

Differential Equations – Day 6 In Class

Professor:

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For each of the following problems:

1. Prove that the equation is exact.
2. Solve using the exact method.
3. Clearly explain how you are piecing together the solution.

GROUP 1

$$(3x^2y^3 + y^4)dx + (3x^3y^2 + y^4 + 4xy^3)dy = 0$$

GROUP 2

$$\left(\frac{x}{y} + e^y\right) \frac{dy}{dx} = -(\cos(x) + \ln(y))$$

GROUP 3

$$\left(\frac{2x}{y} - \frac{3y^2}{x^4}\right) dx + \left(\frac{2y}{x^3} - \frac{x^2}{y^2} + \frac{1}{\sqrt{y}}\right) dy = 0$$

GROUP 4

$$(y^2 + \ln x) \frac{dy}{dx} = -\left(x^3 + \frac{y}{x}\right)$$