4.2: $B_2 = 0$

In the first case we read off that $A_1 = B_3$, and we find that k and κ are related by

$$ka = \kappa a \tan \kappa a. \tag{4.2.1}$$

This equation can be solved graphically. Use

$$k = \sqrt{-\kappa^2 + \kappa_0^2} \tag{4.2.2}$$

with $\kappa_0^2 = \frac{2m}{\hbar^2} V_0$, and find that there is always at least one solution of this kind, no matter how small V_0!

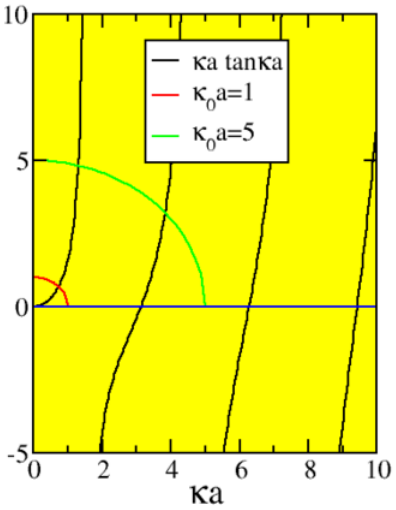

Figure* 4.2.1*: *The graphical solution for the even states of the square well.*

In the middle region all these solutions behave like sines, and you will be asked to show that the solutions are invariant when x goes to − x. (We say that these functions are even.)