

Together
Solve

$$25^{2x-1} = 125^{3x+4}$$

$$\sqrt[4]{\log(25^{2x-1})} = \sqrt[4]{\log(125^{3x+4})}$$

Take log of both sides

$$(2x-1) \log(25) = (3x+4) \log(125)$$

Bring exponents to front

$$\begin{array}{r} 2x \log(25) - 1 \log(25) = 3x \log(125) + 4 \log(125) \\ -3x \log(125) \quad + 1 \log(25) \quad -3x \log(125) \quad + 1 \log(25) \end{array}$$

Distribute logs on each side

$$2x \log(25) - 3x \log(125) = 4 \log(125) + 1 \log(25)$$

Bring variables to 1 side

$$\frac{x(2 \log(25) - 3 \log(125))}{2 \log(25) - 3 \log(125)} = \frac{(4 \log(125) + 1 \log(25))}{(2 \log(25) - 3 \log(125))}$$

and plain log numbers to other side

$$x = -2.8$$

Factor out variable (it is GCF) then divide other factored piece away

You Try
Solve

$$4^{3x+5} = 8^{4x-3}$$

$$\log(4^{3x+5}) = \log(8^{4x-3})$$

$$(3x+5) \log(4) = (4x-3) \log(8)$$

$$\begin{array}{r} 3x \log(4) + 5 \log(4) = 4x \log(8) - 3 \log(8) \\ -4x \log(8) \quad -5 \log(4) \quad -4x \log(8) \quad -5 \log(4) \end{array}$$

$$3x \log(4) - 4x \log(8) = -3 \log(8) - 5 \log(4)$$

$$x \left(\frac{3 \log(4) - 4 \log(8)}{3 \log(4) - 4 \log(8)} \right) = \frac{-3 \log(8) - 5 \log(4)}{3 \log(4) - 4 \log(8)}$$

$$x = 3.1667$$