Solving Log Equations

$\log_2(x) + 6 = 15$

$-6 \quad -6$

$\log_2 x = 9$

$2^{\log_2 x} = 2^9$

$x = 512$

* Negative inside a log is extraneous

$\log_2(x - 6) = 5$

* DO NOT ADD 6 NOW.

$2^{\log_2(x-6)} = 2^5$

$x - 6 = 32$

$x = 38$

$\log_4(5x - 1) = 3$

$4^{\log_4(5x-1)} = 4^3$

$5x - 1 = 64$

$5x = 65$

$x = 13$

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

$\log(5x(x-1)) = 2$

$10^{\log(5x(x-1))} = 10^2$

$5x(x-1) = 100$

$5x^2 - 5x = 100$

$5x^2 - 5x - 100 = 0$

$5(x^2 - x - 20) = 0$

$5(x+4)(x-5) = 0$

$x + 4 = 0 \quad x - 5 = 0$

$x = -4$ $\quad$ $x = 5$

check

$\log 5(-4) + \ldots$

-4 is extraneous

* (can't do negative log)

$\log 5(5) + \log(5-1) = 2$

$\log 25 + \log 4 = 2$

$\log 100 = 2$ ✓

because $10^2 = 100$