

1. The volume of the solid generated by revolving  $f(x) = \frac{1}{\sqrt{1+x^2}}$  about the x-axis over the interval  $[0, \frac{1}{\sqrt{2}}]$  :

Using the disk method:

$$\begin{aligned} V &= \pi \int_0^{\frac{1}{\sqrt{2}}} \left(\frac{1}{\sqrt{1+x^2}}\right)^2 dx && \\ &= \pi \int_0^{\frac{1}{\sqrt{2}}} \frac{1}{1+x^2} dx && 10 \text{ pts} \\ &= \pi \arctan(x) \Big|_0^{\frac{1}{\sqrt{2}}} && 8 \text{ pts} \\ &= \pi(\arctan(\frac{1}{\sqrt{2}}) - \arctan(0)) \\ &= \pi \arctan(\frac{1}{\sqrt{2}}) && 2 \text{ pts} \end{aligned}$$