

# Precalculus

## Trickier logarithmic equations involving quadratics

Todor Milev

2019

## Example

Solve the equation.

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

Domain:  $x > 1$

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

Exp. base 10

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

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

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

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

$$x = 3 \quad \text{or} \quad \cancel{x = -4} \quad \text{not in domain}$$

- 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  $t < 0$ .