

Answer on Question #76395 – Math – Calculus

Question

Prove that $\ln(1 + x) < x$ for all $x > 0$.

Solution

Consider a function $f(x) = \ln(1 + x) - x$. So basically we need to prove that $f(x) < 0 \forall x > 0$.

$$f'(x) = \frac{1}{1+x} - 1 = -\frac{x}{1+x} < 0 \forall x > 0.$$

Thus $f(x)$ is a strongly decreasing function.

As $f(0) = 0 \Rightarrow f(x) < 0 \forall x > 0$.