Laplace Transform Formulas

$$\mathcal{L}(f) = \int_0^\infty e^{-st} f(t)\, dt$$
$$\mathcal{L}(f') = s\mathcal{L}(f) - f(0)$$
$$\mathcal{L}(f'') = s^2\mathcal{L}(f) - sf(0) - f'(0)$$
$$\mathcal{L}(f)\,\mathcal{L}(g) = \mathcal{L}(f * g) = \mathcal{L}\left(\int_0^t f(t-v)g(v)\, dv\right)$$
$$\mathcal{L}(1) = \frac{1}{s}$$
$$\mathcal{L}\left(e^{\lambda t}\right) = \frac{1}{s-\lambda}$$
$$\mathcal{L}(t^n) = \frac{n!}{s^{n+1}}$$
$$\mathcal{L}\left(e^{\lambda t} t^n\right) = \frac{n!}{(s-\lambda)^{n+1}}$$
$$\mathcal{L}(\sin \omega t) = \frac{\omega}{s^2 + \omega^2}$$
$$\mathcal{L}(\cos \omega t) = \frac{s}{s^2 + \omega^2}$$
$$\mathcal{L}\left(e^{\lambda t} \sin \omega t\right) = \frac{\omega}{(s-\lambda)^2 + \omega^2}$$
$$\mathcal{L}\left(e^{\lambda t} \cos \omega t\right) = \frac{s-\lambda}{(s-\lambda)^2 + \omega^2}$$
$$\mathcal{L}(g(t-a)\,\mathcal{U}(t-a)) = e^{-as}\mathcal{L}(g(t)) \quad \text{(where } \mathcal{U} \text{ is the unit step function)}$$
$$\mathcal{L}(g(t)\,\mathcal{U}(t-a)) = e^{-as}\mathcal{L}(g(t+a))$$
$$\mathcal{L}(\mathcal{U}(t-a)) = e^{-as} \cdot \frac{1}{s}$$
$$\mathcal{L}(\delta(t-a)) = e^{-as}$$