TABLE 5.2 Fourier Transform Pairs

Time Domain Signal	Fourier Transform
$f(t)$	$\int_{-\infty}^{\infty} f(t)e^{-j\omega t}dt$
$\frac{1}{2\pi}\int_{-\infty}^{\infty} F(\omega)e^{j\omega t}d\omega$	$F(\omega)$
$\delta(t)$	1
$A\delta(t - t_0)$	$Ae^{-j\omega t_0}$
$u(t)$	$\pi\delta(\omega) + \frac{1}{j\omega}$
1	$2\pi\delta(\omega)$
K	$2\pi K\delta(\omega)$
$\text{sgn}(t)$	$\frac{2}{j\omega}$
$e^{j\omega_0 t}$	$2\pi\delta(\omega - \omega_0)$
$\cos\omega_0 t$	$\pi[\delta(\omega - \omega_0) + \delta(\omega + \omega_0)]$
$\sin\omega_0 t$	$\frac{\pi}{j}[\delta(\omega - \omega_0) - \delta(\omega + \omega_0)]$
$\text{rect}(t/T)$	$T\text{sinc}\,(\omega T/2)$
$\cos\,(\omega_0 t)u(t)$	$\frac{\pi}{2}[\delta(\omega - \omega_0) + \delta(\omega + \omega_0)] + \frac{j\omega}{\omega_0^2 - \omega^2}$
$\sin(\omega_0 t)u(t)$	$\frac{\pi}{2j}[\delta(\omega - \omega_0) - \delta(\omega + \omega_0)] + \frac{\omega_0}{\omega_0^2 - \omega^2}$
$\text{rect}(t/T)\cos(\omega_0 t)$	$\frac{T}{2}\left[\text{sinc}\left(\frac{(\omega - \omega_0)T}{2}\right) + \text{sinc}\left(\frac{(\omega + \omega_0)T}{2}\right)\right]$
$\frac{\beta}{\pi}\text{sinc}(\beta t)$	$\text{rect}(\omega/2\beta)$
$\text{tri}(t/T)$	$T\,\text{sinc}^2(T\,\omega/2)$
$\text{sinc}^2(Tt/2)$	$\frac{2\pi}{T}\text{tri}(\omega/T)$
$e^{-at}u(t), \text{Re}\{a\} > 0$	$\frac{1}{a + j\omega}$
$te^{-at}u(t), \text{Re}\{a\} > 0$	$\left(\frac{1}{a + j\omega}\right)^2$
$t^{n-1}e^{-at}u(t), \text{Re}\{a\} > 0$	$\frac{(n - 1)!}{(a + j\omega)^n}$
$e^{-a\lvert t\rvert}, \text{Re}\{a\} > 0$	$\frac{2a}{a^2 + \omega^2}$
$\sum_{n=-\infty}^{\infty} g(t - nT_0)$	$\sum_{n=-\infty}^{\infty} \omega_0 G(n\omega_0)\delta(\omega - n\omega_0), \omega_0 = \frac{2\pi}{T_0}$
$\sum_{n=-\infty}^{\infty} g(t - nT_0) = \sum_{k=-\infty}^{\infty} C_k e^{jk\omega_0 t}$	$2\pi\sum_{n=-\infty}^{\infty} C_n\delta(\omega - n\omega_0), \omega_0 = \frac{2\pi}{T_0}$
$\delta_T(t)$	$\sum_{k=-\infty}^{\infty} \omega_0\delta(\omega - k\omega_0)$