This exercise concerns the Fourier Transform of the following function $F(x)$:

\[ F(x) = \begin{cases} F_0 & \text{for } x = -a, a, \ldots \\ 0 & \text{otherwise} \end{cases} \]

a) Before calculating the Fourier Transform itself, estimate the “width” of the transform function $A(k)$ in $k$ space.

b) Calculate the Fourier Transform function $A(k)$.

c) Plot $A(k)$. (A sketch by hand is okay.) Label important features such as zeros and maxima. How does the fall-off in $k$ differ from the Fourier transform of the square pulse, which we did in class? That is, is it sharper, less sharp, or about the same?

d) Estimate the width of $A(k)$. Does it agree with your estimate in (a)?