Solving Logs in the form $\log_c p = q$

Recall: $\boxed{\log_c p = q}$

When solving an equation involving logs in the same base:

- Determine the restrictions on the variable x
- Re-arrange to form $\log_c p = q$
- Use $\log_c p = q$
- Determine the solutions that respect the restrictions defined at the start.

Example: Solve log(x+1) = 1-log(x-2)

Restrictions:

$x+1 > 0 \longrightarrow x > -1$

$x - 2 > 0 \longrightarrow x > 2$

Now solve:

$$\log(x+1) = 1 - \log(x-2)$$

$$\log(x+1) + \log(x-2) = 1$$

$$\log_c \underbrace{(x+1)(x-2)}_{p} = 1^{q}$$

$$\left(\log_c p = q \iff c^q = p \right)$$

$$(x+1)(x-2) = 10^1$$

$$x^2 - x - 2 = 10$$

$$x^2 - x - 12 = 0$$

$$(x-4)(x+3) = 0$$

$$x - 4 = 0 \qquad x + 3 = 0$$

$$x = 4 \qquad x = -3$$

Solution: $x = 4$ (Since $x > 2$ is our Restriction) $x > -1$