Do not write in either margin

Question.. Write on both sides of the paper

$f(x,y) = x^3y - 3x^2 + g(y)$

$\partial f / \partial y = x^3 + g'(y) = x^3 + 2y$

Comparing with (13).

i.e $g'(y) = 2y$ or $g(y) = \frac{2y^2}{2} = y^2$.

Hence (14) now becomes :
(recall $f(x,y) = c$)

$$f(x,y) = x^3y - 3x^2 + y^2 = C.$$

i.e. the required gen soln of (1) is

$$x^3y - 3x^2 + y^2 = C$$

Example 2:

Solve $(6x^2 + 4xy + y^2)dx + (2x^2 + 2yx - 3y^2)dy = 0$ — (1)

Sol: Here $M(x,y) = 6x^2 + 4xy + y^2$

$\partial N / \partial y = 4x + 2y$

$N(x,y) = 2x^2 + 2yx - 3y^2$

$\partial N / \partial x = 4x + 2y$

$\therefore \partial N/\partial y = \partial N/\partial x \Rightarrow$ DE is exact!!

Required solution is $f(x,y) = C$