

(1)[5 points] Find a formula for the inverse of $y = \ln(x + 3)$.

(2)[5 points] Express as a single logarithm:

$$\ln(1 + x^2) + \frac{1}{2} \ln x - \ln(\sin x)$$

(3)[5 points] Find the limit

$$\lim_{x \rightarrow \infty} [\ln(1 + x^2) - \ln(1 + x)]$$