

Name: _____

Work in groups to answer as many problems as you can. Ask questions if you get stuck. The numbers used on this worksheet may require a calculator. Keep in mind that numbers you will have on exams will be nice enough to do without a calculator.

$\log_a(xy) = \log_a(x) + \log_a(y)$	$\log_a\left(\frac{x}{y}\right) = \log_a(x) - \log_a(y)$	$\log_a(1) = 0$	$\log_a(x^n) = n \log_a(x)$
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1. Calculate the following:

(a) $\log_5(25) =$

Answer: _____

(d) $\log_5(1) =$

Answer: _____

(g) $\log_2(32) =$

Answer: _____

(b) $\log_3(1) =$

Answer: _____

(e) $\log_2(8) =$

Answer: _____

(h) $\log_2(32) =$

Answer: _____

(c) $\log_{16} 4 =$

Answer: _____

(f) $\log_7\left(\frac{1}{7}\right) =$

Answer: _____

(i) $\log_3\left(\frac{1}{9}\right) =$

Answer: _____

2. Find the value of a .

(a) $\log_a(64) = 6$

Answer: _____

(c) $\log_4\left(\frac{1}{8}\right) = a$

Answer: _____

(e) $\log_7(a) = 3$

Answer: _____

(b) $\log_9(a) = -\frac{1}{2}$

Answer: _____

(d) $\log_9\left(\frac{1}{81}\right) = a$

Answer: _____

(f) $\log_a(36) = 2$

Answer: _____

3. Write the following expressions in terms of logs of x , y and z . (Note the bases are not specified as the laws work for any base)

(a) $\log(x^2y)$

(e) $\log\left(\frac{x}{yz}\right)$

Answer: _____

Answer: _____

(b) $\log\left(\frac{x^3y^2}{z}\right)$

(f) $\log\left(\left(\frac{x}{y}\right)^2\right)$

Answer: _____

Answer: _____

(c) $\log\left(\frac{\sqrt{x}\sqrt[3]{y^2}}{z^4}\right)$

(g) $\log\left((x)^{\frac{1}{3}}\right)$

Answer: _____

Answer: _____

(d) $\log(xyz)$

(h) $\log(x\sqrt{z})$

Answer: _____

Answer: _____

(i) $\log\left(\frac{\sqrt[3]{x}}{\sqrt[3]{yz}}\right)$

(k) $\log\left(x\sqrt{\frac{\sqrt{x}}{z}}\right)$

Answer: _____

Answer: _____

(j) $\log\left(\sqrt[4]{\frac{x^3y^2}{z^4}}\right)$

(l) $\log\left(\sqrt{\frac{xy^2}{z^8}}\right)$

Answer: _____

Answer: _____

4. True or False? (Note the bases are not specified as the laws work for any base)

(a) $\log\left(\frac{x}{y^3}\right) = \log(x) - 3\log(y)$

(b) $\log(a - b) = \log(a) - \log(b)$

Answer: _____

Answer: _____

(c) $\log(x^k) = k \cdot \log(x)$

(f) $(\log(a))^k = k \cdot \log(a)$

Answer: _____

Answer: _____

(d) $\log(a) \cdot \log(b) = \log(a + b)$

(g) $\log_a(a^a) = a$

Answer: _____

Answer: _____

(e) $\frac{\log(a)}{\log(b)} = \log(a - b)$

(h) $-\log\left(\frac{1}{x}\right) = \log(x)$

Answer: _____

Answer: _____

5. Combine the given expression into one single logarithm.

(a) $\log_2(A) + \log_2(B) - 2\log_2(C)$

(b) $4\log_6(y) - \frac{1}{4}\log_6(z)$

Answer: _____

Answer: _____

(c) $4 \log_2(x) - \frac{1}{3} \log_2(x^2 + 1)$

(g) $2 \log_8(x + 1) - 2 \log_8(x - 1)$

Answer: _____

Answer: _____

(d) $\log(5) + 2 \log(x) + 3 \log(x^2 + 5)$

(h) $\log_5(x^2 - 1) - \log_5(x - 1)$

Answer: _____

Answer: _____

(e) $3 \log_2(A) + 2 \log_2(B + 1)$

(i) $\frac{1}{2} \log_4(y + 1) - \frac{1}{2} \log_4(x - 1)$

Answer: _____

Answer: _____

(f) $4 \log_3(2x - 1) - \frac{1}{2} \log_3((x + 1)^2)$

(j) $4 \log(x) - \frac{1}{3} \log(x^2 + 1) + 2 \log(x - 1)$

Answer: _____

Answer: _____

6. Solve the following logarithmic equations. (Note, if the base of the logarithm is not specified, it is not important in finding the solution)

(a) $\log(x) = -3$

(e) $\log_3(x + 25) - \log_3(x - 1) = 3$

Answer: _____

Answer: _____

(b) $\log_{10}(3x - 2) = 2$

(f) $\log_9(x - 5) + \log_9(x + 3) = 1$

Answer: _____

Answer: _____

(c) $2\log(x) = \log(2) + \log(3x - 4)$

(g) $\log(x) + \log(x - 3) = 1$

Answer: _____

Answer: _____

(d) $\log(x) + \log(x - 1) = \log(4x)$

(h) $\log_2(x - 2) + \log_2(x + 1) = 2$

Answer: _____

Answer: _____