NAME: ______________________ **ID #:**______________________

Some formulas you may use:

$$y_p(x) = -\left[\int \frac{y_2(x)\, f(x)}{W(y_1, y_2)}\, dx\right] y_1(x) + \left[\int \frac{y_1(x)\, f(x)}{W(y_1, y_2)}\, dx\right] y_2(x)$$

$$\mathcal{L}\{f(t)\} = F(s) = \int_0^\infty f(t)\, e^{-st}\, dt.$$

$$\mathcal{L}\{1\} = \frac{1}{s}, \quad \mathcal{L}\{t^n\} = \frac{n!}{s^{n+1}}, \quad \mathcal{L}\{e^{a\,t}\} = \frac{1}{s-a},$$

$$\mathcal{L}\{\sin(k\,t)\} = \frac{k}{s^2+k^2}, \quad \mathcal{L}\{\cos(k\,t)\} = \frac{s}{s^2+k^2},$$

$$\mathcal{L}\{f'(t)\} = s\,F(s) - f(0), \quad \mathcal{L}\{f''(t)\} = s^2\,F(s) - s\,f(0) - f'(0),$$

$$\mathcal{L}\{f^{(n)}(t)\} = s^n\,F(s) - s^{n-1}\,f(0) - s^{n-2}\,f'(0) - \cdots - s\,f^{(n-2)}(0) - f^{(n-1)}(0),$$

$$\mathcal{L}\{e^{a\,t}\,f(t)\} = F(s-a),$$

$$\mathcal{L}\{\mathcal{U}(t-a)\,f(t-a)\} = e^{-s\,a}\,F(s), \quad \mathcal{L}\{\mathcal{U}(t-a)\,f(t)\} = e^{-s\,a}\,\mathcal{L}\{f(t+a)\},$$

$$\mathcal{L}\{t^n\,f(t)\} = (-1)^n\,\frac{d^n}{ds^n}F(s),$$

$$\mathcal{L}\{f*g\} = \mathcal{L}\left\{\int_0^t f(t-\tau)\,g(\tau)\,d\tau\right\} = F(s)\,G(s),$$

$$\mathcal{L}\left\{\int_0^t f(\tau)\,d\tau\right\} = \frac{F(s)}{s},$$

$$\mathcal{L}\{\delta(t-t_0)\} = e^{-s\,t_0}.$$

$$2\,\sin(A)\,\sin(B) = \cos(A-B) - \cos(A+B),$$

$$2\,\sin(A)\,\cos(B) = \sin(A+B) + \sin(A-B),$$

$$2\,\cos(A)\,\cos(B) = \cos(A+B) + \cos(A-B),$$

$$\sin(A+B) = \sin(A)\,\cos(B) + \cos(A)\,\sin(B),$$

$$\cos(A+B) = \cos(A)\,\cos(B) - \sin(A)\,\sin(B).$$

*** **THE END** ***