$$\frac{d}{dx}\left(f(x)g(x)\right) = f'(x)g(x) + f(x)g'(x)$$

$$f(x)g(x) = \int f'(x)g(x) + f(x)g'(x)\,dx$$

$$f(x)g(x) = \int f'(x)g(x)\,dx + \int f(x)g'(x)\,dx$$

$$f(x)g(x) - \int f'(x)g(x)\,dx = \int f(x)g'(x)\,dx$$

$$\int f(x)g'(x)\,dx = f(x)g(x) - \int f'(x)g(x)\,dx$$

[IP] = $$\boxed{\int fg'\,dx = fg - \int f'g\,dx}$$