

LOG OPERATIONS

$$\log_{10} 10^7 = 7 \quad \ln e^{217} = 217 \quad \underline{\underline{6^{\log_6 39} = 39}}$$

Solve. $\log_5 x = 4$

↙ argument

Exponentiate! $5^{\log_5 x} = 5^4$

$$\boxed{x = 625}$$

$$\log_b x = y$$

$$b^y = x$$

$$6^4, 6^{-19} = \frac{1}{6^{19}}$$

$$b > 0, b \neq 1$$

$$x > 0$$

$$\log_a 64 = 2$$

$$\sqrt{64} = \sqrt{a^2}$$

$$\cancel{8} = a$$

$$\log_2(-8) = x$$

$$-8 = 2^x$$

No sol.

can't be negative

$$\log_{25} \sqrt[4]{5} = x$$

$$\sqrt[4]{5} = 25^x$$

$$5^{1/4} = 5^{2x}$$

$$\frac{1}{2} \cdot \frac{1}{4} = 2x \cdot \frac{1}{2}$$

$$\boxed{\frac{1}{8} = x}$$

Make
Common
bases!

PROPERTIES OF LOGARITHMS

$$\log_b m + \log_b n = \log_b (m \cdot n)$$

$$\log_b m - \log_b n = \log_b \left(\frac{m}{n}\right)$$

$$\log_b m^p = p \cdot \log_b m$$

$$\log_2 4 + \log_2 8 = \log_2 32$$

$$\log_2 2^2 + \log_2 2^3 = \log_2 2^5$$

$$2 + 3 = 5$$

$$x^2 \cdot x^5 = x^7$$

$$\log_7 7^5 = 5 \cdot \log_7 7$$

$$5 = 5 \cdot 1$$

$$\log_7(x+5) + \log_7(x-3) = 2 \log_7 3^2$$

$$\log_7[(x+5)(x-3)] = \log_7 3^2$$

$$\log_7(x^2 + 2x - 15) = \log_7 9$$

$$x^2 + 2x - 15 = 9$$

$$x^2 + 2x - 24 = 0$$

$$(x+6)(x-4) = 0$$

$$x = \cancel{6} \quad \boxed{x=4} \quad \text{check}$$

$$\log_7 3x = \log_7(x+8)$$

$$\ln 4x + \ln 3 - \ln 6 = 3 \ln 4$$

$$\ln\left(\frac{4x \cdot 3}{6}\right) = \ln 4^3$$

$$e^{\ln 2x} = e^{\ln 64}$$

$$2x = 64$$

$$\boxed{x=32} \quad \text{check}$$

$$\log x + \log(x+3) = 1$$

$$\log_{10}(x^2 + 3x) = 1$$

$$x^2 + 3x = 10$$

$$x^2 + 3x - 10 = 0$$

$$(x+5)(x-2) = 0$$

$$x = \cancel{5} \quad \boxed{x=2} \quad \text{check!}$$

$$\log 8^x = 117 \quad \log \text{ \& plog}$$

$$\frac{x \cdot \log 8}{\log 8} = \frac{\log 117}{\log 8}$$

$$x \approx 2.29$$

$$\frac{7e^{3x+5}}{7} = \frac{14}{7}$$

$$\ln e^{3x+5} = \ln 2$$

$$3x+5 = \ln 2$$

$$3x = \frac{\ln(2) - 5}{3}$$

$$x \approx -1.436$$