a)

x	1	2	3	4
y	1	3	4	3

b)

x	1	2	3	4
y	8	5	4	0

a)

x	y	Δy_0	$\Delta^2 y_0$	$\Delta^3 y_0$
1	1			
		2		
2	3		-1	
		1		-1
3	4		-2	
		-1		
4	3			

$h = 1$

$$P(x) = y_0 + \frac{\Delta y_0}{h}(x-x_0) + \frac{\Delta^2 y_0}{2!h^2}(x-x_0)(x-x_1) + \frac{\Delta^3 y_0}{3!h^3}(x-x_0)(x-x_1)(x-x_2)$$

$$P(x) = 1 + \frac{2}{1}(x-1) + \frac{-1}{2!1^2}(x-1)(x-2) + \frac{-1}{3!1^3}(x-1)(x-2)(x-3)$$

$(x-1)(x-2) = x^2-3x+2$

$\frac{3!1^3}{6}$

$(x^2-3x+2)(x-3) = x^3-6x^2-7x-6$

$$P(x) = 1+2x-2-\frac{x^2}{2}+\frac{3x}{2}-1-\frac{x^3}{6}+x^2+\frac{7x}{6}+1$$

$\frac{3}{}$

$$P(x) = \frac{-x^3}{6}+\frac{x^2}{2}+\frac{30x}{6}-1$$

$5x$

b)

x	y_0	Δy_0	$\Delta^2 y_0$	$\Delta^3 y_0$
1	8			
		-3		
2	5		2	
		-1		-5
3	4		-3	
		-4		
4	0			

$h = 1$

x^3-6x^2-7x-6

x^2-3x+2

$$P(x) = 8 + \frac{-3}{1}(x-1) + \frac{2}{2!\cdot 1^2}(x-1)(x-2) + \frac{-5}{3!1^3}(x-1)(x-2)(x-3)$$

$\frac{-5}{6}$

$$P(x) = 8-3x+3+x^2-3x+2-\frac{5x^3}{6}+5x^2+\frac{35x}{6}+5$$

$$P(x) = -\frac{5x^3}{6}+6x^2+\frac{29x}{6}+10$$