Precalculus
Trickier logarithmic equations involving quadratics

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Example

Solve the equation.

$$\begin{aligned}
\lg(x+2)+\lg(x-1) &= 1 \\
\lg\left((x+2)(x-1)\right) &= 1 \\
(x+2)(x-1) &= 10^1 \\
x^2+x-2 &= 10 \\
x^2+x-12 &= 0 \\
(x-3)(x+4) &= 0 \\
x = 3 \quad \text{or} \quad & \cancel{x=-4} \text{ not in domain}
\end{aligned}$$

Domain: $x > 1$

Exp. base 10

- Recall $\lg = \log_{10}$.
- $\log_a(st) = \log_a(s) + \log_a(t)$, rule does not hold for negative s, t.
- Check whether answers are in domain of original expression: $\lg(t)$ is not a real number for $t < 0$.