Math 2167: Homework 3
Due: Friday, September 13th

1) Sketch the graph of a function \( f(x) \) for which we know that \( f(0) = 4, \)
\( f'(0) = 3, \) \( f'(1) = 0, \) and \( f'(2) = -1. \) Explain your reasoning.

2) These next two problems are a bit different, but you are capable of solving them:

(a) You find that you are dealing with a disease with

\[
\text{infect}'(x) = 0.00018 \cdot \text{suscept}(x) \cdot \text{infect}(x) - 0.023 \cdot \text{infect}(x),
\]

Where \( \text{infect}(x) \) is the number of infected people on day \( x, \) and \( \text{suscept}(x) \)
\( \) is the number of susceptible people on day \( x. \) Discuss the outlook on
day 13 if you know \( \text{suscept}(13) = 5028 \) and \( \text{infect}(13) = 2012. \)

(b) You find that you are dealing with a disease with

\[
\text{infect}'(x) = 0.000004 \cdot \text{suscept}(x) \cdot \text{infect}(x) - 0.047 \cdot \text{infect}(x),
\]

Where \( \text{infect}(x) \) is the number of infected people on day \( x, \) and \( \text{suscept}(x) \)
\( \) is the number of susceptible people on day \( x. \) Discuss the outlook on
day 13 if you know \( \text{suscept}(13) = 5028 \) and \( \text{infect}(13) = 4012. \)

Note: We borrowed this problem from Davis, Porta, and Uhl’s fantastic book
Calculus&Mathematica Derivatives: Measuring Growth.