$\log_3 27$ 3

$\log_2 64$ 6

$\log_{\frac{1}{8}} \frac{1}{512}$ 3

$\log_7 \frac{1}{7}$ -1

$\log_{\frac{1}{3}} 81$ -4

$\log_4(-16)$ undefined

$\log_5 1$ 0

$\log_{\frac{1}{10}} 100$ -2

$\log_4 8$ $\frac{3}{2}$

$\log_2 1$ 0

$\log_4 32$ $\frac{5}{2}$

$\log_2 0$ undefined

Warm Up: Use INVERSES to find the value of x.

a) $\log_3 x = 2$ $\quad x = 9$ NC

3 3

b) $3^x = 9 \rightarrow \log_3 3^x = \log_3 9$ NC

$x = 2$

c) $3^x = 8$

$\log_3 3^x = \log_3 8$

$x = \log_3 8$

$x \approx 1.893$

Calc

d) $2.4^x = 7.2$

$\log_{2.4} 2.4^x = \log_{2.4}(7.2)$

$x = \log_{2.4}(7.2)$

$x \approx 2.255$

Calc

e) $3 \cdot 2^x = 48$

$\frac{3 \cdot 2^x}{3} = \frac{48}{3}$

NC

$2^x = 16$

$\log_2 2^x = \log_2 16$

$x = 4$

f) $4.1 \cdot 2.6^x = 32.8$

$\frac{4.1 \cdot 2.6^x}{4.1} = \frac{32.8}{4.1}$

$2.6^x = 8$ Calc

$\log_{2.6} 2.6^x = \log_{2.6} 8$

$x = \log_{2.6} 8$

$x \approx 2.176$

Solve.

$4^{10}+4^{10}=8^x$

$2\cdot 4^{10}=8^x$

$2\cdot 2^{20}=2^{3x}$

$2^{21}=2^{3x}$

$21=3x$

$x=7$

$x=7$

$16\cdot 2^{2x-4}=\dfrac{8}{2^{x-6}}$

$2^4\cdot 2^{2x-4}=\dfrac{2^3}{2^{x-6}}$

$2^{2x}=2^{3-(x-6)}$

$2x=3-x+6$

$+x \quad +x$

$3x=9$

$x=3$

$x=3$

Simplify.

$\log_{36}(\log_2 64)$

$\log_2 64 = 2^6$

$\log_{36}(6)$

$\log_{36}(36^{1/2}) = \frac{1}{2}$

Solve.

$\log_7 \sqrt[3]{49} \cdot 10^{\log_{10}\left(\frac{1}{9}\right)^{-\frac{1}{2}}} = 4^{\log_4 x}$

$\log_7 7^{2/3} \cdot \left(\frac{1}{9}\right)^{-1/2} = x$

$\frac{2}{3} \cdot 3 = x$

$x = 2$

If $f(x)=15\cdot 3^{x-6}-2$ find: $n=f^{-1}(133)$

$X=15\cdot 3^{y-6}-2$

$+2 \qquad +2$

$\frac{X+2}{15}=\frac{15\cdot 3^{y-6}}{15}$

$\log_3\frac{X+2}{15}=\log_3 3^{y-6}$

$\log_3\left(\frac{x+2}{15}\right)=y-6$

$\log_3\left(\frac{x+2}{15}\right)+6=y$

$f^{-1}(x)=\log_3\left(\frac{x+2}{15}\right)+6$

$f^{-1}(133)=\log_3\left(\frac{135}{15}\right)+6$

$f^{-1}(133)=\log_3 9+6$

$f^{-1}(133)=8$

$\log_4(x+2) \leq 1$

$\log_{\frac{1}{2}} x \geq 2$

$\log_{\frac{1}{3}}(3x-4) \geq -3$