MATH 246 Groupwork 1.7

Name: _____

1. Consider the IVP:

$$y' = 2y + 4t$$
 with $y(0) = 2$

(a) Use Euler's Method with n = 2 iterations of size h = 0.5 to approximate y(1) for the IVP. Fill these in a nice table.

(b) The solution to this IVP is $y(t) = 3e^{2t} - 2t - 1$. How does your approximation compare to the exact value?

2. Consider the IVP:

$$y' = \frac{2t}{y^2} + t$$
 with $y(1) = 3$

Suppose both the Runge-Trapezoidal and the Runge-Midpoint Methods are used to approximate y(2) with n = 10 iterations of size h = 0.1. Fill in the values which are missing from the following tables. Even though I have lots of digits (program output) you can approximate to two decimal digits for your inputs and outputs.

Runge Trapezoidal

Runge Midpoint

i	t_i	$ y_i$		i	t_i	y_i
0	1	3	· –	0	1	3
1	1.1	3.12739516273153		1	1.1	3.12741099337617
2		3.26493404176817		2	1.2	3.2649612309732
3	1.3	3.4123878579216		3	1.3	3.41242233447638
4	1.4			4	1.4	3.56960760999894
5	1.5	3.73632928179026		5	1.5	3.73636820336753
6	1.6	3.91255148850797		6		3.91258865797772
7		4.09814888993696		7	1.7	4.09818233884244
8	1.8	4.29305881576136		8	1.8	4.29308702238228
9	1.9	4.49723899829096		9		
10	2			10		