

Unit 8 Test - Logarithms

Date _____ Period _____

Be sure to show all work for credit.1) What is the change of base formula for $\log_4 25$?

- A) 4^{25} B) $\frac{\log 25}{\log 4}$
 C) 25^4 D) $\frac{\log 4}{\log 25}$

Condense each expression to a single logarithm.2) $3 \log_6 x + 5 \log_6 (x - 6)$

- A) $15 \log_6 (x(x - 6))$
 B) $\log_6 (x^5 \cdot (x - 6)^3)$
 C) $\log_6 (x(x - 6)^{15})$
 D) $\log_6 (x^3 \cdot (x - 6)^5)$

3) $2 \log_9 u - 3 \log_9 v$

- A) $\log_9 \frac{u^2}{v^3}$
 B) $\log_9 (v^3 u^2)$
 C) $\log_9 (w^3 \sqrt{vu})$
 D) $\log_9 (v^3 u^6)$

4) $2 \log_6 x - \log_6 y + 3 \log_6 z$

- A) $\log_6 \frac{3x^2z}{y}$ B) $\log_6 \frac{x^2}{z^3y}$
 C) $\log_6 \frac{x^2z^3}{y}$ D) $\log_6 x^2yz^3$

Expand each logarithm.5) $\log (a^7 b^{16})^{\frac{1}{2}}$

- A) $\frac{7}{2} \cdot \log a + \frac{1}{4} \cdot \log b$
 B) $\frac{7}{2} \cdot \log a + 8 \log b$
 C) $\log a^{\frac{7}{2}} + \log b^8$
 D) $\frac{7}{2} \cdot \log a + 4 \log b$

Solve each equation using properties of logarithms. Be sure to show all work on the free response for credit.

6) What is the extraneous solution to the following equation?

$$2\log_4(x - 1) = \log_4 48 - \log_4 3$$

- A) -3 and 5 B) 5 C) -5 and 3 D) -3

7) What is the first step to solving:

$$\log 4 + \log(4x^2 - 6) = 3$$

- A) Convert from logarithmic form to exponential form.
B) Combine the 4 with the $4x^2 - 6$ using the addition property of logarithms.
C) Use the product property to condense the logarithmic expression.
D) Simplify the expression by subtracting 3 to isolate the logarithmic expression.

8) Is the following problem solved correctly? If not, choose where the error first occurs.

Given: $\log_2(4c - 20) = 6$

Step 1. $2^6 = 4c - 20$

Step 2. $12 = 4c - 20$

Step 3. $-8 = 4c$

Step 4. $c = -2$

- A) Step 2 B) Step 3 C) It is solved correctly. D) Step 1

Solve each equation using properties of exponents. Be sure to show all work on the free response for credit.

9) If $x = -3b - 1$, and $y = 6$, solve $10^x = 10^y$

- A) $\{7\}$ B) $\{-\frac{7}{3}\}$
C) $\{-1\}$ D) $\{-\frac{1}{3}\}$

10) If $x = 2a - 15$ and $y = 4a$, solve $9^x = \left(\frac{1}{27}\right)^y$

- A) $a = \frac{15}{8}$ B) $a = \frac{8}{15}$
C) $a = -\frac{4}{15}$ D) $a = -\frac{15}{4}$

Solve each equation using properties of logarithms. Be sure to show all work on the free response for credit.

11) $7^{10n} + 2 = 81$

- A) -0.4957 B) 0.2245
C) -0.7152 D) -0.5069

Rewrite each equation in exponential form.

12) $\log_6 \frac{1}{36} = x$

- A) $x^6 = \frac{1}{36}$ B) $\left(\frac{1}{36}\right)^x = 6$
C) $6^x = \frac{1}{36}$ D) $x^{\frac{1}{36}} = 6$

13) $\log_y 2 = x$

- A) $y^x = 2$ B) $y^2 = x$
C) $x^y = 2$ D) $2^x = y$

Rewrite each equation in logarithmic form.

14) $20^m = n$

- A) $\log_n m = 20$
B) $\log_m n = 20$
C) $\log_{20} n = m$
D) $\log_m 20 = n$