$$\mathcal{L}\{y'(t)\} = sY(s) - y_0 \qquad \mathcal{L}\{y''(t)\} = s^2Y(s) - sy_0 - v_0$$

$$\mathcal{L}\{C\} = \frac{C}{s} \qquad \text{Constant}$$

$$\mathcal{L}\{t^n\} = \frac{n!}{s^{n+1}} \qquad \text{Power Func.}$$

$$\mathcal{L}\{\sin \omega t\} = \frac{\omega}{\omega^2 + s^2}$$

$$\mathcal{L}\{\cos \omega t\} = \frac{s}{\omega^2 + s^2}$$

$$\mathcal{L}\{f(\alpha t)\} = \frac{1}{\alpha} F(s/\alpha) \qquad \text{Argument Scaling}$$

$$\mathcal{L}\left\{e^{at} f(t)\right\} = F(s - a) \qquad \text{First Shift Theorem}$$

$$\mathcal{L}\{u_c(t)\} = e^{-sc}\frac{1}{s} \qquad \text{Heaviside Transfer}$$

$$\mathcal{L}\{f(t - c)u_c(t)\} = e^{-sc}F(s) \qquad \text{Second Shift Theorem}$$

$$\mathcal{L}\{t^n f(t)\} = (-1)^n \frac{\mathrm{d}^n}{\mathrm{d}s^n} F(s) \qquad \text{Resonance}$$

$$\mathcal{L}\{f * g\} = F(s)G(s) \qquad \text{Convolution Theorem}$$