FORMULA SHEET FOR QUIZZES AND MIDTERM I MATH421:01

$$\mathcal{L}[y'(t)] = s\mathcal{L}[y(t)](s) - y(0). \tag{1}$$

$$\mathcal{L}[t^n] = \frac{n\,!}{s^{n+1}}, \quad n = 0, 1, 2, \ldots \tag{2}$$

$$\mathcal{L}[e^{at}] = \frac{1}{s-a}, \quad \mathcal{L}[\sin at] = \frac{a}{s^2+a^2}, \quad \mathcal{L}[\cos at] = \frac{s}{s^2+a^2} \tag{3}$$

$$\mathcal{L}[\delta(t-a)] = e^{-as} \tag{4}$$

$$\mathcal{L}[e^{at}f(t)] = F(s-a) \tag{5}$$

$$\mathcal{L}[f(t-a)\mathcal{U}(t-a)] = e^{-as}F(s) \tag{6}$$

$$\mathcal{L}[\int_0^t f(u)g(t-u)\,du] = \mathcal{L}[f*g] = F(s)G(s) \tag{7}$$

$$\mathcal{L}[\int_0^t f(u)\,du] = \mathcal{L}[f*1] = F(s)/s \tag{8}$$

$$\mathcal{L}[f(t)] = \frac{1}{1-e^{-sT}}\int_0^T e^{-st}f(t)\,dt \qquad \text{for } f(t) \text{ with period } T \tag{9}$$