LKM 3

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1.]

x	y
1951	35
1961	42
1971	58
1981	84

a.) Polinom Newton Orde 2 → 3 titik

x	f(x)	ST-1	ST-2
1951	35	7/10	9/10/20 = 9/200
1961	42	16/10	
1971	58		

$$p(x) = 35 + \frac{7}{10}(x-1951) + \frac{9}{200}(x-1951)(x-1961)$$

$$P(1955) = 35 + \frac{7}{10}(4) + \frac{9}{200}(4)(-6)$$

$$= 36.72 //$$

b.) Polinom Lagrange orde 3

$$f_3(x) = L_0(x) f(x_0) + L_1(x) f(x_1) + L_2(x) f(x_2) + L_3(x) f(x_3)$$

$$= \frac{(x-x_1)(x-x_2)(x-x_3)}{(x_0-x_1)(x_0-x_2)(x_0-x_3)} f(x_0) + \frac{(x-x_0)(x-x_2)(x-x_3)}{(x_1-x_0)(x_1-x_2)(x_1-x_3)} f(x_1)$$

$$+ \frac{(x-x_0)(x-x_1)(x-x_3)}{(x_2-x_0)(x_2-x_1)(x_2-x_3)} + \frac{(x-x_0)(x-x_1)(x-x_2)}{(x_3-x_0)(x_3-x_1)(x_3-x_2)}$$

$$f_3(1955) = \frac{(1955-1951)(1955-1971)(1955-1981)}{(1951-1961)(1951-1971)(1951-1981)} \cdot 35 + \frac{(1955-1951)(1955-1971)(1955-1981)}{(1961-1951)(1961-1971)(1961-1981)} \cdot 42$$

$$+ \frac{(1955-1951)(1955-1961)(1955-1981)}{(1971-1951)(1971-1961)(1971-1981)} \cdot 58 + \frac{(1955-1951)(1955-1961)(1955-1971)}{(1981-1951)(1981-1961)(1981-1971)} \cdot 84$$

$= 36.72$ //

2.]

u	y
40	180
50	204
60	226
70	250
80	276
90	304

a.) Polinomial Lagrange orde 3

$$f_3(u) = \frac{(u-50)(u-60)(u-70)}{(40-50)(40-60)(40-70)} \cdot 180 + \frac{(u-40)(u-60)(u-70)}{(50-40)(50-60)(50-70)} \cdot 204 + \frac{(u-40)(u-50)(u-70)}{(60-40)(60-50)(60-70)} \cdot 226$$
$$+ \frac{(u-40)(u-50)(u-60)}{(70-40)(70-50)(70-60)} \cdot 256$$

$$f_3(84) = \frac{(34)(24)(14)}{(-10)(-20)(-30)} \cdot 180 + \frac{(44)(24)(14)}{(10)(-10)(-20)} \cdot 204 + \frac{(44)(34)(14)}{(20)(10)(-10)} \cdot 226 + \frac{(44)(34)(24)}{(30)(20)(10)} \cdot 256$$

$= 294,457$ //

b.) Polinomial Lagrange Orde 4

$$f_4(84) = \frac{(84-50)(84-60)(84-70)(84-80)}{(40-50)(40-60)(40-70)(40-80)} \cdot 180 + \frac{(84-40)(84-60)(84-70)(84-80)}{(50-40)(50-60)(50-70)(50-80)} \cdot 204$$
$$+ \frac{(84-40)(84-50)(84-70)(84-80)}{(60-40)(60-50)(60-70)(60-80)} \cdot 226 + \frac{(84-40)(84-50)(84-60)(84-80)}{(70-40)(70-50)(70-60)(70-80)} \cdot 250$$
$$+ \frac{(84-40)(84-50)(84-60)(84-70)}{(80-40)(80-50)(80-70)(80-60)} \cdot 276$$

$= 286.198$ //