MM2 – Chapter 15 – Section 5

Pre-Class Question:

1. Click the link to https://www.nytimes.com/interactive/2020/us/coronavirus-us-cases.html

2. Discuss whether or not, the number of COVID cases plot at the top of the page, is proportional to the probability an average American would get COVID.

3. If it were (I am not saying yea or nay until class), where would the expected average value be for the date? What would sigma be about?

Class Worksheet

1. Find $\langle y \rangle$ for a falling ball.
   a. Write down the conservation of energy equation for an arbitrary height *y*.

   b. Solve this equation for the infinitesimal *dt*.

   c. Discuss why *dt* would be proportional to the probability and *dy*?

$$dt = P(y)dy$$

   d. Normalize the probability function.

   e. Find $\langle y \rangle$.

2. For the 3-D speed distribution for an atomic gas, find (Note v only goes from 0 to infinity):

$$f(v) = Av^2 \exp\left(-\frac{mv^2}{2kT}\right)$$

   a. $\langle v \rangle$
   b. $\langle v^2 \rangle$