log = expon.

x^3x^4

Algebra 2 7.5

Simplify and evaluate expressions using the properties of logarithms

Solve logarithmic equations

Compute pH from logarithms

$\frac{x^5}{x^2}$ $(x^3)^4$

logarithm = exponent

product rule

quotient rule

power^power

4B. $\log_6 x + \log_6 (x+5) = 2$

$\log_6 x(x+5) = 2$

$\log_6 (x^2+5x) = 2$

$x^2+5x = 6^2$

$-36 \quad -36$

$x^2+5x-36 = 0$

$(x+9)(x-4) = 0$

$x+9=0 \qquad x-4=0$

$x=-9 \qquad x=4$

1 36
2 18
3 12
4 9
6 6

-36

$9 \quad -4$

5

$x=-9 \qquad x=4$

-2

Solve each equation. Check your solutions.

8. $\log_4 48 - \log_4 n = \log_4 6$

$\log_4\left(\frac{48}{n}\right) = \log_4 6$

$\frac{48}{n} = \frac{6}{1}$

$6n = 48$

$\frac{6n}{6} = \frac{48}{6}$

$n = 8$

How is this problem different?

9. $\log_3 2x + \log_3 7 =$

Whiteboards

10. $3\log_2 x = \log_2 8$

$\log_2 x^3 = \log_2 8$

$x^3 = 8$

$x = 2$

$3\log_2 x = 1$

$\log_2 x^3 = 1$

$\sqrt[3]{2} = \sqrt[3]{x^3}$

$\sqrt[3]{2} = x$

11. $\log_{10} a + \log_{10} (a - 6) = 2$

$\log_{10} a^2 - 6a = 2$

23. $\log_3 56 - \log_3 n = \log_3 7$

26. $\log_{10} a + \log_{10} (a + 21) = 2$

25. $5 \log_2 x = \log_2 32$

When we are multiplying...

State whether each equation is *true* or *false*.

51. $\log_8 (x - 3) = \log_8 x - \log_8 3$

Explain your reasoning

$\log_8(x-3) - \log_8 \frac{x}{3}$

52. $\log_5 22x = \log_5 22 + \log_5 x$

$\log_5 22x = \log_5 22x$

55. $\log_7 \frac{x}{3} = \log_7 x - \log_7 3$

$\frac{x}{3}$

58. $\log_9 \dfrac{x^2y^3}{z^4} = 2\log_9 x + 3\log_9 y - 4\log_9 z$

$= \log_9 x^2 + \log_9 y^3 - \log_9 z^4$

$= \log_9 \dfrac{x^2y^3}{z^4}$