

In-class Activity

Problems from the Upcoming 7th Edition of
Applied Calculus by Hughes Hallett, et al.
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Problems

1. Figure 1 shows the total number $P(t)$ of Covid-19 cases in New York confirmed on or before day t , where $t = 0$ is March 15, 2020. Figure 2 shows $N(t)$, the new cases on day t for New York, Florida, Maine and Wyoming.¹ Use the fact that $dP/dt \approx N$ to identify the $N(t)$ graph for New York.

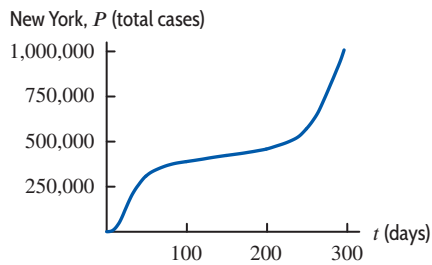


Figure 1

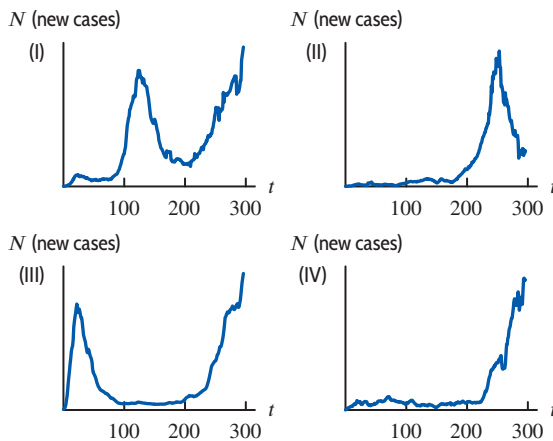


Figure 2

2. Table 1 shows the area, A , covered by Arctic sea ice in millions of square kilometers between 2017 and 2020.² Let $A = f(t)$ for t in years since 2000.

- (a) Does $f'(t)$ appear to be positive or negative? Interpret in terms of Arctic sea ice.
 (b) What is $f(17)$? Estimate $f'(17)$. Give units.
 (c) What is $f(20)$? Estimate $f'(20)$. Give units.

Table 1

Year	2017	2018	2019	2020
Sea Ice (mn km ²)	4.82	4.79	4.36	3.92

3. Figure 3 shows the total number $P(t)$ of Covid-19 cases in Arizona confirmed on or before day t , where $t = 0$ is March 1, 2020;³ $N(t)$ is the number of new cases on day t , approximated by $P'(t)$.

- (a) Which of the following are the approximate t -values of local maxima of $N(t)$? (Select all that apply.) $t = 0, 110, 130, 150, 190, 260, 320, 360$.
 (b) Which, from the previous list, are the approximate t -values of local minima of $N(t)$?

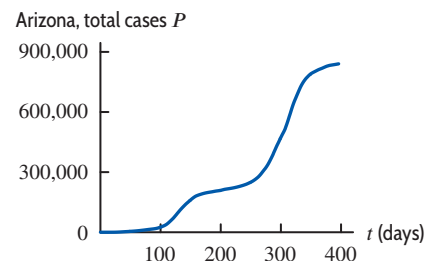


Figure 3

¹Smoothed from JHU CSSE COVID-19 data at github.com/CSSEGISandData/COVID-19, accessed October 22, 2020.

²<https://climate.nasa.gov/vital-signs/arctic-sea-ice/>, accessed 3 April, 2021. To facilitate yearly comparisons, the values shown were all in September, usually the lowest point of the year.

³Smoothed from JHU CSSE COVID-19 data at github.com/CSSEGISandData/COVID-19, accessed March 24, 2021.