2) Dada a função $y = xe^x$ e os valores

x	1,7	1,8	1,9	2,0

e sl utilizando do chamado método de Newton podemos obter o polinômio pedido:

$$P_3(x) = \nabla_0^0 + \nabla_0^1(x-x_0) + \nabla_0^2(x-x_0)(x-x_1) + \nabla_0^3(x-x_0)(x-x_1)(x-x_2)$$

i	x	$\nabla_i^0 = y_i$	∇_i^1	∇_i^2	∇_i^3
0	1,7	9,3057	15,8370	11,5050	5,1667
1	1,8	10,8894	18,1380	13,0558	—
2	1,9	12,7032	20,7490	—	—
3	2,0	14,7781	—	—	—

$$\nabla_0^1 = \frac{\nabla_1^0 - \nabla_0^0}{x_1 - x_0}$$

$$\nabla_1^1 = \frac{\nabla_2^0 - \nabla_1^0}{x_2 - x_1}$$

$$\nabla_2^1 = \frac{\nabla_3^0 - \nabla_2^0}{x_3 - x_2}$$

$$\nabla_0^2 = \frac{\nabla_1^1 - \nabla_0^1}{x_2 - x_0}$$

$$\nabla_1^2 = \frac{\nabla_2^1 - \nabla_1^1}{x_3 - x_1}$$

$$\nabla_0^3 = \frac{\nabla_1^2 - \nabla_0^2}{x_3 - x_0}$$

$P_3(x) = 9,3057 + 15,8370(x-1,7) + 11,5050 \cdot (x-1,7)(x-1,8) + 5,1667(x-1,7)(x-1,8)(x-1,9)$

$P_3(x) = 9,3057 + 15,8370x - 26,9229 + 11,5050(x^2 - 3,5x + 3,06) + 5,1667(x^3 - 1,9x^2 - 3,5x^2 + 6,65x + 3,06x - 5,8140)$

$P_3(x) = 9,3057 + 15,8370x - 26,9229 + 11,5050x^2 - 40,2675x + 35,2053 + 5,1667x^3 - 9,8167x^2 - 18,0834x + 34,3586x + 15,8101x - 30,0392$

$\therefore P_3(x) = 5,1667x^3 - 16,3951x^2 + 25,7381x - 12,4511$ //

No padrão formado, temos:

$$P(x) = -12,4511 + 25,7381x - 16,3951x^2 + 5,1667x^3$$