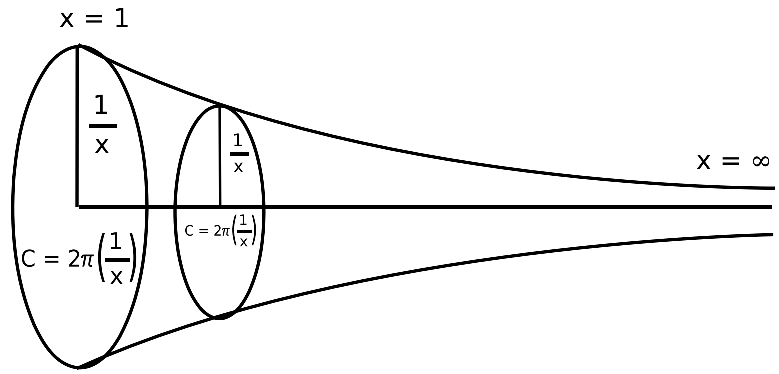
Why the Surface Area of the Newgle diverges:

It's easy to see that the circumference of a circle with radius $\frac{1}{x}$ is equal to $2\pi\left(\frac{1}{x}\right)$



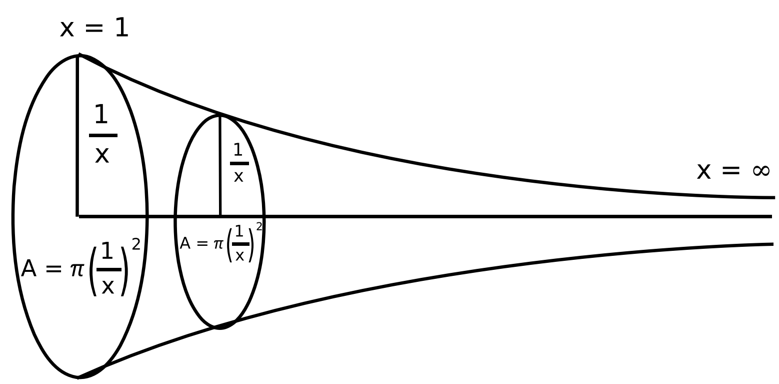
To find the surface area we just add up all the circumferences from x = 1 to x = ∞
(The integral symbol and limit sign want scare you, but they're really quite harmless.)

$$\int_1^\infty 2\pi\left(\frac{1}{x}\right)dx = \lim_{b\to\infty}\left[\!\left[\int_1^b 2\pi\left(\frac{1}{x}\right)dx = [2\pi\ln x]_1^b = [2\pi\ln b - 2\pi\ln 1] = [2\pi\ln b]\right]\!\right] = 2\pi\ln\infty = \infty$$

Tada! The surface area diverges to ∞!

Why the Volume of the Newgle converges:

Likewise, it's easy to see that the area of a circle with radius $\frac{1}{x}$ is equal to $\pi\left(\frac{1}{x}\right)^2$



To find the volume we just add up all the areas from x = 1 to x = ∞

$$\int_1^\infty \pi\left(\frac{1}{x}\right)^2 dx = \lim_{b\to\infty}\left[\!\left[\int_1^b \pi\left(\frac{1}{x}\right)^2 dx = \left[-\frac{\pi}{x}\right]_1^b = \left[-\frac{\pi}{b}+\pi\right]\right]\!\right] = -\frac{\pi}{\infty}+\pi = \pi$$

Voila! The volume converges to π!