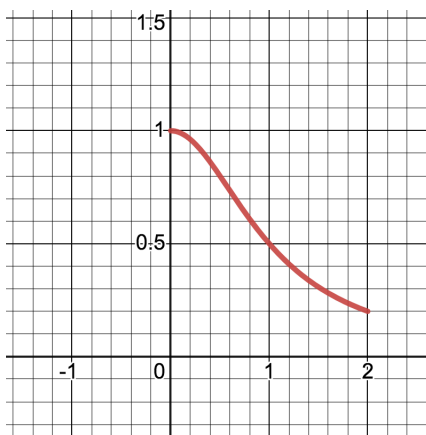


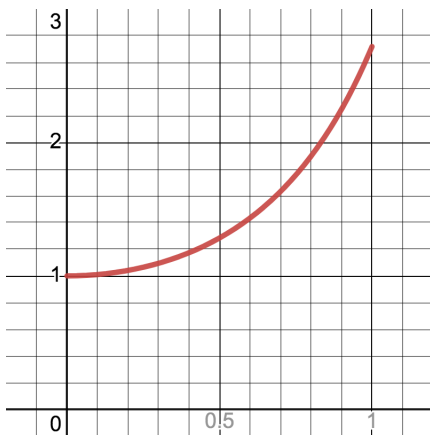
SECTION 2.3: VOLUMES OF REVOLUTION USING CYLINDRICAL SHELLS

1. Sketch the region R bounded by $y = \frac{1}{1+x^2}$, $y = 0$, $x = 0$, and $x = 2$. (The graph of $y = \frac{1}{1+x^2}$ is sketched for you below.) We want to determine the volume of the solid obtained by rotating R about the y -axis.



- (a) If we wanted to use the Disk Method, how would we slice the region R ? Explain why this choice would be inconvenient?
- (b) Slice the region R vertically and sketch the shape that slice would make on the figure above. Describe the shape in words.
- (c) In the space below, we will set up and evaluate the integral for the volume of this solid.

2. Determine the formula for the volume of a cylindrical shell.
3. Use the formula for the volume of a cylindrical shell, to deduce the Method of Cylindrical Shells formula. Draw an accompanying picture.
4. Sketch the region bounded above by $y = e^{x^2}$, below by $y = 1 - x$, and on the right by $x = 1$. Use the Method of Cylindrical Shells to find the volume of the solid obtained by rotating R about the y -axis. (Note $y = e^{x^2}$ is already graphed for you below.)



5. Repeat the problem 5, but slice the region horizontally and use disks/washers.