

Let  $f(x) = \frac{1}{x}$ .

1. Find  $\int_1^{\infty} f(x) dx$
2. Find the volume of the solid formed when  $y = f(x)$  is rotated about the  $x$ -axis for  $1 \leq x \leq \infty$ .
3. What can you say about the surface area of the solid formed when  $y = f(x)$  is rotated about the  $x$ -axis for  $1 \leq x \leq \infty$  ?