Table of Fourier Transforms and Properties		
	Time Domain *f*(*t*)	**Fourier Domain**
definitions	*definition of Inverse Fourier Transform* $f(t)=\int_{-\infty}^{\infty}F(f)e^{j2\pi ft}df$	*definition of Fourier Transform* $F(f)=\int_{-\infty}^{\infty}f(t)e^{-j2\pi ft}dt$
unit impulse	$\delta(t)$	1
unit step	$u(t)$	$\frac{1}{2}\delta(f)+\frac{1}{j2\pi f}$
exponential	$e^{j2\pi f_o t}$	$\delta(f-f_o)$
rectangular pulse	$\mathrm{rect}(t)$ (see definitions below)	$\mathrm{sinc}(f)$ (see definitions below)
sine	$\sin(2\pi f_o t)$	$\frac{1}{2j}(\delta(f-f_o)-\delta(f+f_o))$
cosine	$\cos(2\pi f_o t)$	$\frac{1}{2}(\delta(f-f_o)+\delta(f+f_o))$
Fourier Series	$\sum_{n=-\infty}^{\infty}C_n e^{jn2\pi f_0 t}$	$\sum_{n=-\infty}^{\infty}C_n\delta(f-nf_o)$
Table of Fourier Transform Properties		
Linearity	$Af_1(t)+Bf_2(t)$	$AF_1(f)+BF_2(f)$
n[th] Derivative	$\frac{d^n f(t)}{dt^n}$	$(j2\pi f)^n F(f)$
Frequency shift	$e^{j2\pi f_o t}f(t)$	$F(f-f_o)$
Time Shift	$f(t-t_o)$	$e^{-j2\pi f t_o}F(f)$
Time Scaling	$f\left(\frac{t}{a}\right)$	$\lvert a\rvert F(af)$
Time reversal	$f(-t)$	$F(-f)$
Convolution in time	$\int_{-\infty}^{\infty}f_1(\tau)f_2(t-\tau)d\tau$	$F_1(f)F_2(f)$
Convolution in frequency	$f_1(t)f_2(t)$	$\int_{-\infty}^{\infty}F_1(f')F_2(f-f')df'$

Function Definitions: $\mathrm{rect}(x)=\begin{cases}1, & \lvert x\rvert\le\frac{1}{2}\\ 0, & \lvert x\rvert>\frac{1}{2}\end{cases}$, $\mathrm{sinc}(x) = \sin(\pi x)/\pi x$