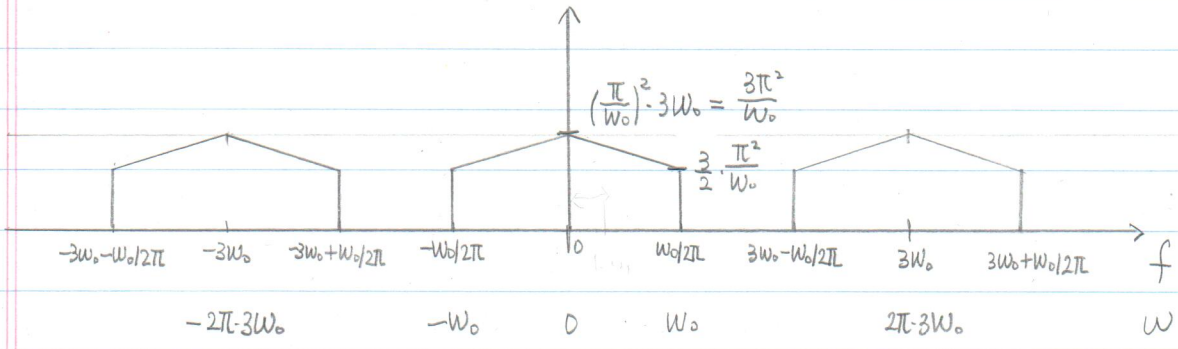
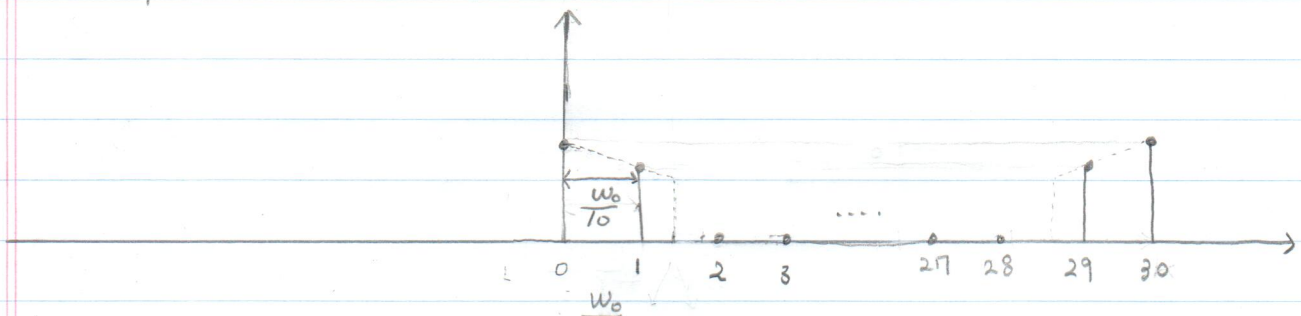
d) $T_s = \frac{1}{3w_0}$, $f_s = 3w_0$ $X_p(w) = \frac{1}{T}\sum_{n=-\infty}^{\infty} X(w - \frac{2\pi n}{T})$



e) $N=30$, the period of $x_2[n]$: $T_0 = N \cdot T_s = 30 \cdot \frac{1}{3w_0} = \frac{10}{w_0}$

The sample interval of $Y_0[k] = \frac{1}{T_0} = \frac{w_0}{10}$



$$\begin{cases} \frac{\frac{w_0}{2\pi}}{\frac{w_0}{10}} = \frac{10}{2\pi} = 1.5915\ldots > 1 \\ \frac{w_0}{2\pi} < \frac{w_0}{10} \end{cases}$$