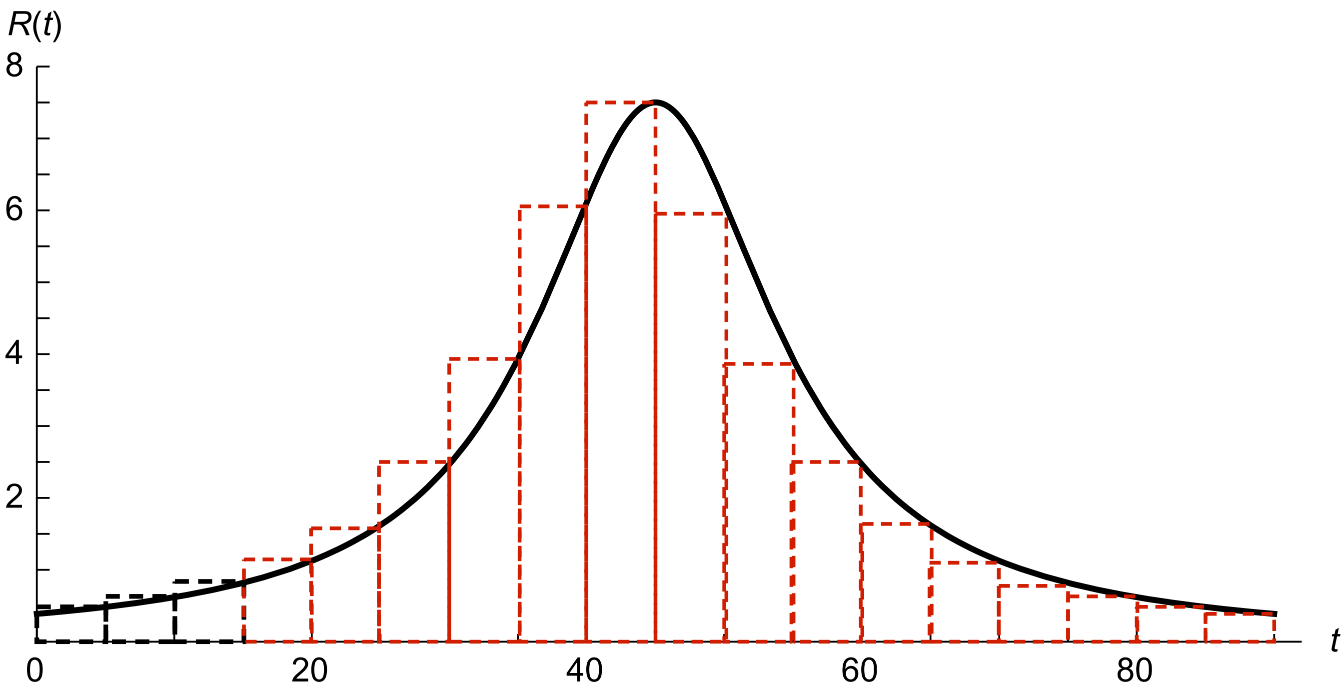
Note: in a tutorial earlier this semester, you were given some cumulative death data for a certain Ebola outbreak, and were asked to investigate the *death rate* for that outbreak. Here we're going somewhat in reverse, starting with the death rate and using this to investigate cumulative deaths.

It can be shown that the **daily death rate** $R(t)$, in deaths/day, of a certain actual Ebola outbreak can be modeled fairly well by the following bell-shaped curve:



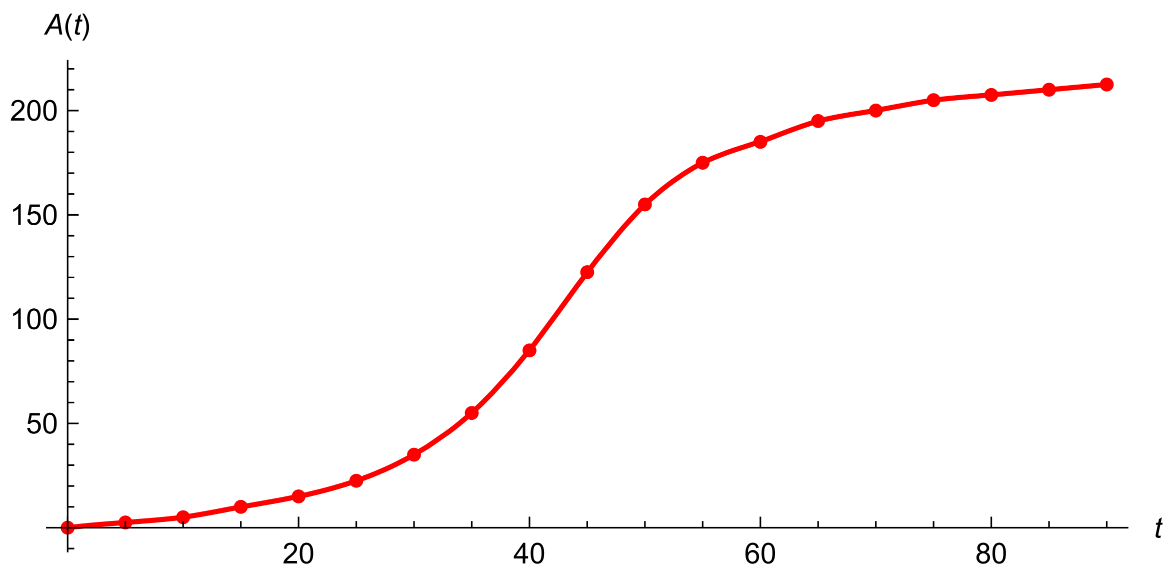
Note that we've dashed in a rectangle over each of the first three intervals of length 5, on the above t axis. The height of each rectangle is just the value of the function $R(t)$ at the right endpoint of the interval in question.

1. Continue the process of drawing rectangles over each of the above subintervals of length 5, on the t axis, with the height of each rectangle being the value of $R(t)$ at the right endpoint of the interval in question.

2. For any of the times $t = 5, 10, 15, 20, \ldots 90$ (days), Let $A(t)$ denote the *total area* of the rectangles you've sketched in, up to the given time t. Compute $A(5)$, $A(10)$, $A(15)$, $\ldots$, all the way up to $A(90)$. Write your answers in the table on the next page; we've done the first three for you. (Estimate the height of each rectangle using the scale on the vertical axis. Readings to the nearest half person should be fine.) Use some of the extra space at the bottom of this page for scratch, if you need to.

t	$A(t)$	t	$A(t)$	t	$A(t)$
5	2.5	35	55	65	195
10	5	40	85	70	200
15	10	45	122.5	75	205
20	15	50	155	80	207.5
25	22.5	55	175	85	210
30	35	60	185	90	212.5

3. On the axes below, *plot* your above points $A(t)$, as a function of t. Then connect the dots as smoothly as you can, to get a nice curve.



4. Describe the shape of your graph, from Exercise 3 above, in words, in terms of a function or functions that we've studied in this class. It looks like an arctangent function.

5. What "real life" quantity (in terms of this Ebola outbreak) does your function from Exercise 3 represent (or at least approximate)? Please explain.

Since $A(t)$ is the area under the death rate function, from time zero to time t, we see that $A(t)$ represents *cumulative* (or total) deaths from Ebola during this outbreak, from time zero to time t.

6. If you were to graph the *derivative* of your function from Exercise 3, what would it look like, roughly, in terms of things we've already discussed in this tutorial? Please explain.

The derivative of total deaths is the death rate, which is just the function $R(t)$ graphed at the beginning of this tutorial.