

3. Exponentials and Logarithms

Name:	Class:	Date:
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Mark	/ 20	%
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1) Rewrite as a logarithm [1]

$$7^5 = 16807$$

2) Rewrite in index form [1]

$$\log_4 \frac{1}{64} = -3$$

3) Which of the following logarithms represents the equation $\log_8 \frac{1}{8} = -1$. [1]

A: $8^{-1} = \frac{1}{8}$

B: $-1^8 = \frac{1}{8}$

C: $8^{\frac{1}{8}} = -1$

D: $\frac{1}{8^{-1}} = 8$

4) Find the value of the following [2]

a) $\log_3 81$

b) $\log_{0.1} 100$

5) Find the value of x [1]

$$\log_x 64 = 2$$

6) Using a calculator, find the value of the following to 3 significant figures. [1]

$$\log_{10} 497$$

7) Write as a single logarithm [4]

a) $\log_3 5 + \log_3 3$

b) $2\log_6 8 - \log_6 4$

c) $3\log_3 2 + 2\log_3 3 + 4\log_3 4$

d) $\log_4 3 + \log_4 7 - \log_4 \frac{1}{2}$

8) Write as a single logarithm, then simplify your answer [1]

$$2\log_9 3 + 2\log_9 9$$

9) Write in terms of $\log_a x$ and $\log_a y$ [1]

$$\log_a \left(\frac{x^2}{y^5} \right)$$

10) Given that $s = \log_m 81$, express in terms of s , $\log_m 3$ [1]

11) Solve, giving your answer to 3 significant figures [2]

a) $12^{x-1} = 42$

b) $9^{3x-3} = 7^{2x-6}$

12) Solve, giving your answers to 3 significant figures [2]

a) $8^{2x} - 13(8^x) + 36 = 0$

b) $\log_4 x + 5\log_x 4 + 6 = 0$

13) Solve the following simultaneous equations, giving your answers as exact fractions. [1]

$$16^{4y} = 64^{5x+7} \quad \text{and} \quad \log_4 y = \log_4 x + 4$$

14) Find, to 3 significant figures

[1]

$$\log_4 109$$

Solutions for the assessment 3. Exponentials and Logarithms

1) $\log_7(16807) = 5$

2) $4^{-3} = \frac{1}{64}$

3) A

4) a) 4

b) -2

5) 8

6) 2.70

7) a) $\log_3 15$

b) $\log_6 16$

c) $\log_3 18432$

d) $\log_4 42$

8) 3

9) $2\log_a x - 5\log_a y$

10) $\frac{1}{4}s$

11) a) 2.50

b) -1.88

12) a) $x = 0.667$ or $x = 1.06$

b) $x = 0.25$ or $x = 0.000977$

13) $x = \frac{21}{2033}$ and $y = \frac{5376}{2033}$

14) 3.38