

B.5 - Day 2 - Solving Logarithmic Equations

Day 2 Objective: 1. Solve logarithmic equations by using log properties then converting into exponential form.

Remember from last unit!?!?

take note

Properties Properties of Logarithms

For any positive numbers m , n , and b where $b \neq 1$, the following properties apply.

Product Property $\log_b mn = \log_b m + \log_b n$

Quotient Property $\log_b \frac{m}{n} = \log_b m - \log_b n$

Power Property $\log_b m^n = n \log_b m$

May 1-12:14 PM

Ex.1 Use logarithmic properties, then solve for x.

$$\log_2 x \oplus \log_2 4 = 5$$

$$\log x \ominus \log 3 = 2$$

$$\log_2 4x = 5$$

$$\log_{10} \frac{x}{3} = 2$$

$$2^5 = 4x$$

$$10^2 = \frac{x}{3}$$

$$32 = 4x$$

$$3 \cdot 100 = \frac{x}{3} \cdot 3$$

$$\boxed{8 = x}$$

$$\boxed{300 = x}$$

May 1-12:29 PM

Ex.2 Use logarithmic properties, then solve for x.

$$\log_4(x-4) \oplus \log_4 8 = 4$$

$$\log_9(x-6) \ominus \log_9 6 = 1$$

$$\log 8x - 32 = 4$$

$$\log_9 \frac{(x-6)}{6} = 1$$

$$4^4 = 8x - 32$$

$$6 \cdot 9 = \frac{x-6}{6} \cdot 6$$

$$256 = 8x - 32$$

$$54 = x - 6$$

$$\boxed{36 = x}$$

$$\boxed{60 = x}$$

May 1-12:29 PM

Ex.3 Use logarithmic properties, then solve for x.

$$\log_7(x+3) \oplus \log_7(x+9) = 1$$

$$\log_7 x^2 + 12x + 27 = 1$$

$$0 = x^2 + 12x + 20$$

$$0 = (x+2)(x+10)$$

$$x^2 + 12x + 27 = 1$$

$$\boxed{x = -2, -10}$$

$$\log_2(x+23) + \log_2(x-1) = \log_2 52$$

$$(x+23)(x-1) = 52$$

$$x^2 + 22x - 23 = 52$$

$$x^2 + 22x - 75 = 0$$

$$(x-3)(x+25) = 0$$

$$\boxed{x = 3, x = -25}$$

May 1-12:39 PM