n	$f^{(n)}(x)$	$f^{(n)}(5)$
0	$\ln x$	$\ln 5$
1	$1/x$	$1/5$
2	$-1/x^2$	$-1/5^2$
3	$2/x^3$	$2/5^3$
4	$-6/x^4$	$-6/5^4$
5	$24/x^5$	$24/5^5$
$\vdots$	$\vdots$	$\vdots$

$$\begin{aligned}
f(x) &= \ln x = \sum_{n=0}^{\infty} \frac{f^{(n)}(5)}{n!}(x-5)^n \\
&= \frac{\ln 5}{0!}(x-5)^0 + \frac{1}{1!5^1}(x-5)^1 + \frac{-1}{2!5^2}(x-5)^2 + \frac{2}{3!5^3}(x-5)^3 \\
&\quad + \frac{-6}{4!5^4}(x-5)^4 + \frac{24}{5!5^5}(x-5)^5 + \ldots \\
&= \ln 5 + \sum_{n=1}^{\infty} (-1)^{n+1} \frac{(n-1)!}{n!5^n}(x-5)^n \\
&= \ln 5 + \sum_{n=1}^{\infty} (-1)^{n+1} \frac{1}{n5^n}(x-5)^n
\end{aligned}$$

$$\begin{aligned}
\lim_{n\to\infty} \left|\frac{a_{n+1}}{a_n}\right| &= \lim_{n\to\infty} \left|\frac{(-1)^{n+2}(x-5)^{n+1}}{(n+1)5^{n+1}} \cdot \frac{n5^n}{(-1)^{n+1}(x-5)^n}\right| \\
&= \lim_{n\to\infty} \left|\frac{(-1)(x-5)n}{(n+1)5}\right| \\
&= \lim_{n\to\infty} \left(\frac{n}{n+1}\right)\frac{|x-5|}{5} \\
&= \frac{|x-5|}{5} < 1 \text{ for convergence, so } |x-5| < 5 \text{ and } R = 5.
\end{aligned}$$