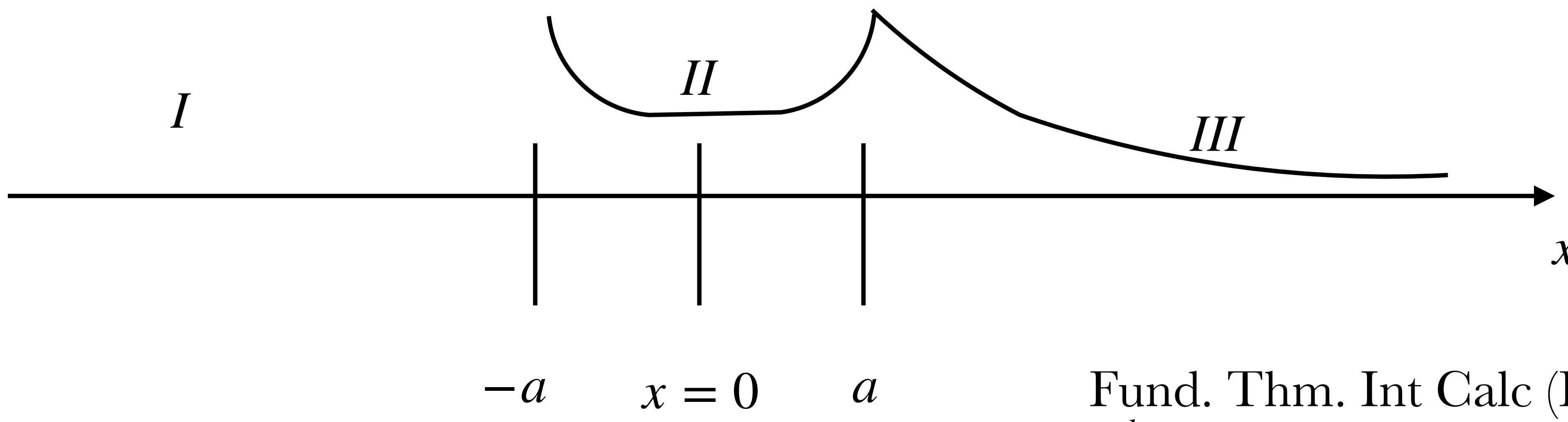


Fund. Thm. Int Calc (FTIC):

$$\int_a^b \frac{df}{dx} dx = f(b) - f(a)$$

Even solutions:

$$\psi_{\text{even}} = \begin{cases} \psi_I(x) = Ae^{kx} & x \leq -a \\ \psi_{II}(x) = B(e^{kx} + e^{-kx}) & -a \leq x \leq a \\ \psi_{III}(x) = Ae^{-kx} & x \geq a \end{cases}$$

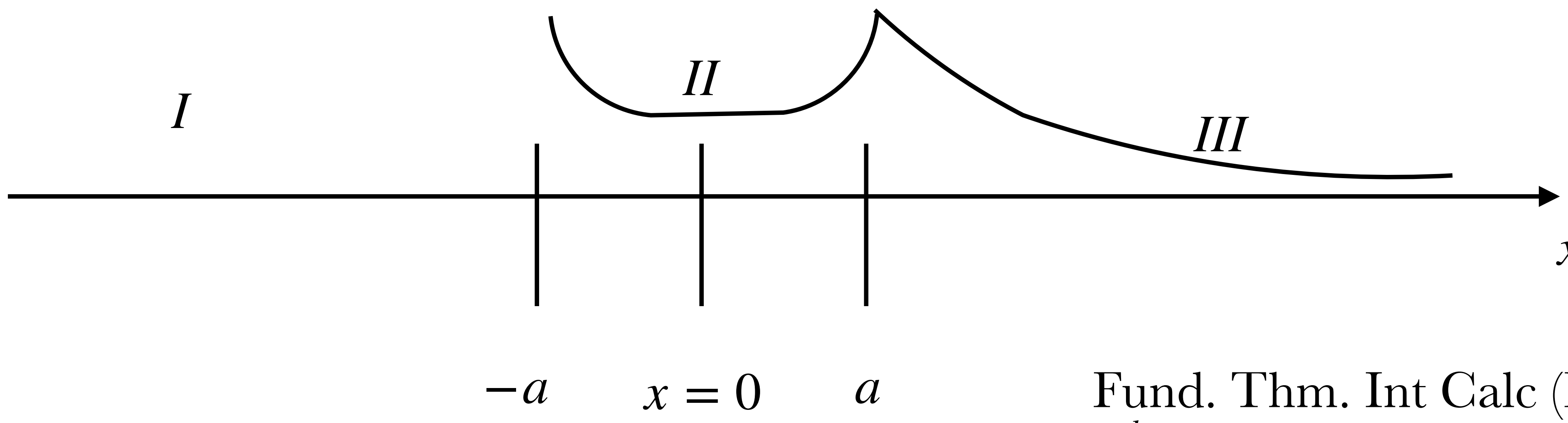
$$\Delta\left(\frac{d\psi}{dx}\right) \equiv \left.\frac{d\psi}{dx}\right|_+ - \left.\frac{d\psi}{dx}\right|_- = \int_-^+ \frac{d^2\psi}{dx^2} dx$$

$$\psi_{II}(x) = Be^{kx} + Ce^{-kx} \quad -a < x < a$$

And impose that $\psi_{II}(-x) = \psi_{II}(x)$, which only holds if B=C

At a point where the potential is infinite we have:

$$\Delta\left(\frac{d\psi}{dx}\right) \equiv \left.\frac{d\psi}{dx}\right|_+ - \left.\frac{d\psi}{dx}\right|_- = -\frac{2m\alpha}{\hbar^2}\psi(a)$$



Fund. Thm. Int Calc (FTIC):

$$\int_a^b \frac{df}{dx}dx = f(b) - f(a)$$

Odd solutions:

$$\psi_{\text{odd}} = \begin{cases} \psi_I(x) = Ae^{kx} & x \leq -a \\ \psi_{II}(x) = B(e^{kx} - e^{-kx}) & -a \leq x \leq a \\ \psi_{III}(x) = -Ae^{-kx} & x \geq a \end{cases}$$

$$\Delta\left(\frac{d\psi}{dx}\right) \equiv \left.\frac{d\psi}{dx}\right|_+ - \left.\frac{d\psi}{dx}\right|_- = \int_-^+ \frac{d^2\psi}{dx^2}dx$$

$$\psi_{II}(x) = Be^{kx} + Ce^{-kx} \quad -a < x < a$$

And impose that $\psi_{II}(-x) = -\psi_{II}(x)$, which only holds if $C = -B$

$$Be^{kx} + Ce^{-kx} = -(Be^{-kx} + Ce^{kx})$$

At a point where the potential is infinite we have:

$$\Delta\left(\frac{d\psi}{dx}\right) \equiv \left.\frac{d\psi}{dx}\right|_+ - \left.\frac{d\psi}{dx}\right|_- = -\frac{2m\alpha}{\hbar^2}\psi(a)$$