

1. Suppose  $b$  is a positive constant greater than 1, and let  $A$ ,  $B$ , and  $C$  be defined as follows:

$$\log_b 2 = A \quad \log_b 3 = B \quad \log_b 5 = C$$

In each case, use the properties of logarithms to evaluate the given expression in terms of  $A$ ,  $B$ , and/or  $C$ .

a)  $\log_b 6$

b)  $\log_b \frac{1}{6}$

c)  $\log_b 27$

d)  $\log_b \frac{1}{27}$

e)  $\log_b 10$

f)  $\log_b 0.01$

g)  $\log_b 0.3$

h)  $\log_b \left(\frac{5}{3}\right)$

i)  $\log_b 0.6$

j)  $\log_b \frac{5}{9}$

k)  $\log_b \frac{5}{16}$

l)  $\log_b \sqrt{5}$

m)  $\log_b \sqrt{15}$

n)  $\log_b \sqrt[3]{0.4}$

o)  $\log_b \sqrt[4]{60}$

p)  $\log_3 b$

q)  $\log_3(10b)$

r)  $\log_{b^2} 5$

s)  $\log_{\sqrt{b}} 2$

t)  $\log_{3b} 2$

u)  $\log_{3b} 15$

v)  $\log_{5b} 1.2$

w)  $\log_{5b} 2.5$

x)  $(\log_b 5)(\log_5 b)$

y)  $(\log_b 6)(\log_6 b)$

z)  $\log_{2b} 6 + \log_{2b} \left(\frac{1}{6}\right)$

A)  $\log_{18} \frac{1}{b}$

2. Suppose that  $\log A = a$ ,  $\log B = b$ , and  $\log C = c$ . Express the following logarithms in terms of  $a$ ,  $b$ , and  $c$ .

a)  $\log AB^2C$

b)  $\log 10\sqrt{A}$

c)  $\log \sqrt{10ABC}$

d)  $\log \frac{10A}{\sqrt{BC}}$

e)  $\log A + 2 \log \frac{1}{A}$

f)  $\log \frac{A}{10}$

g)  $\log \frac{100A^2}{B^4 \sqrt[3]{C}}$

h)  $\log \frac{(AB)^5}{C}$