Class exercise 4.2

- construct the divided difference table and the Newton's interpolating polynomial for this table.

x	0	1	2	4	6
y	1	9	23	93	259

x	y	$\Delta^0 y$	$\Delta^1 y$	$\Delta^2 y$	$\Delta^3 y$	$\Delta^4 y$
0	1	1				
1	9		$\frac{9-1}{1-0} = 8$			
2	23		$\frac{23-9}{2-1} = 14$	$\frac{14-8}{2-0} = 3$		
4	92		$\frac{92-23}{4-2} = \frac{69}{2}$	$\frac{\frac{69}{2}-14}{4-1} = \frac{41}{6}$	$\frac{\frac{41}{6}-3}{4-0} = \frac{23}{24}$	
6	259		$\frac{259-93}{6-4} = 83$	$\frac{83-\frac{41}{6}}{6-2} = \frac{457}{24}$	$\frac{\frac{457}{24}-\frac{41}{6}}{6-1} = \frac{293}{120}$	$\frac{\frac{293}{120}-\frac{23}{24}}{6-0} = \frac{84}{360}$

$a_0 = 1 \quad a_1 = 8 \quad a_2 = 3 \quad a_4 = \frac{23}{24} \quad a_5 = \frac{84}{360}$

$$y = 1 + 8(x-x_0) + 3(x-x_0)(x-x_1) + \frac{23}{24}(x-x_0)(x-x_1)(x-x_2) + \frac{84}{360}(x-x_0)(x-x_1)(x-x_2)(x-x_3)$$