



U7 L5: Solving Logarithms (Section 7.4)



I can solve logarithmic equations.

$$\log_b x = y \rightarrow b^y = x \quad b > 0, b \neq 1, x > 0$$

$$b^{\log_b x} = x \quad \text{and} \quad \log_b b^x = x$$

★ one log in equation \rightarrow rewrite in exponential

★ two logs:

exactly one log on each side of equation \rightarrow drop logs

ie. $\log_b \triangle = \log_b \square$

$$\triangle = \square$$

★ Check solutions: $\log_b \square^{\frac{-1}{x+4}}$

\uparrow
MUST END POSITIVE

$$x = -1$$



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Solve each equation. Check your solutions!

$$1. \log_8 n = \frac{4}{3}$$

$$* 8^{\frac{4}{3}} = n$$

$$(2^3)^{\frac{4}{3}} = n$$

$$2^4 = n$$

$$\boxed{16 = n} \checkmark$$

$$8 \wedge (4 \div 3)$$

$$8 x^y (4 \div 3)$$

$$2. 3 = \log_6 (2x + 6)$$

$$6^3 = 2x + 6$$

$$216 = 2x + 6$$

$$\begin{array}{r} -6 \\ \hline \end{array}$$

$$\frac{210}{2} = \frac{2x}{2}$$

$$\boxed{105 = x}$$



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Solve each equation. Check your solutions!

$$3. \log_4 x^2 = \log_4 (4x - 3)$$

$$x^2 = 4x - 3$$

$$x^2 - 4x + 3 = 0$$

$$(x-1)(x-3) = 0$$

$$x-1=0$$

$$x-3=0$$

$$\boxed{x=1}$$

$$\boxed{x=3}$$

✓

✓



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Solve each equation. Check your solutions!

$$4. \log_7(2x + 8) = \log_7(x + 5)$$

$$2x + 8 = x + 5$$

$$x + 8 = 5$$

$$x = -3$$

✓