$a_0 = 1$ & $a_n = 3^{-n} a_{n-1}$

$$a_n = 3^{-n} a_{n-1}$$
$$= 3^{-n} \times 3^{-(n-1)} a_{n-2}$$
$$\vdots$$
$$= 3^{-(n+(n-1)+\cdots+1)} a_0$$

$$\Rightarrow \quad a_n = 3^{-\Sigma n} = \left(\frac{1}{3}\right)^{\Sigma n}$$

Now

$$\frac{1}{R} = \overline{\lim_{n\to\infty}} \sup |a_n|^{\frac{1}{n^2}} = \lim\sup \left(\frac{1}{3}\right)^{\frac{n(n+1)}{2n^2}} = \frac{1}{\sqrt{3}}$$

Thus $\boxed{R = \sqrt{3}}$ Ans