Name: _____

Natural Exponential & Logarithmic Functions

1) Use the relationship $a^t = e^{\left[\ln(a)^t\right]}$ to convert each of the following eqautions to the natural base.

    1) $y = 1200(1.025)^t$

    2) $y = 2500(0.75)^t$

2)   1) Evaluate $e^{\ln 4 + \ln 5}$

    2) Express $4\ln 2 + \ln 3 + 2$ as a single logarithm

3)   1) Evaluate $e^{3\ln 2} \bullet e^{2\ln 3}$

    2) Express $2\ln 4 - \ln 8 - \ln 5$ as a single logarithm

4) Find the domain of each function

    1) $f(x) = \ln(x + 2)$ 2) $g(x) = \ln(x - x^2)$

    3) $h(t) = \ln(1 + t^2)$ 4) $y = \ln(4x - 3)$

    5) $f(x) = \ln(1 - \sin x)$ 6) $y = \dfrac{1}{\ln x}$

5) Simplify

    1) $\ln\left(e^{\ln(e^2)}\right)$ 2) $e^{\left(\frac{1}{2}\right)\ln 8}$

    3) $e^{-\ln 23}$

6) The number of bacteria in a colony increases exponentially and is modeled by $y = y_0 e^{kt}$, where t is measured in hours. At time t=0, there are 12,000 bacteris, and four hours later there are 50,000 bacteria. To the nearest 1000 bacteria, how many are present 10 hours after time 0?

7) Find the exponential function $y = Ce^{kt}$ that passes through the given points.
    $(0,1)$, $(3,5)$