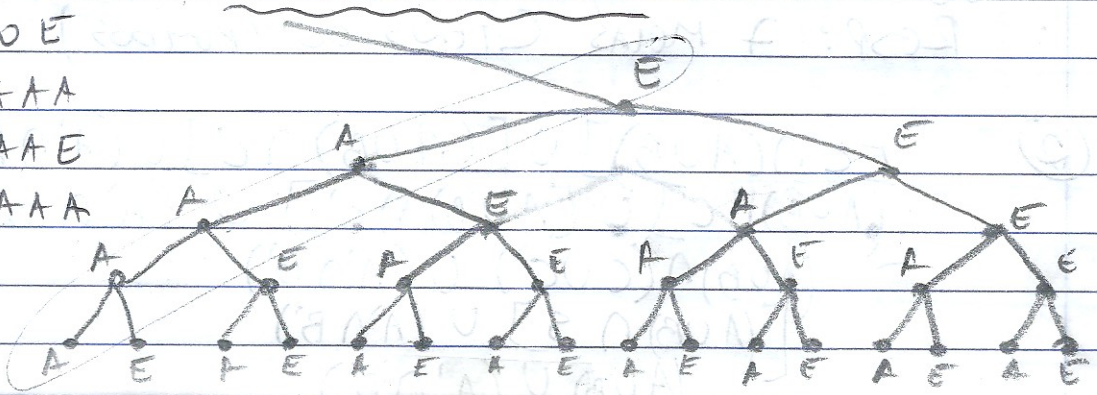
LADO A



8 POSSIBILIDADES

LADO E

EAAAA
EAAAE
EEAAA



(6) $1+4+7+\ldots+(3n-2)=[n(3n-1)]/2$

1. $P(1)=3(1)-2=1$ e $1(3(1)-1)/2=1$ OK

2. $P(k)=1+4+7+\ldots+(3k-2)=[k(3k-1)]/2$

3. $P(k+1)=\underline{1+4+7+\ldots+(3k-2)}+[3(k+1)-2]=[(k+1)\cdot 3(k+1)-1]/2$

USANDO $P(k)$ EM $P(k+1)$

$[k(3k-1)]/2+[3(k+1)-2]=[(k+1)(3k+3-1)]/2$

$(3k^2-k)/2+(3k+1)=[(k+1)(3k+2)]/2$

LADO ESQUERDO: $(3k^2-k)/2+(3k+1)=\dfrac{3k^2-k+6k+2}{2}$

$=\dfrac{3k^2+5k+2}{2}$

LADO DIREITO: $[(k+1)(3k+2)]/2=\dfrac{3k^2+2k+3k+2}{2}=$

$=\dfrac{3k^2+5k+2}{2}$ OK