1 - Encontre o polinômio interpolador do conjunto de pontos {(0,1), (1,6), (2,5),(3,8)}

R:

i	0	1	2	3
x	0	1	2	3
y	1	6	5	8

K= 4

N=k-1=3

$P_3(x) = a_0 + a_1x + a_2x^2 + a_3x^3$

$P_3(0) = a_0 + a_1(0) + a_2(0)^2 + a_3(0)^3 = 1$

$P_3(1) = a_0 + a_1(1) + a_2(1)^2 + a_3(1)^3 = 6$

$P_3(2) = a_0 + a_1(2) + a_2(2)^2 + a_3(2)^3 = 5$

$P_3(3) = a_0 + a_1(3) + a_2(3)^2 + a_3(3)^3 = 8$

$= a_0 + 0 + 0 + 0 = 1$ $\quad\boxed{a_0 = 1}$

$= a_0 + a_1 + a_2 + a_3 = 6$ $\Rightarrow$ $a_1 + a_2 + a_3 = 5$ $\quad 2*L_1 - L_2 \Rightarrow$

$= a_0 + 2a_1 + 4a_2 + 8a_3 = 5$ $\quad 2a_1 + 4a_2 + 8a_3 = 4$

$= a_0 + 3a_1 + 9a_2 + 27a_3 = 8$ $\quad 3a_1 + 9a_2 + 27a_3 = 7$

$2a_1 + 2a_2 + 2a_3 = 10$ $\quad a_1 + a_2 + a_3 = 5$ $\quad 3*L_1 - L_3$

$-2a_1 - 4a_2 - 8a_3 = -4$ $\Rightarrow$ $0 - 2a_2 - 6a_3 = 6$ $\Rightarrow$

$0 - 2a_2 - 6a_3 = 6$ $\quad 3a_1 + 9a_2 + 27a_3 = 7$

$3a_1 + 3a_2 + 3a_3 = 15$ $\quad a_1 + a_2 + a_3 = 5$ $\quad - 3*L2 + L3$

$-3a_1 - 9a_2 - 27a_3 = -7$ $\Rightarrow$ $0 - 2a_2 - 6a_3 = 6$ $\Rightarrow$

$0 - 6a_2 - 24a_3 = 8$ $\quad 0 - 6a_2 - 24a_3 = 8$

$0 + 6a_2 + 18a_3 = -18$

$0 - 6a_2 - 24a_3 = 8$ $\Rightarrow$ $-2a_2 - 6(5/3) = 6$

$0 + 0 - 6a_3 = -10 \Rightarrow \boxed{a_3 = +5/3}$ $\quad -2a_2 - 10 = 6 = -2a_2 = 16 = \boxed{a_2 = -8}$

$\Rightarrow$ $a_1 - 8 + 5/3 = 5 = a_1 = 5 - 5/3 + 8 = +34/3$

Portanto o $P_3(x) = a_0 + a_1x + a_2x^2 + a_3x^3 = \boxed{1 + 34/3x - 8x^2 + 5/3x^3}$