MAT 212, Quiz #8, Summer 2016 Name KEY

Instructions: Show all work. Answers without work required to obtain the solution will not receive full credit. Some questions may contain multiple parts: be sure to answer all of them. Give exact answers unless specifically asked to estimate.

1. Use Euler's method to estimate the solution to $y' = t \ln y, y(1) = 2$ at $t = 2$, in 4 steps. Recall that $y_{n+1} = y_n + \Delta t f(t_n, y_n)$. Carry at least 6 decimal places through your calculation.

$\frac{2-1}{4} = 1/4 = \Delta t$

$n=$	t_n	y_n	$m_n = f(t_n, y_n)$	$y_{n+1} = y_n + \Delta t \cdot m_n$
0	1	2	$1(\ln 2) = .6931$	$= 2 + .1/4 . 6939 = 2.173286795$
1	1.25	2.17	$1.25 \ln(2.17) = .9703$	$= 2.17 + 1/4 \cdot .9703 = 2.415862006$
2	1.50	2.41	$1.50 \ln(2.415..) = 1.323$	$= 2.415... + 1/4 \cdot 1.323 = 2.746633067$
3	1.75	2.746	$1.75 \ln(2.7466) = 1.768$	$= 2.7466... + .25 \cdot 1.768 = 3.188672489$
4	2	3.188		

$y(2) \approx 3.1887$

2. Find the solution to the system $\begin{cases} x_1 + x_2 = 2 \\ x_1 + 2x_2 = 1 \end{cases}$ by row-reducing by hand.

$$\left[\begin{array}{cc|c} 1 & 1 & 2 \\ 1 & 2 & 1 \end{array}\right] \Rightarrow \left[\begin{array}{cc|c} 1 & 1 & 2 \\ 0 & 1 & -1 \end{array}\right]$$

$-R_1 + R_2 \Rightarrow R_2$

$-R_2 + R_1 \Rightarrow R_1$

$$\left[\begin{array}{cc|c} 1 & 0 & 3 \\ 0 & 1 & -1 \end{array}\right]$$

$x_1 = 3$

$x_2 = -1$ or $\vec{x} = \begin{bmatrix} 3 \\ -1 \end{bmatrix}$