Section 4.3
Solutions and Hints

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for the book:
Precalculus, Mathematics for Calculus 4th Edition
by James Stewart, Lothar Redlin and Saleem Watson.

You may need to memorize the change of base formula.
To change from base b to base a:

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

32. Evaluate: $\log_{12}(9) + \log_{12}(16)$

$\log_{12}(9) + \log_{12}(16) = \log_{12}(9 * 16) = \log_{12}(144) = \log_{12}(12^2) = 2 * \log_{12}(12) =$ **2**

34. Evaluate: $e^{3 * \ln 5}$

$$e^{3*\ln(5)} = e^{\ln(5^3)} = 5^3 = \mathbf{125}$$

38. Evaluate the following:

$$\begin{aligned}\ln\left(\ln\left(\ln\left(e^{e^{200}}\right)\right)\right) &= \ln\left(\ln\left(e^{200} * \ln(e)\right)\right)\\ &= \ln\left(200 * \ln\left(e * \ln(e)\right)\right)\\ &= \ln\left(200 * \ln\left(e * 1\right)\right)\\ &= \ln\left(200 * \ln(e)\right)\\ &= \ln(200 * 1)\\ &= \mathbf{\ln(200)}\end{aligned}$$

46. Rewrite the expression as a single logarithm.

$2*(\log_5(x) + 2*\log_5(y) - 3*\log_5(z)) = 2*\log_5(x) + 4*\log_5(y) - 6*\log_5(z)$

$= \log_5(x^2) + \log_5(y^4) - \log_5(z^6)$

$= \log_5(x^2 * y^4) - \log_5(z^6)$

$= \mathbf{\log_5((x^2 * y^4) / z^6)}$