CS 3010.02 | Class exercise 4.1 | Christopher Koepke

- use direct method to find the interpolating polynomial.

x:	-2	-1	0	2	3
y:	31	5	1	11	61
	0	1	2	3	4

$y_0 = 31$

$y_1 = 31 + a_1(-1+2) \Rightarrow \frac{5-31}{1} = a_1 = -26$ $\quad P_1(x) = 31 - 26(x+2)$

$y_2 = 31 - 26(0+2) + a_2(0+2)(0+1) \Rightarrow \frac{1+21}{2} = a_2 = 11$ $\quad P_2(x) = 31 - 26(x+2) + 11(x+2)(x+1)$

$y_3 = 31 - 26(2+2) + 11(2+2)(2+1) + a_3(2+2)(2+1)(2-0)$

$\Rightarrow \frac{11-59}{(4)(3)(2)} = a_3 = -2$ $\quad P_3(x) = 31 - 26(x+2) + 11(x+2)(x+1) - 2(x+2)(x+1)(x-0)$

$y_4 = 31 - 26(3+2) + 11(3+2)(3+1) - 2(3+2)(3+1)(3-0) + a_4(3+2)(3+1)(3-0)(3-$

$\Rightarrow \frac{61-1}{(5)(4)(3)(1)} = a_4 = 1$

- $a_0 = 31 \quad a_1 = -26 \quad a_2 = 11 \quad a_3 = -2 \quad a_4 = 1$

$$y = 31 + (x+2)(2 + (x+1)(11 + (x-0)(-2 + (x-2)(1))))$$