The forms of half-derivatives and half-integrals for functions of the form

$$f(x) = x^k, k \in \{0, 1, 2, ...\}$$

Half Integrals:

$$\lambda_i = J^{\frac{1}{2}} x^i$$

$$\lambda_0 = \frac{2x^{\frac{1}{2}}}{\Gamma\left(\frac{1}{2}\right)}$$

$$\lambda_1 = \frac{4x^{\frac{3}{2}}}{3\Gamma\left(\frac{1}{2}\right)}$$

$$\lambda_2 = \frac{16x^{\frac{5}{2}}}{15\Gamma\left(\frac{1}{2}\right)}$$

$$\lambda_3 = \frac{96x^{\frac{7}{2}}}{105\Gamma\left(\frac{1}{2}\right)}$$

$$\lambda_i = \frac{i!2^{i+1}}{(2i+1)!!} \frac{x^{\frac{2i+1}{2}}}{\Gamma\left(\frac{1}{2}\right)}$$

Half Derivatives:

$$\frac{d}{dx}\lambda_0 = \frac{x^{-\frac{1}{2}}}{\Gamma\left(\frac{1}{2}\right)}$$

$$\frac{d}{dx}\lambda_1 = \frac{2x^{\frac{1}{2}}}{\Gamma\left(\frac{1}{2}\right)}$$

$$\frac{d}{dx}\lambda_2 = \frac{8x^{\frac{3}{2}}}{3\Gamma\left(\frac{1}{2}\right)}$$

$$\frac{d}{dx}\lambda_3 = \frac{48x^{\frac{5}{2}}}{15\Gamma\left(\frac{1}{2}\right)}$$

$$\frac{d}{dx}\lambda_i = \frac{i!2^i}{(2i-1)!!} \frac{x^{\frac{2i-1}{2}}}{\Gamma\left(\frac{1}{2}\right)}$$