

$$I = \int_a^b f(x) dx \approx \int_a^b P_2(x)$$

$$\int_a^b \left( \frac{(x-b)(x-x_m)}{(a-b)(a-x_m)} f(a) + \frac{(x-a)(x-b)}{(x_m-a)(x_m-b)} f(x_m) + \frac{(x-a)(x-x_m)}{(b-a)(b-x_m)} f(b) \right) dx \approx \int_a^b f(x)$$

$$\int_a^b \frac{(x-b)(x-x_m)}{(a-b)(a-x_m)} f(a) dx + \int_a^b \frac{(x-a)(x-b)}{(x_m-a)(x_m-b)} f(x_m) dx + \int_a^b \frac{(x-a)(x-x_m)}{(b-a)(b-x_m)} f(b) dx$$

$$\textcircled{1} = \frac{1}{(a-b)(a-x_m)} \int_a^b (x^2 - x \cdot x_m - bx + bx_m) dx$$

$$\frac{1}{(a-b)(a-x_m)} \left( \frac{x^3}{3} - \frac{x^2}{2} \cdot x_m - \frac{x^2}{2} b + bx_m x \right)$$

$$\textcircled{2}: \frac{1}{(x_m-a)(x_m-b)} \int_a^b (x^2 - bx - ax + ab)$$

$$\frac{1}{(x_m-a)(x_m-b)} \int_a^b (x^2 - x(b+a) + ab)$$

$$\frac{x^3}{3} - \frac{x^2}{2}(b+a) + abx$$

$$\textcircled{3} \frac{\frac{b^3}{3} - \frac{b^2}{2}(x_m+a) + a \cdot b \cdot x_m}{(b-a)(b-x_m)}$$

$$- \frac{\left( \frac{a^3}{3} - \frac{a^2}{2}(x_m+a) + a^2 \cdot x_m \right)}{(b-a)(b-x_m)}$$

Jumlah:

$$\textcircled{1} \frac{\left( \frac{b^3}{3} - \frac{b^2}{2}x_m - \frac{b^3}{2} + b^2x_m \right) - \frac{a^3}{3} + \frac{a^2}{2}x_m + \frac{a^2}{2}b - abx_m}{(a-b)(a-x_m)}$$

$$\textcircled{2} \frac{\frac{b^3}{3} - \frac{b^2}{2}(b+a) + ab^2 - \frac{a^3}{3} + \frac{a^2}{2}(b+a) - a^2b}{(x_m-a)(x_m-b)}$$

$$\textcircled{3} \frac{\frac{b^3}{3} - \frac{b^2}{2}(x_m+a) + a \cdot b \cdot x_m - \frac{a^3}{3} + \frac{a^2}{2}(x_m+a) - a^2x_m}{(b-a)(b-x_m)}$$

$$(x_m+b) \left( \frac{a^2}{2} - \frac{b^2}{2} \right)$$

$$\frac{\frac{b^3}{3} - \frac{b^2}{2}(b+x_m) + bx_m - \frac{a^3}{3} + \frac{a^2}{2}(x_m+b) - abx_m}{(a-b)(a-x_m)}$$

$$= (x_m+b)(b-a) \frac{(x_m+b)(a^2-b^2)}{2}$$

$f(x_m)$

$$(b-a) \left( \frac{\frac{b^3+ab+a^2}{3} - \frac{(x_m+b)(b+a) + b x_m}{2}}{(a-b)(a-x_m)} \right)$$

$$\textcircled{2} \frac{(b-a) \left( \frac{(b^2+ab+a^2)}{3} - \frac{(a+b)(a+b)}{2} + ab \right) - f(x_m)}{(x_m-a)(x_m-b)}$$

$f(b)$

$$\textcircled{3} \frac{(b-a) \left( \frac{b^2+ab+a^2}{3} - \frac{(x_m+a)(b+a)}{2} + a x_m \right) \cdot f(b)}{(b-a)(b-x_m)}$$

$f(a)$

$$\textcircled{1} \frac{(b-a)}{2} \cdot \frac{\left( 2 \cdot \left( \frac{b^2+ab+a^2}{3} \right) - (x_m+b)(b+a) + 2b x_m \right)}{(a-b)(a-x_m)}$$

$(b+a)(b-a)$

$$\textcircled{2} \frac{(b-a)}{2} \cdot \frac{\left[ 2 \left[ \frac{b^2+ab+a^2}{3} \right] - (a+b)^2 + 2ab \right]}{(x_m-a)(x_m-b)}$$

$$\frac{h}{3} \left[ \frac{4(x_m - a)(x_m - b)}{(x_m - a)(x_m - b)} \right] \cdot f(x_m)$$

$$\frac{h(4f(x_m))}{3}$$

$$\Delta = (b - a)(b - x_m)$$

$$+\Delta - \Delta$$

$$=$$