$$b^a = c \iff a = \log_b c$$

Solving Logarithmic and Exponential Equations (Examples). Solve each equation for the variable.

$\langle Ex\ 1\rangle$ $3^{x+5} = 3^{2x}$

$\langle Ex\ 2\rangle$ $1000^{2x+5} = 100^{3x}$

$\langle Ex\ 3\rangle$ $27^x = 81^{2x-3}$

$\langle Ex\ 4\rangle$ $8^x = 32^{2x-1}$

$\langle Ex\ 5\rangle$ $3^{x+1} = 5$

$\langle Ex\ 6\rangle$ $2^{x-8} = 5^{3x}$

$\langle Ex\ 7\rangle$ $25^{x+3} = 125^{4x}$

$\langle Ex\ 8\rangle$ $16^{5x-1} = 32$

$\langle Ex\ 14\rangle$ $\log_4 x = 3$

$\langle Ex\ 15\rangle$ $\log_2 (5x-1) = 8$

$\langle Ex\ 16\rangle$ $\log_4 (x^2 - 9) = 2$

$\langle Ex\ 17\rangle$ $\log (3x-8) = 2$

$\langle Ex\ 18\rangle$ $\ln (6-5x) = 4$

$\langle Ex\ 19\rangle$ $\log_3 x + \log_3 (x-2) = 1$

$\langle Ex\ 20\rangle$ $\log_6 x + \log_6 (x-5) = 2$

$\langle Ex\ 21\rangle$ $\ln x + \ln 5 = \ln (x-2)$

$\langle Ex\ 9\rangle$ $3^x = 5$

$\langle Ex\ 22\rangle$ $\log_6 x + 2 = \log_6(x-1)$

$\langle Ex\ 10\rangle$ $8^{2x-1} = 6$

$\langle Ex\ 23\rangle$ $2\log_6 x - \log_6(x-5) = 2$

$\langle Ex\ 11\rangle$ $2^{x^2+4x} = \dfrac{1}{8}$

$\langle Ex\ 24\rangle$ $\log_2 80 + \log_2 x = 5$

$\langle Ex\ 12\rangle$ $2^{5x+1} = 3^{x-2}$

$\langle Ex\ 25\rangle$ $\log(x+5) - \log(x-1) = 2$

$\langle Ex\ 13\rangle$ $5^{x+2} = 4^{3x}$

$\langle Ex\ 26\rangle$ $\log_5 x + \log_5(2x-1) = \log_5 3$

. . . .

Extras:

$\langle Extra\ \#1\rangle$ $12^{x+5} = 5$ $\langle Extra\ \#2\rangle$ $6 = 2^{3x-1}$ $\langle Extra\ \#3\rangle$ $5^x = 10^{2x+1}$

$\langle Extra\ \#4\rangle$ $8^{4x+1} = 3^{2x}$ $\langle Extra\ \#5\rangle$ $9^{x+3} = 7^{x-5}$