6.5 Practice Problems

In problems 1 - 4, use the properties of logarithms to expand each logarithmic expression as much possible. Where possible, evaluate logarithmic expressions without using a calculator.

1. $\log(10000xy)$

2. $\log_3\left(\frac{81}{x}\right)$

3. $\ln\left(\frac{e^3}{x}\right)$

4. $\log_4\left(\frac{16x^2}{y^3}\right)$

In problems 5 - 8, use properties of logarithms to condense each logarithmic expression. Write the expression as a single logarithm whose coefficient is 1.

5. $\log 25 + \log 4$

6. $\log_2 x - \log_2 y$

7. $2\ln x + 4\ln y - 3\ln z$

8. $2\log_3 x - 3\log_3 y$

In problems 9 - 10, use common logarithms or natural logarithms and a calculator to evaluate to four decimal places. (Use the change of base formula.)

9. $\log_8 25$

10. $\log_{27} 13$

In problems 11 – 12, simplify using properties of logarithms.

11. $2^{\log_2(2x-9)}$

12. $\log_9 9^{1-8x}$

If $f(x)=\ln x$, $g(x)=e^{8x}$, and $h(x)=x^6$, find the following.

a. $(f\circ g)(x)$

b. domain of $(f\circ g)(x)$

c. $(f\circ g)(3)$

d. $(g\circ f)(x)$

e. domain of $(g\circ f)(x)$

f. $(f\circ h)(x)$

g. domain of $(f\circ h)(x)$

h. $(f\circ h)(e)$