① ~~x f(x) f'(x)~~

~~0.1 = 0.620~~

~~0.2~~

~~0.3~~

①

x	f(x)	f'(x)
0.1	−0.62049958	3.585502082
0.2	−0.28398668	3.14033271
0.3	0.00660095	2.66668043

$$P5(x) = f(x_0)h_0(x) + f(x_1)h_1(x) + f(x_2)h_2(x) + f'(x_0)\hat{h}_0(x) + f'(x_1)\hat{h}_1(x) + f'(x_2)\hat{h}_2(x)$$

$$= (-0.62049958)h_0(x) + (-0.28398668)h_1(x) + (0.00660095)h_2(x) + (3.585502082)\hat{h}_0(x) + (3.14033271)\hat{h}_1(x) + (2.66668043)\hat{h}_2(x)$$

$$h_k(x) = (1 - 2(x - x_k) l_k'(x_k)) l_k^2(x)$$

(1)

$$l_0(x) = \frac{(x-0.2)(x-0.3)}{(0.1-0.2)(0.1-0.3)}$$

$$= 50x^2 - 25x + 3$$

$$l_0'(x) = 100x - 25$$

$$l_1(x) = \frac{(x-0.1)(x-0.3)}{(0.2-0.1)(0.2-0.3)}$$

$$= -100x^2 + 40x - 3$$

$$l_1'(x) = -200x + 40$$

$$l_2(x) = \frac{(x-0.2)(x-0.1)}{(0.3-0.2)(0.3-0.1)}$$

$$= 50x^2 - 15x + 1$$

$$l_2'(x) = 100x - 15$$

(2)

$$h_0(x) = \left(1 - 2(x - 0.1)[100x - 25]\right)(50x^2 - 25x + 3)^2$$

$$= -500000x^6 + 675000x^5 - 370000x^4$$

$$+ 104750x^3 - 16000x^2 + 1230x - 36$$

$$h_1(x) = \left(1 - 2(x - 0.2)[-50x + 40]\right)(-100x^2 + 40x - 3)^2$$

$$= 4000000\,x^6 - 4800000\,x^5 + 2330000\,x^4$$

$$- 584000\,x^3 + 79400\,x^2 - 5520\,x + 153$$

$$h_2(x) = \left(1 - 2(x - 0.3)[100x - 15]\right)(50x^2 - 15x + 1)^2$$

$$= -500000x^6 + 525000x^5 - 220000x^4$$

$$+ 47250x^3 - 5500x^2 + 330x - 8$$

③

$$\hat{h}_k(x) = (x - x_k) l_k^2$$

$$\hat{h}_1(x) = (x - 0.2)(-100x^2 + 40x - 3)^2$$

$$= 10000x^5 - 10000x^4 + 3800x^3 - 680x^2 + 57x - 1.8$$

$$\hat{h}_0(x) = (x - 0.1)(50x^2 - 25x + 3)^2$$

$$= 2500x^5 - 2750x^4 + 1175x^3 - 242.5x^2 + 24x - 0.9$$

$$\hat{h}_2(x) = (x - 0.3)(50x^2 - 15x + 1)^2$$

$$= 2500x^5 - 2250x^4 + 775x^3 - 127.5x^2 + 10x - 0.3$$

$$P_5(x) = (-0.62049958)(-500000x^6 + 675000x^5 - 370000x^4 + 104750x^3 - 16000x^2 + 1230x - 36)$$

$$+ (-0.28398668)(4000000x^6 - 4800000x^5 + 2330000x^4 - 584000x^3 + 79400x^2 - 5520x + 153)$$

$$+ (0.00660095)(-500000x^6 + 525000x^5 - 220000x^4 + 47250x^3 - 5500x^2 + 330x - 8)$$

$$+ (3.58502082)(2500x^5 - 2750x^4 + 1175x^3 - 242.5x^2 + 24x - 0.9)$$

$$+ (3.14033271)(10000x^5 - 10000x^4 + 3800x^3 - 680x^2 + 57x - 1.8)$$

$$+ (2.66668043)(2500x^5 - 2250x^4 + 775x^3 - 127.5x^2 + 10x - 0.3)$$

Q:2

1. max number = $(0.11111) \times 2^5$

$= (11111.0)_2 \times 2^0$

$= (31)_{10}$

2. min number = $-(31)_{10}$

3. no. of sets = $8 \times 2 = 16$ sets

4. max number for non -ve = $(31)_{10}$

5. min number for non- ve = $(0.10000) \times 2^{-2}$

$= 0.0\ 0\ 0\ 1 \times 2^0$

$= (0.125)_{10}$

6. error 2 →

e=5 →

$0.10000 \times 2^5 = (16)_{10}$
$0.10001 \times 2^5 = (17)_{10}$
$0.10010 \times 2^5 = (18)_{10}$
$0.10011 \times 2^5 = (19)_{10}$
$0.10100 \times 2^5 = (20)_{10}$
$0.10101 \times 2^5 = (21)_{10}$
$0.10110 \times 2^5 = (22)_{10}$
$0.10111 \times 2^5 = (23)_{10}$
$0.11000 \times 2^5 = (24)_{10}$
$0.11001 \times 2^5 = (25)_{10}$
$0.11010 \times 2^5 = (26)_{10}$
$0.11011 \times 2^5 = (27)_{10}$
$0.11100 \times 2^5 = (28)_{10}$
$0.11101 \times 2^5 = (29)_{10}$
$0.11110 \times 2^5 = (30)_{10}$
$0.11111 \times 2^5 = (31)_{10}$