Math III Logs and Exponential

Transforming from exponential form to logarithmic form

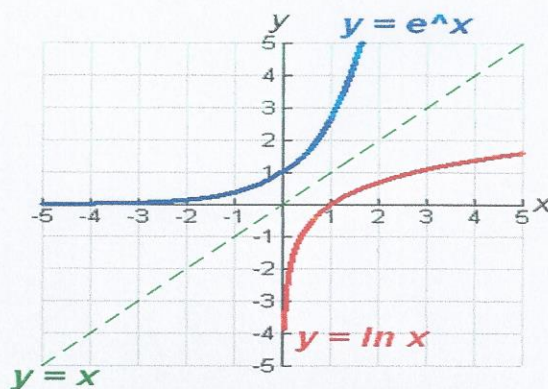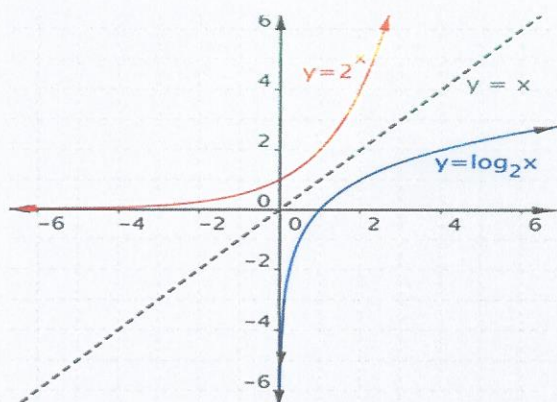**Exponential Form**

$$y = b^x$$

$$y = e^x$$

Logarithmic Form

$$y = \log_b x$$

$$y = \ln x$$

$y = b^x$ and $y = \log_b x$ are inverses of each other as well as $y = e^x$ and $y = \ln x$. Their graphs are reflections across the $y = x$ line

Logarithm Rules

$$\log_b(xy) = \log_b x + \log_b y$$

$$\log_b\left(\frac{x}{y}\right) = \log_b x - \log_b y$$

$$\log_b(x^y) = y \log_b x$$

$$\log_b x = \frac{\log x}{\log b}$$

1. Which is the function $2^{x-1} = 8$ written in logarithmic form?
   A. $\log_2 x - 1 = 8$ 　　　　 C. $\log_8 x - 1 = 2$
   B. $x = \log_2 8 + 1$ 　　　　 D. $x = \log_2 8 - 1$

2. Sally opened a savings account that earns 8% interest compounded continuously in order to save money for a $4500 car. So far Sally has saved $2500. How many years did it take for Sally to save enough money to buy the car if she did not add any more money to the account?

A. $x = \dfrac{\ln\left(\frac{9}{5}\right)}{.08}$ 　　 B. $x = \dfrac{.08}{\ln\left(\frac{9}{5}\right)}$ 　　 C. $x = \log_{1.08}\left(\frac{9}{5}\right)$ 　　 D. $x = \log_{\frac{9}{5}} 1.08$

3. Which of the following is equivalent to $e^{4x} = 2981$?

A. $x = \dfrac{\ln 2981}{4}$ 　　 B. $x = \dfrac{4}{\ln 2981}$ 　　 C. $x = \dfrac{\ln 4}{2981}$ 　　 D. $x = \dfrac{2981}{\ln 4}$

4. Which of the following is equivalent to $2^{3x-4} = 32$?

A. $x = \dfrac{\log_2 32}{3} + 4$ 　　 B. $x = \dfrac{\log_2 32 + 4}{3}$ 　　 C. $\log_2 3x - 4 = 32$

5. Given the function: $f(x) = 2\log_2(2x)$

    A. Sketch the graph

    B. State the x-intercept?

    C. State the domain and range?

    D. Describe the end behavior as x approaches ∞.