

Math 3325 Quiz #5  
FALL SEMESTER 2009

Lance L. Littlejohn

Name SOLUTIONS

1. Consider the IVP

$$y' = x + y$$

$$y(0) = 1.$$

Using Euler's Method with  $h = .1$ , approximate  $y(1)$ , where  $y(x)$  is the unique solution to this IVP. Fill in the following table completely showing at least five decimal places of accuracy.

$x_0 = 0$	$y_0 = 1$
$x_1 = .1$	$y_1 = 1.1$
$x_2 = .2$	$y_2 = 1.22$
$x_3 = .3$	$y_3 = 1.362$
$x_4 = .4$	$y_4 = 1.5282$
$x_5 = .5$	$y_5 = 1.72102$
$x_6 = .6$	$y_6 = 1.943122$
$x_7 = .7$	$y_7 = 2.1974342$
$x_8 = .8$	$y_8 = 2.48717762$
$x_9 = .9$	$y_9 = 2.81589538$
$x_{10} = 1.0$	$y_{10} = 3.18748492$

$$y(1) \approx 3.18748492$$

2. Consider the IVP

$$y' = x^2y + xy + x$$

$$y(0) = 1.$$

Using the Runge-Kutta fourth-order method with 10 iterations, approximate  $y(1)$ , where  $y(x)$  is the unique solution to this IVP. Fill in the following table completely showing at least five decimal places of accuracy.

$x_0 = 0$	$y_0 = 1$
$x_1 = .1$	$y_1 = 1.010361143$
$x_2 = .2$	$y_2 = 1.043159368$
$x_3 = .3$	$y_3 = 1.101763562$
$x_4 = .4$	$y_4 = 1.191019614$
$x_5 = .5$	$y_5 = 1.317950986$
$x_6 = .6$	$y_6 = 1.49279513$
$x_7 = .7$	$y_7 = 1.730590061$
$x_8 = .8$	$y_8 = 2.053671601$
$x_9 = .9$	$y_9 = 2.495702085$
$x_{10} = 1.0$	$y_{10} = 3.108325527$

$$y(1) \approx 3.108325527$$