

# Solving Log Equations - Quadratic

Ex) solve for all values of x

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

← equals inside parentheses

\* Rewrite as exponential equation

↑ this base

↑ raised to this power

expand

$$(x+3)^2 = 2x^2 + x + 3$$

$$\begin{array}{r} x^2 + 6x + 9 = 2x^2 + x + 3 \\ -x^2 - 6x - 9 \quad -x^2 - 6x - 9 \\ \hline \end{array}$$

\* set equal to zero

$$0 = x^2 - 5x - 6$$

$$0 = (x-6)(x+1)$$

← Factor, complete square, or quadratic formula to solve for x

$$x = 6 \quad x = -1$$