## Class 11: Exploring a Particular Definite Integral Calculus II

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1. Evaluate the following integral:

$$\int_0^3 \sin(\frac{\pi t^2}{2}) dt . \tag{1}$$

You will need to write some python code to do this.

2. Now consider this:

$$S(x) = \int_0^x \sin(\frac{\pi t^2}{2}) dt . {2}$$

- (a) Is this a function of t?
- (b) Is this a function of x?
- 3. Sketch the integrand of the integral in Eq. (2). Try it by hand before using python or wolfram alpha.
- 4. Make a rough sketch of of S(x). What is the large-x behavior of S(x)?
- 5. Define the function S(x) using some python code.
- 6. Write some code that makes a plot of S(x).
- 7. By the way, what is  $\frac{d}{dx}S(x)$ ? Why?