13.34)
Hint: Find the FT of the derivative of \( f(t) \), then use the derivative property to find the FT of \( f(t) \).

\[
F(\omega) = 30 (\text{sinc} \left( \frac{3 \omega}{2} \right))^2
\]

13.35)
Hint: Either (1) treat \( f(t) \) as a sum of three pulses each of duration \( T/3 \), (2) treat \( f(t) \) as a sum of three pulses of duration \( T/3 \), \( 2T/3 \), and \( T \), (3) find the transform of the derivative of \( f(t) \) (which consists of four impulses) and use the derivative property. The result can be expressed in a couple of different ways all of which can be shown to be equal to:

\[
F(\omega) = 12 \text{sinc}(\omega/2) e^{-j\frac{3\omega}{2}} + 8 \text{sinc}(\omega) e^{-j\omega} + 4 \text{sinc}(\omega/2) e^{-j\frac{\omega}{2}}
\]

13.42)
\begin{enumerate}
\item \( F(\omega) = 2\pi \left[ e^{j\pi/5} \delta(\omega + 5) + e^{-j\pi/5} \delta(\omega - 5) \right] \)
\item \( G(\omega) = \frac{0.5 + j\omega}{(0.5 + j\omega)^2 + 25} \)
\end{enumerate}

13.43)
\begin{enumerate}
\item \( F(\omega) = \pi \left( 1/2 + j3 \right) \delta(\omega + 2) + \pi \left( 1/2 - j3 \right) \delta(\omega - 2) - (\pi/2) [\delta(\omega + 6) + \delta(\omega - 6)] \)
\item Hint: Working with the derivative simplifies this problem too. The derivative consists of two shifted rectangular pulses and two shifted impulses.
\[
G(\omega) = \frac{8\pi^2 A}{\omega_1^2} \text{sinc}(\omega \pi/\omega) - \frac{4\pi^2 A}{\omega_1^2} (\text{sinc}(\omega \pi/\omega))^2
\]
\end{enumerate}