Taller 23 mc

x	f(x)	Distancia a 4.25
1	3	→ 3.25
3	0	→ 1.25
5	-1	→ 0.75
7	2,5	→ 2.75
9	1	→ 9.75

Sol:

grado 1 (2 ptos)

$$L(x) = f(x_0) \cdot \frac{x - x_1}{x_0 - x_1} + f(x_1) \cdot \frac{x - x_0}{x_1 - x_0}$$

$x_0 = 3$, $f(x_0) = 0$

$x_1 = 5$, $f(x_1) = -1$

$$L_1(x) = 0 \cdot \frac{x-5}{3-5} + 1 \cdot \frac{x-3}{5-3} = \frac{x-3}{2}$$

$$L_1(4.25) = \frac{4.25 - 3}{2} = \frac{1.25}{2} = 0.625$$

grado II (3 ptos.)

$x=3 \quad f = 0$

$x=5 \quad f = 1$

$x=7 \quad f = 2.5$

$$L_n(x) = f(x_0)\cdot\frac{(x-x_1)(x-x_2)}{(x_0-x_1)(x_0-x_2)} + f(x_1)\cdot\frac{(x-x_0)(x-x_2)}{(x_1-x_0)(x_1-x_2)} +$$

$$\rightarrow f(x_2)\cdot\frac{(x-x_0)(x-x_1)}{(x_2-x_0)(x_2-x_1)}$$

$$L_2(x) = 0\cdot\frac{(x-5)(x-7)}{(3-5)(3-7)} + 1\cdot\frac{(x-3)(x-7)}{(5-3)(5-7)} + 2.5\cdot\frac{(x-3)(x-5)}{(7-3)(7-5)}$$

$$L_2(x) = \frac{(x-3)(x-7)}{2\cdot(-2)} + 2.5\cdot\frac{(x-3)(x-5)}{4\cdot 2}$$

$$L_2(x) = -\frac{(x-3)(x-7)}{4} + \frac{2.5\,(x-3)(x-5)}{8}$$

Evalúo 4.25 =

$(4.25-3)(4.25-7) = 1.25\cdot(-2.75) = -3.4375$

$(4.25-3)(4.25-5) = 1.25\cdot(-0.75) = -0.9375$

$$L_2(4.25) = -\frac{-3.4375}{4} + \frac{2.5\,(-0.9375)}{8}$$

$$= 0.859375 - 0.2929687 5 = 0.56640625$$

grado III

1, 3
3, 0
5, 1
7, 2.5

1. $f(1) = 3$

$$L_0(x) = \frac{(x-3)(x-5)(x-7)}{(1-3)(1-5)(1-7)} = \frac{(x-3)(x-5)(x-7)}{-48}$$

$$T_0(x) = 3 \cdot L_0(x) = 3 \cdot \frac{(x-3)(x-5)(x-7)}{-48}$$

2. $f(3) = 0$

$$L_1(x) = \frac{(x-1)(x-5)(x-7)}{(3-1)(3-5)(3-7)} = \frac{(x-1)(x-5)(x-7)}{16}$$

$$T_1(x) = 0 \cdot L_1(x) = 0$$

3. $f(5) = 1$

$$L_2(x) = \frac{(x-1)(x-3)(x-7)}{(5-1)(5-3)(5-7)} = \frac{(x-1)(x-3)(x-7)}{-16}$$

$$T_2(x) = \frac{(x-1)(x-3)(x-7)}{-16}$$

4. $f(7) = 2,5$

$$L_3(x) = \frac{(x-1)(x-3)(x-5)}{(7-1)(7-3)(7-5)} = T_3(x) = 2.5 \cdot \frac{(x-1)(x-3)(x-5)}{48}$$

$$L_3(x) = \frac{3(x-3)(x-5)(x-7)}{-48} + \frac{(x-1)(x-3)(x-7)}{-16} + \frac{2.5(x-1)(x-3)(x-5)}{48}$$

Calculo $x = 4.25$

I. $(x-3)(x-5)(x-7) = -0.1611$ $\quad (1.25)(-0.75)(-2.75)$

II. $(x-1)(x-3)(x-7) = 0.6982$ $\quad (3.25)(1.25)(-2.75)$

III. $(x-1)(x-3)(x-5) = -0.1588$ $\quad (3.25)(1.25)(-0.75)$

$$f(4.25) = -0.1611 + 0.6982 - 0.1588 = 0.3783$$