

# Math 131A Homework 1

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Q1 (a)

(b)

Q2 (a)  $y(1.5) \approx y(1) + 0.5 * y'(1) = 2 + 0.5 * \frac{1+1}{1+2} = \frac{7}{3} \approx 2.333333$

$$y(2) \approx y(1.5) + 0.5 * y'(1.5) = \frac{7}{3} + 0.5 * \frac{1+1.5}{1+\frac{7}{3}} = \boxed{\frac{65}{24}} \approx 2.708333$$

h	y(2)
0.5	2.708333333333335
0.2	2.890060069455041
0.1	2.7355407599225927
0.01	2.741056919124695

(b)

(c) Exact solution:  $y(2) = \sqrt{14} - 1 \approx 2.741657387$ ; we can see that smaller  $h$  values resulted in approximations that are closer to the exact  $y(2)$  value as expected.

Q3 (a)

(b)

(c)

(d)