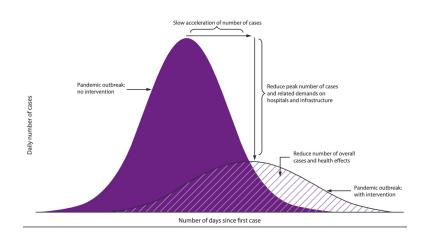
Calculus I Exam Question on the Coronavirus Prepared by Professor Sarah Hews (3/19/2020)

In reference to the phrase 'flatten the curve', consider the following graphs. Let E(t) be the curve that is without preventative measures. Let P(t) be the curve that incorporates preventative measures.



- 1. Describe what is on the x-axis and the y-axis of the graph.
- 2. Label the following on the graph: E'(t) = 0, P'(t) = 0.
- 3. Compare E(t) and P(t) at these two points (E'(t) = 0 and P'(t) = 0). What do they tell us about the impact of preventative measures on the maximum number of cases at a time?
- 4. Label the following on the graph: E''(t) = 0, P''(t) = 0 (there should be two of each).
- 5. Compare E'(t) and P'(t) at the two points (E''(t) = 0 and P''(t) = 0) where E'(t) > 0and P'(t) > 0. What is the impact of preventative measures on the maximum rate that the number of cases is increasing?
- 6. Mark the regions where E''(t) > 0, E''(t) < 0, P''(t) > 0, and P''(t) < 0.
- 7. Describe in words what is happening to the number of cases when E''(t) > 0 and P''(t) > 0.
- 8. Go to https://www.worldometers.info/coronavirus/country/us/ and scroll down to the graph that shows the Total Coronavirus Cases in the United States. Sketch it below. Let C(t) be the total number of cases at time t.
- 9. Is C'(t) > 0 or C'(t) < 0 during February and March? What does that tell us about the number of total cases during February and March?
- 10. Is C''(t) > 0 or C''(t) < 0 during February and March? What does that tell us about the rate of change of the number of total cases during February and March?