INSOFE School of Data Science, Vijaybhoomi University

Calculus Demystified - 3

Assignment — 1
07 May 2022 (Colors 2021)

------------ Some good ol' integral calculus ------------

1) There are a couple of nice methods that speak about approximating integration. Two of these methods are the Trapezoidal Rule and Simpson's rule. Can you present the proofs for these methods?

   a) Approximate $\int_0^1 x^2 dx$ using the trapezoidal rule. Take $n = 10$.

   b) Approximate $\int_0^\pi sinx\, dx$ using Simpson's rule. Take $n = 4$.

2) Find the length of the curve $y = \frac{x^3}{6} + \frac{1}{2x}$ from $x = 1$ to $x = 2$.

3) Let R be a region between $y = x^2$ and $y = x$. Find the volume of the solid obtained by revolving R around:
   (a) x-axis and (b) y-axis.
   Draw figures to show what these surfaces look like.

Cheers!