Let $p[f|x_0,\dots,x_n]$ be the IP of $f(x)$:

$$\int_a^b f(x)\,dx \approx \int_a^b p[f|x_0,\dots,x_n]\,dx$$

$$= \int_a^b \sum_{j=0}^{n} L_j^n(x)\cdot f(x_j)\,dx$$

$$= \sum_{j=0}^{n} \underbrace{\int_a^b L_j^n(x)\,dx}_{w_j} \cdot f(x_j) = Q[f]$$

w_j: QW, x_j: QN

Rem.: The QWs do NOT depend on f!

For given QNs x_j compute them once and tabulate for posterity

$\rightsquigarrow$ for equally spaced QNs over $I=[a,b]$ this leads to so-called

Newton-Cotes QRs