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$$\lim_{k\to+\infty} \sqrt[k]{\frac{k}{7^k}} = \lim_{k\to+\infty} \frac{k^{\frac{1}{k}}}{7} = \frac{1}{7} \lim_{k\to+\infty} k^{\frac{1}{k}}$$

Now $\lim_{k\to+\infty} k^{\frac{1}{k}}$ gives ∞^0, which is indeterminate.

Let $y = k^{\frac{1}{k}} \Longrightarrow \lim_{k\to+\infty} \ln y = \lim_{k\to+\infty} \frac{\ln k}{k}$ $\begin{matrix}\to \infty \\ \to \infty\end{matrix}$

L'Hopital $\Longrightarrow \lim_{k\to+\infty} \frac{\frac{1}{k}}{1} = 0$

So $\lim_{k\to+\infty} y = e^0 = 1 \Longrightarrow \lim_{k\to+\infty} \sqrt[k]{\frac{k}{7^k}} = \frac{1}{7} < 1$

So by the Root Test, $\sum_{k=1}^{\infty} \frac{k}{7^k}$ converges.