Here is a rough solution to problem 17 on page 68 (Ch.2.4)

We can assume that μ and ν are IF's. This means we can get two exact DE's from the given DE. We use the usual criteria for *exact* (and the Product Rule) to conclude that

$$\mu M_y + \mu_y M = \mu N_x + \mu_x N \tag{0.1}$$

$$\nu M_y + \nu_y M = \nu N_x + \nu_x N \tag{0.2}$$

where M_y is a common abbreviation for the partial derivative $\partial M/\partial y$.

Now, assume we have a function $y(x)$ defined implicitly by the given formula, $\mu(x, y(x)) = c\nu(x, y(x))$, where c is a fixed constant from now on. Taking $\partial/\partial x$ of both sides we get

$$\mu_x + \mu_y \frac{dy}{dx} = c\nu_x + c\nu_y \frac{dy}{dx}. \tag{0.3}$$

This is from multivariable calculus, but if you haven't had that course, you can get this from the formula for the total differential (see the lecture notes on dF). Subtle remark: even though $\mu = c\nu$, it is probably NOT true that $\mu_x = c\nu_x$ on the given curve. Now, multiply (0.2) by c and subtract that from (0.1). Using the formula $\mu = c\nu$, this simplifies to

$$[\mu_y - c\nu_y]M = [\mu_x - c\nu_x]N \tag{0.4}$$

Combining this with (0.3) we get

$$\frac{dy}{dx} = \frac{\mu_x - c\nu_x}{-\mu_y + c\nu_y} = \frac{-M}{N} \tag{0.5}$$

which implies $Mdx + Ndy = 0$, which means $y(x)$ is a solution of the given DE.