$f(t)$	$F(s) = L[f(t)] = \int_0^\infty f(t)e^{-st}\,dt$
1	$\frac{1}{s}$
$t^a\ (a > -1)$	$\frac{\Gamma(a+1)}{s^{a+1}}$
e^{at}	$\frac{1}{s-a}$
$\cos(at)$	$\frac{s}{s^2+a^2}$
$\sin(at)$	$\frac{a}{s^2+a^2}$
$e^{at}f(t)$	$F(s-a)$
$f'(t)$	$sF(s) - f(0)$
$f''(t)$	$s^2F(s) - sf(0) - f'(0)$
$f^{(n)}(t)$	$s^nF(s) - s^{n-1}f(0) - \cdots - f^{(n-1)}(0)$
$\int_0^t f(\tau)\,d\tau$	$\frac{F(s)}{s}$
$H(t-a),\ \ a > 0$	$\frac{e^{-as}}{s}$
$f(t-a)H(t-a),\ \ a > 0$	$e^{-as}F(s)$
$f(t)H(t-a),\ \ a > 0$	$e^{-as}L[f(t+a)]$
$f(t)\delta(t-a),\ \ a > 0$	$f(a)e^{-as}$
$f * g$	$F(s)G(s)$

Legendre polynomial $P_n(x) = \frac{1}{2^n n!}\frac{d^n}{dx^n}(x^2-1)^n$

$$f(x) = \frac{a_0}{2} + \sum_1^\infty \left(a_n \cos\frac{n\pi x}{L} + b_n \sin\frac{n\pi x}{L}\right),\ \ a_n = \frac{1}{L}\int_{-L}^{L} f(x)\cos\frac{n\pi x}{L}\,dx,\ \ b_n = \frac{1}{L}\int_{-L}^{L} f(x)\sin\frac{n\pi x}{L}\,dx$$

$$\mathcal{F}[f(x)] = \hat{f}(\omega) = \int_{-\infty}^{\infty} f(x)e^{-ix\omega}\,dx,\quad \mathcal{F}^{-1}[g(\omega)] = \check{g}(x) = \frac{1}{2\pi}\int_{-\infty}^{\infty} g(\omega)e^{ix}\quad d\omega$$

$$\mathcal{F}[af+bg] = a\mathcal{F}[f] + b\mathcal{F}[g],\quad \mathcal{F}[f'(x)] = i\omega\mathcal{F}[f]$$

$$\int x\cos(ax)\,dx = \frac{\cos ax}{a^2} + \frac{x\cos ax}{a^2} + C,\qquad \int x\sin(ax)\,dx = \frac{\sin(ax)}{a^2} - \frac{x\sin(ax)}{a} + C\ \ (a \neq 0)$$