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

1. Find $\displaystyle\int_1^\infty f(x)\ dx$

2. Find the volume of the solid formed when $y = f(x)$ is rotated about the x-axis for $1 \le x \le \infty$.

3. Find the surface area of the solid formed when $y = f(x)$ is rotated about the x-axis for $1 \le x \le \infty$.