Let's use the symbol S_n to represent a string of *n* S's. So, for example, S_7 = SSSSSSS.

In Leyland's formula he defines a string of *n* S's to mean "start with the number 2 and take the square root *n* times", so

$$S_n = 2^{\frac{1}{2^n}}$$

and thus

$$\lg(S_n) = \lg\left(2^{\frac{1}{2^n}}\right) = \frac{1}{2^n} = 2^{-n}$$

where "lg" means "log base 2". Therefore,

$$\lg(\lg(S_n)) = \lg(2^{-n}) = -n \qquad (1)$$

Leyland's formula for π is

$$\frac{\lg(\lg(S_{22}))}{\lg(\lg(S_7))}$$

so by equation (1) this equals -22 / -7 = 22/7 = 3.142857…