$$\mu(x) = e^{\int_{x_0}^{x} p(t)\,dt}$$

$$y' + p(x)y = f(x), \quad p(x) \text{ is } C^0$$

$$\frac{d}{dx}\left[\mu(x)\right] = \frac{d}{dx}\left[e^{\int_{x_0}^{x} p(t)\,dt}\right]$$

$$\mu'(x) = e^{\int_{x_0}^{x} p(t)\,dt} \frac{d}{dx}\int_{x_0}^{x} p(t)\,dt$$

$$\boxed{\mu'(x) = \mu(x)\,p(x)}$$

$$\frac{d}{dx}\left[\mu(x)y\right] = \mu(x)y' + \mu'(x)y$$

$$\boxed{\frac{d}{dx}\left[\mu(x)y\right] = \mu(x)y' + \mu(x)p(x)y}$$

$$y' + p(x)y = f(x)$$

$$\mu(x)y' + \mu(x)p(x)y = \mu(x)f(x)$$

$$\frac{d}{dx}\left[\mu(x)y\right] = \mu(x)f(x)$$

$$\mu(x)y = \int \mu(x)f(x)\,dx$$

$$y = \frac{1}{\mu(x)}\int \mu(x)f(x)\,dx$$