

Exercise 290

For the following exercises, solve the logarithmic equation exactly, if possible.

$$\log_4(x + 2) - \log_4(x - 1) = 0$$

Solution

Combine the logarithms.

$$\log_4 \frac{x + 2}{x - 1} = 0$$

The base is 4, the exponent is 0, and the result is $\frac{x+2}{x-1}$.

$$4^0 = \frac{x + 2}{x - 1}$$

$$1 = \frac{x + 2}{x - 1}$$

Multiply both sides by the least common denominator $x - 1$.

$$x - 1 = x + 2$$

Cancel x from both sides.

$$-1 = 2$$

This is a false statement regardless of the value of x . Therefore, there's no solution.