

Warm Up

Describe in a complete sentence what was done wrong. Then Correct the mistake. Write a complete sentence explaining what you did to correct the problem.



$$\log_2 5x = (\log_2 5)(\log_2 x)$$

Quick Review

Write each equation in exponential form.

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1) $\log_2 64 = 6$

$2^6 = 64$

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

3) $\log_{10}(0.01) = -2$

$10^{-2} = .01$

Write each equation in logarithmic form.

4) $2^5 = 32$

$\log_2 32 = 5$

5) $16^{\frac{1}{2}} = 4$

6) $10^{-1} = 0.1$

$\log_{10} 0.1 = -1$

Evaluate. Round answer to the 2 decimal places where necessary.

7) $\log_2 8$

3

8) $\log_8 64$

9) $\log_6 216$

10) $\log_7 7$

1

11) $\log_8 \frac{1}{8}$

12) $\log_{\frac{1}{2}} 16$

13) $\log_4 77$

14) $\log_2 144$

15) $\log 45$

1.65

Expand the expression using the properties of logs.

$$\log_3(x^4/y^{4/3})$$

16) $\log_4(x^3y^4z^6)$

$$3\log_4 x + 4\log_4 y + 6\log_4 z$$

17) $\log_3(x^4 \cdot \sqrt[3]{y^4})$

$$4\log_3 x + \frac{4}{3}\log_3 y$$

18) $\log_7(f^2/g^4)$

$$2\log_7 f - 4\log_7 g$$

Condense the expression using the properties of logs.

19) $\log_2 8 + 2\log_2 y + 3\log_2 z$

$$\log_2(8y^2z^3)$$

20) $4\log_3 a - 2\log_3 b$

$$\log_3\left(\frac{a^4}{b^2}\right)$$

21) $3\log_5 x - \frac{\log_5 y}{2}$

$$\log_5\left(\frac{x^3}{y^{1/2}}\right)$$

Solving Logarithmic Equations

Name _____

Log=Log

$$\begin{array}{r} \cancel{\log}_{13}(-5n+3) = \cancel{\log}_{13}3 \\ -5n+3 = 3 \\ \quad \quad \quad \underline{-3 \quad -3} \\ -5n = 0 \\ \boxed{n=0} \end{array}$$

$$\begin{array}{r} \cancel{\log}_{16}(8-3n) = \cancel{\log}_{16}5n \\ 8-3n = 5n \\ \quad \quad \quad \underline{+3n \quad +3n} \\ 8 = 8n \\ \boxed{n=1} \end{array}$$

$$\begin{array}{r} \cancel{\log}_3(8-n) = \cancel{\log}_3(4-4n) \\ 8-n = 4-4n \\ \quad \quad \quad \underline{+4n \quad +4n} \\ 8+3n = 4 \\ \quad \quad \quad \underline{-8 \quad -8} \\ 3n = -4 \end{array}$$

$$\begin{array}{r} 3n = -4 \\ \frac{3n}{3} = \frac{-4}{3} \\ \boxed{n = -\frac{4}{3}} \end{array}$$

$$\begin{array}{r} \cancel{\log}_{17}(x^2+2) = \cancel{\log}_{17}(-6x+2) \\ x^2+2 = -6x+2 \\ \quad \quad \quad \underline{+6x \quad -2 \quad +6x \quad -2} \\ x^2+6x = 0 \end{array}$$

$$\begin{array}{l} x(x+6) = 0 \\ x=0, x=-6 \end{array}$$

Three Logs

$\log_8 x + \log_8(x+8) = \log_8 48$ $\log_8 x(x+8) = \log_8 48$ $x^2 + 8x = 48$ $x^2 + 8x - 48 = 0$ $(x+12)(x-4) = 0$ <div style="border: 1px solid black; padding: 2px; display: inline-block;"> $x=12$ $x=4$ </div>	$\log(x+1) - \log x = \log 18$ $\log\left(\frac{x+1}{x}\right) = \log 18$ $\frac{x+1}{x} = \frac{18}{1}$ $18x = x+1$ $17x = 1$ $x = \frac{1}{17}$
$\log_9 3 + \log_9(-4x) = \log_9 5$ $\log_9(3 \cdot 4x) = \log_9 5$ $\log_9 3 \cdot 4x = \log_9 5$ $\frac{-12x}{-12} = \frac{5}{-12}$	$\log_7 10 + \log_7(x-10) = \log_7 57$ $\log_7 10(x-10) = \log_7 57$ $10x - 100 = 57$ $\frac{10x}{10} = \frac{157}{10}$
$x = \frac{-5}{12} = \frac{5}{-12} = -\frac{5}{12}$ $x = \frac{157}{10}$	

Two Logs on one side

$$\log 2x^2 - \log 2 = 4$$

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

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

$$\log_6(x^2 + 2) + \log_6 3 = 1$$

1 - 10 evens or odds
17 - 20 evens or odds