

Due September 21

Study Group Members

Name

Directions: Be sure to include in-line citations, including page numbers if appropriate, every time you use the results of discussion, a text, notes, or technology. **Only write on one side of each page.**

“Taking mathematics from the beginning of the world to the time of Newton, what he has done is much the better half.” – Gottfried Leibniz, 1688

Problems

1. Given the ordinary differential equation

$$f'(x) = 2(f(x))^{-3/2}x^2.$$

- (a) Use the method of separation of variables to find the general solution.
 - (b) Then find the particular solution that satisfies the initial condition $f(-1) = 6$.
2. Use Euler’s method to analyze the differential equation

$$\frac{dy}{dx} = x^2 - y^2, \quad y(0) = 1.$$

If you do your calculations by hand, approximate $y(0.5)$ by using steps of size 0.1 (in the input variable) and repeating for 5 iterations. If you use a computer to do the calculations, approximate $y(0.5)$ by using steps of size 0.01 (in the input variable) and repeating for 50 iterations.