

## ECE-300, Fourier Transform Practice

Fill in the following table using only the Fourier transform tables.  
You can work with one other person if you wish.

	$x(t)$	$\Leftrightarrow$	$X(\omega)$
a.)		$\Leftrightarrow$	$rect\left(\frac{\omega}{4}\right)$
b.)	$sinc\left(\frac{3t}{\pi}\right)$	$\Leftrightarrow$	
c.)		$\Leftrightarrow$	$sinc\left(\frac{\omega}{5}\right)$
d.)	$sinc^2\left(\frac{2t-4}{3}\right)$		
e.)		$\Leftrightarrow$	$\delta(\omega - 1000) \cos(\omega)$
f.)	4	$\Leftrightarrow$	
g.)		$\Leftrightarrow$	$\left[ rect\left(\frac{\omega}{6}\right) - rect\left(\frac{\omega}{2}\right) \right] e^{-j3\omega}$
h.)		$\Leftrightarrow$	$\frac{j\omega}{2 - j\omega}$
i.)		$\Leftrightarrow$	$\frac{3}{2 + j\left(\frac{\omega}{5} + 2\right)}$
j.)		$\Leftrightarrow$	$j\omega e^{-\frac{\omega^2}{6}}$
k.)	$\frac{2}{3 + (2t + 3)^2}$	$\Leftrightarrow$	

Answers (which you will not look at until you've tried!)

	$x(t)$	$\Leftrightarrow$	$X(\omega)$
a.)	$\frac{2}{\pi} \operatorname{sinc}\left(\frac{2t}{\pi}\right)$	$\Leftrightarrow$	$\operatorname{rect}\left(\frac{\omega}{4}\right)$
b.)	$\operatorname{sinc}\left(\frac{3t}{\pi}\right)$	$\Leftrightarrow$	$\frac{\pi}{3} \operatorname{rect}\left(\frac{\omega}{6}\right)$
c.)	$\frac{5}{2\pi} \operatorname{rect}\left(\frac{5t}{2\pi}\right)$	$\Leftrightarrow$	$\operatorname{sinc}\left(\frac{\omega}{5}\right)$
d.)	$\operatorname{sinc}^2\left(\frac{2t-4}{3}\right)$		$\frac{3}{2} \Lambda\left(\frac{3\omega}{4\pi}\right) e^{-j2\omega}$
e.)	$0.090 e^{j1000t}$	$\Leftrightarrow$	$\delta(\omega - 1000) \cos(\omega)$
f.)	4	$\Leftrightarrow$	$8\pi\delta(\omega)$
g.)	$\frac{3}{\pi} \operatorname{sinc}\left(\frac{3}{\pi}[t-3]\right) - \frac{1}{\pi} \operatorname{sinc}\left(\frac{1}{\pi}[t-3]\right)$	$\Leftrightarrow$	$\left[\operatorname{rect}\left(\frac{\omega}{6}\right) - \operatorname{rect}\left(\frac{\omega}{2}\right)\right] e^{-j3\omega}$
h.)	$2e^{2t}u(-t) - \delta(t)$	$\Leftrightarrow$	$\frac{j\omega}{2 - j\omega}$
i.)	$15e^{-10t}e^{-j10t}u(t)$	$\Leftrightarrow$	$\frac{3}{2 + j\left(\frac{\omega}{5} + 2\right)}$
j.)	$-3t\sqrt{\frac{3}{2\pi}}e^{-\frac{3}{2}t^2}$	$\Leftrightarrow$	$j\omega e^{-\frac{\omega^2}{6}}$
k.)	$\frac{2}{3 + (2t+3)^2}$	$\Leftrightarrow$	$\frac{\pi}{\sqrt{3}} e^{j\frac{3}{2}\omega} e^{-\frac{\sqrt{3}}{2} \omega }$