

FEBRUARY 13, 2012

Alg 2

GET OUT PAGE 409 #8-38, 48-58 EVEN

$$52) \log_4 x = 2$$

$$4^2 = x$$

$$16 = x$$

$$54) \log_x 243 = 5$$

$$x^5 = 243$$

$$x = 3$$

$$32) \log_9 \frac{1}{3} = x$$

$$9^x = \frac{1}{3}$$

$$x = \frac{1}{2}$$



2/13 - Logarithm Properties, Expanding

1. Product Property

$$\log_b(uv) = \log_b u + \log_b v$$

$$\begin{aligned}\log_2(8x) \\ &= \log_2 8 + \log_2 x \\ &= \boxed{3 + \log_2 x}\end{aligned}$$

$$\begin{aligned}\log_4 32 \\ &= \log_4(16 \cdot 2) \\ &= \log_4 16 + \log_4 2 \\ &= 2 + \frac{1}{2} \\ &= \boxed{2\frac{1}{2}}\end{aligned}$$

2. Quotient Property

$$\log_b \frac{u}{v} = \log_b u - \log_b v$$

$$\begin{aligned} \log_2 \frac{n}{2} &= \log_2 n - \log_2 2 \\ &= \log_2 n - 1 \end{aligned}$$

$$\begin{aligned} \log_4 \frac{x}{8} &= \log_4 x - (\log_4 4 + \log_4 2) \\ \log_4 \frac{8}{x} &= \log_4 8 - \log_4 x \\ &= \log_4 (2 \cdot 4) - \log_4 x \\ &= \log_4 2 + \log_4 4 - \log_4 x \\ &= \frac{1}{2} + 1 - \log_4 x \\ &= \frac{3}{2} - \log_4 x \end{aligned}$$

3. Power Property

$$\log_b u^n = n \log_b u$$

$$\begin{aligned} & \log_3 3^{-1} \\ & = -1 \cdot \log_3 3 \\ & = -1 \cdot 1 \\ & = -1 \end{aligned}$$

$$\begin{aligned} & \log_2 4^2 \\ & = 2 \log_2 4 \\ & = 2 \cdot 2 \\ & = 4 \end{aligned}$$

Expand each completely by using the 3 properties and what you already know about simplifying logarithms.

$$\begin{aligned} & \log_2(8x^2) \\ &= \log_2 8 + \log_2 x^2 \\ &= 3 + 2 \log_2 x \end{aligned}$$

$$\begin{aligned} & \log_2 \sqrt{3x} \\ &= \log_2 (3x)^{\frac{1}{2}} \\ &= \frac{1}{2} \log_2 (3x) \\ &= \frac{1}{2} (\log_2 3 + \log_2 x) \\ &= \frac{1}{2} \log_2 3 + \frac{1}{2} \log_2 x \end{aligned}$$

No () in your final answer

$$\log_2 \frac{4\sqrt{xy}}{3}$$

$$= \log_2(4\sqrt{xy}) - \log_2 3$$

$$= \log_2 4 + \log_2 \sqrt{xy} - \log_2 3$$

$$= 2 + \log_2 (xy)^{\frac{1}{2}} - \log_2 3$$

$$= 2 + \frac{1}{2} \log_2 (xy) - \log_2 3$$

$$= 2 + \frac{1}{2} (\log_2 x + \log_2 y) - \log_2 3$$

$$= 2 + \frac{1}{2} \log_2 x + \frac{1}{2} \log_2 y - \log_2 3$$

$$\log \frac{4\sqrt{xy}}{3}$$
$$= \log \frac{4(xy)^{\frac{1}{2}}}{3}$$

HOMEWORK

PAGE 410 #9-24 ALL

DUE Tuesday
before the dance