$x = y^2$ → $\sqrt{x} = y$ → $(\ )^2 = (\ )^2$ → $x = y^2$

$x = 2^y$ → $\log_2 x = \log_2$ → $\log_2 x = y$ → $2^{\log_2 x} = 2^y$ → $x = 2^y$

Is it an exponent or log equation?

exponent

Can you make the bases the same?

yes

1. Make the bases the same.
2. Set the exponents =

$4^{x-2} = \left(\frac{1}{8}\right)^{2x-4}$

$(2^2)^{x-2} = (2^{-3})^{2x-4}$

$2^3 = 2^x$

$2^{2x-4} = 2^{-6x+12}$

$2x - 4 = -6x + 12$

$+6x + 4 = +6x + 4$

$\frac{8x}{8} = \frac{16}{8}$

$x = 2$

no

1. Log both sides of the equation (undo exponent) to get x out of the exponent.

$3^x = 8$

$\log \quad = \log$

$\log 3^x = \log 8$

$x \frac{\log 3}{\log 3} = \frac{\log 8}{\log 3}$

$x = \frac{\log 8}{\log 3}$

$x \approx 1.893$

log

Do all the terms have a log?

yes

1. Condense both sides of the =
2. Exponentiate to cancel (undo) the logs and solve.

$\log_5 x + \log_5 3 = \log_5 27$

$\log_5 3x = \log_5 27$

$5^{\ } = 5^{\ }$

$\frac{3x}{3} = \frac{27}{3}$

$x = 9$

no

1. Get the logs alone on one side of the =
2. Condense the logs
3. Exponentiate to change to exponential form.

$\log_2(4x) - 3 = \log_2 5$

$-\log_2 5 + 3 = -\log_2 5 + 3$

$\log_2(4x) - \log_2 5 = 3$

$\log_2 \frac{4x}{5} = 3$

$2^{\ } = 2^{\ }$

$\frac{5}{4} \cdot \frac{4x}{5} = 2^3 \cdot \frac{5}{4}$

$x = 10$

Check to see if all the logs are positive