

1. Find all numbers x that satisfy the given equation:

$$\log_7(x+5) - \log_7(x-1) = 2$$

$$\log_7 \frac{x+5}{x-1} = 2$$

$$\frac{x+5}{x-1} = 7^2$$

$$x+5 = 49(x-1)$$

$$x+5 = 49x - 49$$

$$54 = 48x$$

$$x = \frac{54}{48} = \frac{9}{8}$$

2. Evaluate the following quantities:

(a) $\log_2(2^{-3}) = -3$

(b) $4^{2\log_4(1/4)} = 4^{2(-1)} = 4^{-2} = 1/16.$

3. Let $f(x) = 4 + \ln(x - 2)$.

- (a) Find the domain of f . $(2, \infty)$ because $\ln(x - 2)$ is only defined for $x - 2 > 0$.
- (b) Find the range of f . $(-\infty, \infty)$.
- (c) Find a formula for f^{-1} .

$$\begin{aligned}x &= 4 + \ln(y - 2) \\x - 4 &= \ln(y - 2) \\e^{x-4} &= y - 2 \\y &= e^{x-4} + 2\end{aligned}$$

- (d) Find the domain of f^{-1} . $(-\infty, \infty)$.
- (e) Find the range of f^{-1} . $(2, \infty)$ because e^{x-4} only outputs numbers greater than 0.