

These are some random selected problems from my differential equations class.

Suppose we have the differential equation $(x + y)^2 dx + (2xy + x^2 - 6)dy = 0$

$$\begin{aligned}(x + y)^2 dx + (2xy + x^2 - 6)dy &= 0 \\ \int (x + y)^2 dx + \int (2xy + x^2 - 6)dy &= \int 0\end{aligned}\tag{1}$$