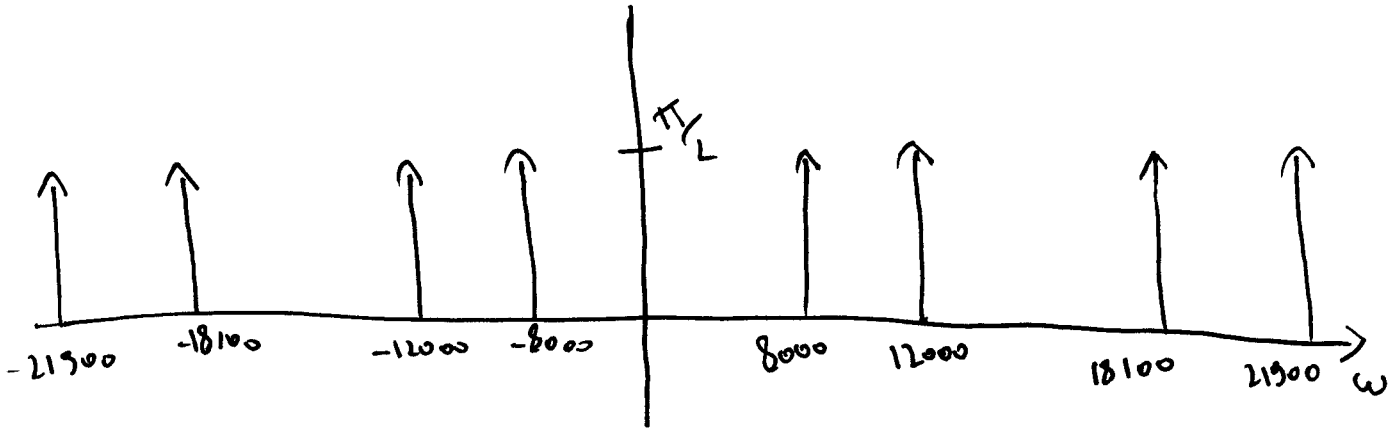
COMMUNICATIONS I

SOLUTION TO PROBLEM SHEET FIVE

1. $s(t) = x_1(t)\cos 10000t + x_2(t)\cos 20000t$



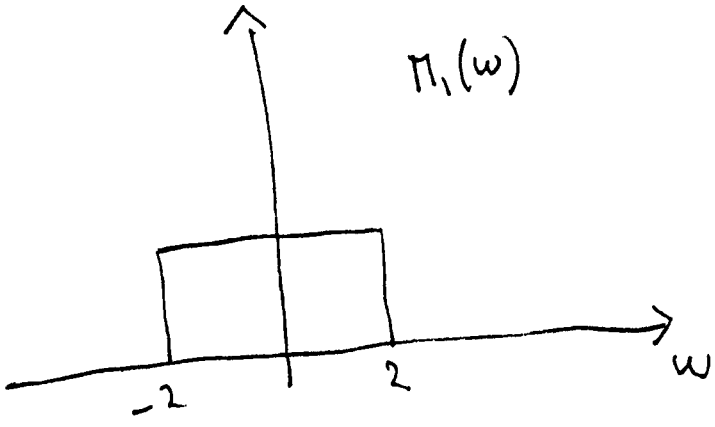
THE SIGNAL IN CASE a) IS $y_1(t) = \frac{1}{2}x_1(t)$

THE SIGNAL IN CASE b) IS $y_2(t) = \frac{1}{2}x_2(t)$

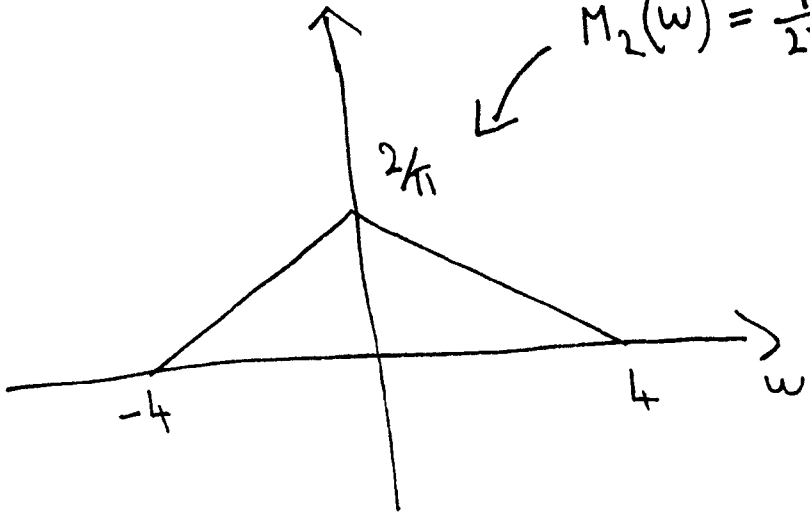
THIS IS A SIMPLE EXAMPLE OF FREQUENCY-DIVITION MULTIPLEXING (FDM)

2.

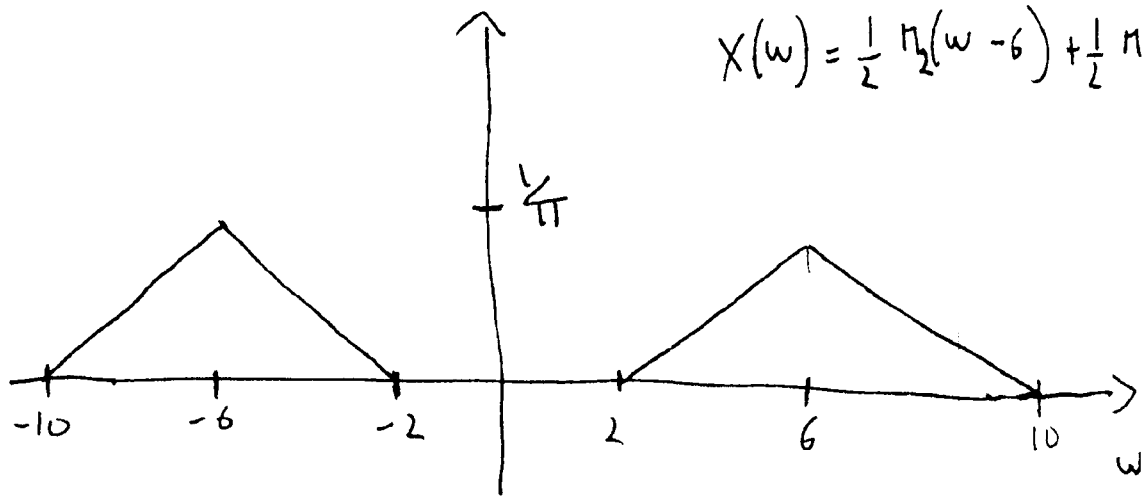
$$\frac{2}{\pi}\,\mathrm{SINC}(2t) \quad \Longleftrightarrow \quad \mathrm{RECT}\left(\frac{\omega}{4}\right)$$

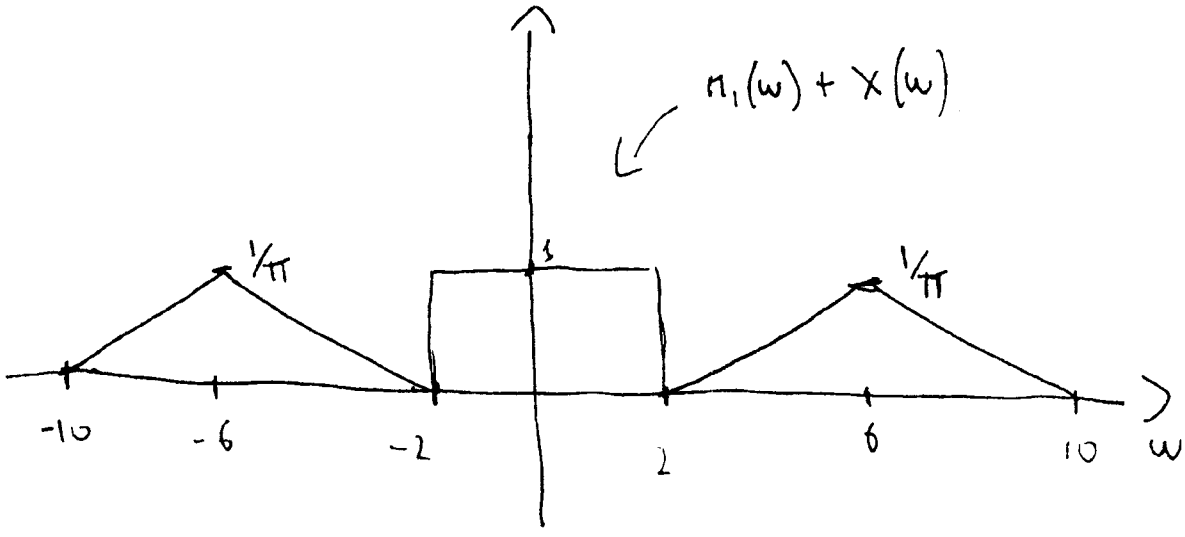


$$M_2(\omega) = \frac{1}{2\pi}\,\Pi_1(\omega) * M_1(\omega)$$

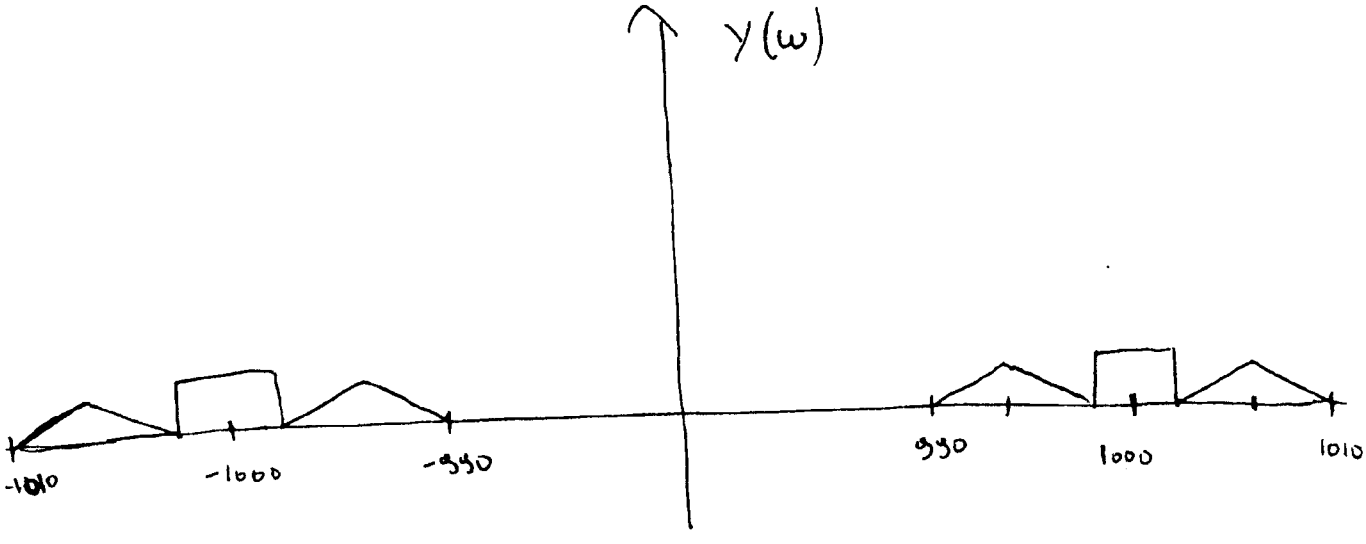


$$X(\omega) = \frac{1}{2} \Pi_2(\omega - 6) + \frac{1}{2} \Pi_2(\omega + 6)$$





BANDWIDTH $B = 10/2\pi = \frac{5}{\pi}$ Hz



2.(c) YES

2.(d)