

Show all of your work and completely simplify your answer.

1. Differentiate (and simplify) $y = (1 - \ln(\operatorname{sech}x))\operatorname{sech}x$.
2. Given the curve $f(x) = \operatorname{sech}^{-1}\sqrt{1-x^2}$
 - a. Find the intervals for which $f'(x) > 0$ and $f'(x) < 0$.
 - b. Find all local/relative extrema.
 - c. Find the intervals for which $f''(x) > 0$ and $f''(x) < 0$.
 - d. Find all inflection points.