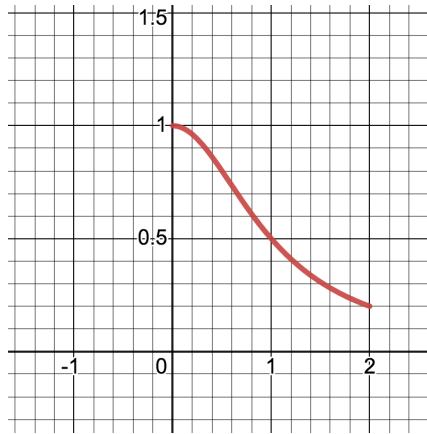


SECTION 2.3: VOLUMES OF REVOLUTION USING CYLINDRICAL SHELLS

1. In the space below, write the formulas for the Disk Method and the Washer Method with accompanying formulas. Assume we are integrating with respect to x .

2. 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?

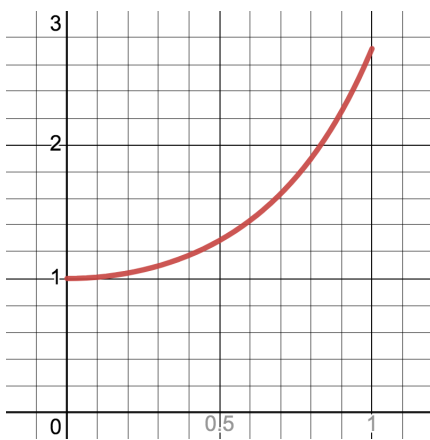
(b) Slice the region R vertically and sketch the shape that slice would make on the figure above. Describe the shape in words.

(c) In the space below, we will set up and evaluate the integral for the volume of this solid.

3. Determine the formula for the volume of a cylindrical shell.

4. Use the formula for the volume of a cylindrical shell, to deduce the Method of Cylindrical Shells formula. Draw an accompanying picture.

5. 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.)



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