

Answer on Question #80237 – Math – Algebra

Question

Find the parity of function, i.e. even or odd.

$$f(x) = \ln \operatorname{mod}\left[\frac{1 - e^{-x}}{1 + e^{-x}}\right]$$

Solution

Simplify the given function $f(x)$:

$$f(x) = \ln \left| \frac{1 - e^{-x}}{1 + e^{-x}} \right| = \ln \left| \frac{1 - \frac{1}{e^x}}{1 + \frac{1}{e^x}} \right| = \ln \left| \frac{e^x - 1}{e^x} \cdot \frac{e^x}{e^x + 1} \right| = \ln \left| \frac{e^x - 1}{e^x + 1} \right| = \ln \left| -\frac{1 - e^x}{1 + e^x} \right| = \ln \left| \frac{1 - e^x}{1 + e^x} \right|.$$

Find a function $f(-x)$:

$$f(-x) = \ln \left| \frac{1 - e^{-(-x)}}{1 + e^{-(-x)}} \right| = \ln \left| \frac{1 - e^x}{1 + e^x} \right|.$$

$f(x) = f(-x)$. That's why $f(x)$ is even.

Answer: $f(x)$ is even.