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

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

$$\frac{f(a)+f(b)}{(a-b)(b-a)} \int_a^b \cancel{xb} - \cancel{xa} - b^2 + ba + \cancel{xa} - \cancel{xb}\,dx$$

$$-a^2 + ab \;;\; \frac{f(a)+f(b)}{(a-b)(b-a)} \int_a^b -b^2 + 2ab - a^2)$$

$$(a-b)(b-a) = (ab - a^2 - b^2 + ab)$$

$$\frac{f(a)+f(b)}{-b^2+2ab-a^2} \cdot \left(-b^2x + 2abx - a^2x \Big|_a^b\right)$$

$$-b^3 + 2ab^2 - a^2b - (-b^2a + 2a^2b - a^3)$$

$$-b^3 + \underline{2ab^2} - \underline{a^2b} + \underline{b^2a} - 2a^2b + a^3$$

$$-b^3 + 3ab^2 - 3a^2b + a^3 \cdot \frac{f(a)+fb}{-b^2+2ab-a^2}$$

$$-(b-a)^{\cancel{2}} \cdot \frac{f(a)+f(b)}{\cancel{(b-a)}(a-b)}$$

$a-b=-(b-a)$

$$-\frac{f(a)+f(b)}{a-b}\cdot(b-a)^2;\ \frac{\cancel{-}f(a)+f(b)}{\cancel{-}\cancel{(b-a)}}\cdot(b-a)^{\cancel{2}}$$

$$\int_a^b f(x)\,dx \cong \int_a^b P_1(x)\,dx = f(a)+f(b)\cdot(b-a)$$

Sin Embargo, como se toma el promedio de $f(a)$ y $f(b)$;

$$f(a)+f(b)\cdot\frac{(b-a)}{2}$$

$$E = \int_a^b \varepsilon(x)\,dx \; ; \; \varepsilon(x) = \frac{f''(\xi)}{2}(x-a)$$

$$(x-b) \text{ si } \frac{f''(\xi)}{2} \text{ es cte y } \cancel{(a-b)} \; \cancel{a-} \; b-a=h$$

$$\frac{f''(\xi)}{2}\int_a^b (x-a)(x-b)\,dx \qquad \begin{array}{c|cc} & x & -a \\ \hline x & x^2 & -xa \\ -b & -xb & ab \end{array}$$

$$\int_a^b x^2 - xa - xb + ab \, dx$$

$$\frac{x^3}{3} - \frac{x^2 a}{2} - \frac{x^2 b}{2} + abx \Big|_a^b$$

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

$$-\frac{b^3}{6} + \frac{ab^2}{2} + \frac{a^3}{6} - \frac{a^2 b}{2} \; ;$$

$$\left(\frac{-2b^3}{12} + \frac{6ab^2}{12} + \frac{2a^3}{12} - \frac{a^2 b \cdot 6}{12}\right)\frac{f''(\xi)}{2}$$

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

$$\left(-b^3+3ab^2-3b^2a+a^3\right)3f(\xi)$$

$$3\left(a^3-b^3\right)f(\xi)$$

$$-3(b-a)^3 f(\xi) \; ; \; -3h^3 f(\xi)$$

$$\frac{-3}{36} \; ; \; \frac{-1}{12} \; ; \; \frac{-h^3}{12} f(\xi)$$