



NOTE #4: SECTIONS 2.6-3.2

Problem 1. Determine whether each equation is exact. If it is exact, find the solution.

$$(2x + 4y) + (2x - 2y)y' = 0$$

$$(2x + 3) + (2y - 2)y' = 0$$

2

Problem 2. solve the given initial value problem and determine at least approximately where the solution is valid.

$$(2x - y) + (2y - x)y' = 0, \quad y(1) = 3$$

Problem 3. show that the given equation is not exact but becomes exact when multiplied by the given integrating factor. Then solve the equation.

$$x^2y^3 + x(1 + y^2)y' = 0, \quad \mu(x, y) = 1/(xy^3)$$

Problem 4. Find the solutions of the given differential equations.

a. $y'' + 3y' + 2y = 0$

b. $y'' + 4y' + 3y = 0, \quad y(0) = 2, y'(0) = -1$

Problem 5. Determine the longest interval in which the given initial value problem is certain to have a unique twice differentiable solution.

$$t(t - 4)y'' + 3ty' + 4y = 2, \quad y(3) = 0, y'(3) = -1$$

Problem 6. Find the Wronskian of the given pair of functions.

$$e^{-2t}, te^{-2t}$$

Problem 7. If the Wronskian W of f and g is $3e^{4t}$, and if $f(t) = e^{2t}$, find $g(t)$.

Problem 8. Do $y_1(t)$ and $y_2(t)$ form a fundamental set of solutions? What is the general solution?

$$y'' + 4y = 0; \quad y_1(t) = \cos(2t), y_2(t) = \sin(2t)$$