

Math 181

A first-order linear differential equation is an equation of the form

$$\frac{dy}{dx} + P(x)y = Q(x)$$

where P and Q are continuous functions.

An integrating factor for a first-order linear differential equation

$$\frac{dy}{dx} + P(x)y = Q(x)$$

is $u(x) = e^{\int P(x)dx}$. The solution of the differential equation is

$$ye^{\int P(x)dx} = \int Q(x)e^{\int P(x)dx} dx + C$$

Example: Find the general solution of

$$y' + xy = xe^{-x^2} y^{-3}$$

