

Name: _____

Natural Exponential & Logarithmic Functions

Exercise 1: Determine the domain and range of each of the following functions

a. $f(x) = e^{\sqrt{x}}$

b. $f(x) = e^{|x|}$

c. $f(x) = e^{-x^2}$

Exercise 2: Use the properties of natural logarithms to simplify each expression

1) $\ln \frac{1}{e}$

2) $\ln \left(\frac{1}{e} \right)^{-\frac{1}{7}}$

3) $\frac{\ln 1}{5}$

4) $\frac{\ln 1}{6}$

5) $\ln \left(\frac{1}{e} \right)^{\frac{3}{5}}$

6) $\ln \left(\frac{1}{e} \right)^5$

7) $\ln e^{10}$

8) $\ln \sqrt{e}$

9) $e^{-\ln 3} + \ln e^3$

10) $e^{2\ln e} + \ln(-e)$

11) $e^{-2\ln 5} - e^{\ln e}$

12) $e^{\frac{1}{2}\ln 9}$

Exercise 3: Write each natural logarithm in terms of $\ln 2$ and $\ln 3$

1) $\ln 6$

2) $\ln 16^x$

3) $\ln \frac{2}{27}$

4) $\ln \frac{8}{9}$