1 Rewriting Exponential and Logarithmic equations

When solving an exponential or logarithmic equation, the first step is to rewrite the equation so that the unknown is isolated on one side. To do this we use all the mad skillz we have been developing in rewriting equations.

1.

$$\begin{aligned} 7^x &= 14 \\ x &= \log_7 14 \end{aligned}$$

2.

$$\begin{aligned} y^4 &= 256 \\ y &= 256^{\frac{1}{4}} \\ y &= 4 \end{aligned}$$

3.

$$\begin{aligned} \log_9 d &= 3 \\ d &= 9^3 \\ d &= 729 \end{aligned}$$

4.

$$\begin{aligned} \log_h 8 &= 3 \\ h^3 &= 8 \\ h &= 8^{\frac{1}{3}} \\ h &= 2 \end{aligned}$$

5.

$$\begin{aligned} \log_u 3 + \log_u 9 &= 3 \\ \log_u 27 &= 3 \\ u^3 &= 27 \\ u &= 27^{\frac{1}{3}} = 3 \end{aligned}$$

6.

$$\begin{aligned} \log_3 x - \log_3 4 &= 12 \\ \log_3 \frac{x}{4} &= 12 \\ \frac{x}{4} &= 3^{12} \\ x &= 4(3^{12}) \end{aligned}$$

2 Practice Problems

Rewrite each of these equations so that the variable is alone on one side of the equal sign. Then solve for the unknown.

1. $8^x = 9$

2. $\log_{10} x = 14$

3. $\log_x 729 = 3$

4. $3^x = 8100$

5. $\log_x 18 = 2$

6. $\log_8 7x = 8$

7. $5^{x+7} = 421$

8. $\log_x 343 = 3$

9. $\log_6 x^2 = 100$

10. $27^{3x} = 3$

11. $\log_x 12^3 = 24$

12. $\log_{12} 2x + 12 = 5$