

$$\begin{aligned}
f(x) &= \frac{x}{81+x^2} = \frac{x}{81} \left[\frac{1}{1+(x/9)^2} \right] = \frac{x}{81} \left[\frac{1}{1-\{-(x/9)^2\}} \right] \\
&= \frac{x}{81} \sum_{n=0}^{\infty} \left[-\left(\frac{x}{9}\right)^2 \right]^n = \frac{x}{81} \sum_{n=0}^{\infty} (-1)^n \frac{x^{2n}}{81^n} \\
&= \sum_{n=0}^{\infty} (-1)^n \frac{x^{2n+1}}{81^{n+1}}
\end{aligned}$$

The geometric series $\sum_{n=0}^{\infty} \left[-\left(\frac{x}{9}\right)^2 \right]^n$ converges when $\left| -\left(\frac{x}{9}\right)^2 \right| < 1 \Leftrightarrow \frac{|x^2|}{81} < 1 \Leftrightarrow |x^2| < 81 \Leftrightarrow |x| < 9$, so $R = 9$ and $I = (-9, 9)$.