$$* 3x^2 + y^2 + 3xy - 3 = 0$$

$$\frac{d}{dx}\left[3x^2 + y^2 + 3xy - 3\right] = 0$$

$$6x + 2y\frac{dy}{dx} + 3y + 3x\frac{dy}{dx} = 0$$

$$\frac{dy}{dx}(2y + 3x) = -6x - 3y$$

$$\frac{dy}{dx} = \frac{-6x - 3y}{2y + 3x}$$

The second order differential equation:

$$\frac{d^2y}{dt^2} - 3\frac{dy}{dt} + 2y = 0$$

has the solution:

$$y = Ae^t + Be^{2t}$$

which can be verified by direct substitution.

Solution of First order ODE, by seperation of variables

First order ODE, can generally be written in the form:

$$\frac{dy}{dx} = f(x,y)$$