

Math 114 Spring 2017
Calculus I Practice Homework 8.5 Solutions
Do not turn in

1. Suppose $f'(x) = \frac{1}{2}f(x)$ and $f(1) = 3$. Use Euler's method to approximate $f(4)$ using three steps.

Solution: We have

$$\begin{aligned}f(2) &\approx f'(1)(2-1) + f(1) = 3/2 \cdot 1 + 3 = 4.5 \\f(3) &\approx f'(2)(3-2) + f(2) \approx 9/4 + 9/2 = 27/4 \\f(4) &\approx f'(3)(4-3) + f(3) \approx 27/8 + 27/4 = 81/8.\end{aligned}$$

2. Suppose $f'(x) = 4 - \frac{f(x)}{x}$, and $f(2) = 2$. Use Euler's method and four steps to approximate $f(4)$.

Solution:

$$\begin{aligned}f(5/2) &\approx f'(2)(.5) + f(2) = 3/2 + 2 = 7/2 \\f(3) &\approx f'(5/2)(1/2) + f(5/2) \\&\approx \left(4 - \frac{7/2}{5/2}\right) / 2 + 7/2 = 13/10 + 7/2 = 24/5 \\f(7/2) &\approx f'(24/5)(1/2) + f(3) \\&\approx \left(4 - \frac{24/5}{3}\right) / 2 + 24/5 = 6/5 + 24/5 = 6 \\f(8) &\approx f'(7/2)(1/2) + f(7/2) \\&\approx \left(4 - \frac{6}{7/2}\right) / 2 + 6 = 8/7 + 6 = 50/7.\end{aligned}$$

3. Go back and complete all the exercises from Tuesday's lab. Solutions coming soon.
4. Stewart 2.7.3
5. Stewart 2.7.5
6. Stewart 2.7.15

7. Stewart 2.7.19
8. Stewart 2.7.25
9. (★) Stewart 2.7.37