Name: Key Section: ___

MAP 2302 – Ordinary Differential Equations I

February 19, 2016

Quiz 3

1. Find the general solution of the following DE:

$$\frac{d^2y}{dt^2} - 6\frac{dy}{dt} + 9y = 0$$

Char. eqn.: $r^2 - 6r + 9 = 0 \Rightarrow (r-3)^2 = 0 \Rightarrow r = 3$

$\therefore y = c_1 e^{3t} + c_2 t e^{3t}$

↑ repeated root

2. For each part, select the answer A or B, considering

$$u(x) = \begin{cases} x^2, & x \geq 0 \\ 0, & x < 0 \end{cases} \quad \text{and} \quad v(x) = \begin{cases} 0, & x \geq 0 \\ x^2, & x < 0 \end{cases}$$

a) The Wronskian for $W(u,v)$, ~~for $x > 0$~~, is

(A.) Always 0.

B. Never 0.

b) $\{u, v\}$ are linearly independent.

A. True.

B. False.

for $x \geq 0$, $W(u,v) = \begin{vmatrix} x^2 & 0 \\ 2x & 0 \end{vmatrix} = 0$

for $x < 0$, $W(u,v) = \begin{vmatrix} 0 & x^2 \\ 0 & 2x \end{vmatrix} = 0$

$c \cdot u = \begin{cases} cx^2, & x \geq 0 \\ 0, & x < 0 \end{cases} \neq v$

for any scalar c, so they are lin. indep.