Paint Pot if you know about integration …

Take the curve $y=\frac{1}{x}$ between $x=1$ and $x=\infty$ and rotate it $360°$ around the x axis to form a long, funnel shaped paint pot. DIAGRAM???

The volume of the paint pot is:

$$\int_1^\infty \pi y^2 dx = \int_1^\infty \frac{1}{x^2} dx = ... = \pi$$

The surface area of the paint pot is:

$$\int_1^\infty 2\pi y \sqrt{1+\left(\frac{dy}{dx}\right)^2}\, dx = \int_1^\infty 2\pi \frac{1}{x} \sqrt{1+\left(\frac{1}{x^4}\right)}\, dx$$

Now this integral is too difficult for me but …

$$2\pi \frac{1}{x} \sqrt{1+\left(\frac{1}{x^4}\right)} > 2\pi \frac{1}{x}$$

So the surface area of the paint pot is greater than:

$$\int_1^\infty 2\pi \frac{1}{x} dx = ... = \infty$$

So the paint pot has a finite volume but an infinite surface area.

If you fill the pot with paint then you won't have enough paint to cover the surface of the pot!