

MATH 319 - SEC 003, SPRING 2014. HOMEWORK 5

INSTRUCTOR: GERARDO HERNÁNDEZ

Due : Wednesday, March 5.

Please show all your work and/or justify your answers.

Section 3.2 Problem 13 Verify that $y_1(t) = t^2$ and $y_2(t) = t^{-1}$ are two solutions of the differential equation $t^2 y'' - 2y = 0$ for $t > 0$. Then show that $y = c_1 t^2 + c_2 t^{-1}$ is also a solution of this equation for any c_1 and c_2 .

Section 3.2 Problem 14 Verify that $y_1(t) = 1$ and $y_2(t) = t^{1/2}$ are solutions of the differential equation $yy'' + (y')^2 = 0$ for $t > 0$. Then show that $y = c_1 y_1(t) + c_2 y_2(t)$ is not, in general, a solution of this equation. Explain why this results does not contradict Theorem 3.2.2

Section 3.2 Problem 16 Can $y = \sin(t^2)$ be a solution on an interval containing $t = 0$ of an equation $y'' + p(t)y' + q(t)y = 0$ with continuous coefficients? Explain your answer.

Section 3.2 Problem 17 If the Wronskian W of f and g is $3e^{4t}$, and if $f(t) = e^{2t}$, find $g(t)$.

Section 3.2 Problem 36 If the Wronskian of any two solutions of $y'' + p(t)y' + q(t)y = 0$ is constant, what does this imply about the coefficients $p(t)$ and $q(t)$?

Section 3.3 Problem 13-16 In each of the Problems 13-16 find the general solution of the given differential equation

13. $y'' + 2y' + 1.25y = 0$

14. $9y'' + 9y' - 4y = 0$

15. $y'' + y' + 1.25y = 0$

16. $y'' + 4y' + 6.25y = 0$