Algebra - Variables on Both Sides

solving with variables on both sides

Ex: $2x - 4 = 4x + 8$ } use inverse operations to get 'x' on one side

$-2x \quad -2x$

$-4 = 2x + 8$

$-8 \quad -8$

$-12 = 2x$

$\frac{-12}{2} = \frac{2x}{2}$

$-6 = x$

with fractions... multiply by the common denominator on both sides to eliminate the fractions (distribute)

Ex: $6\left(\frac{1}{2}x + 8\right) = \left(\frac{2}{3}x - 2\right)6$

$3x + 48 = 4x - 12$

$-3x \quad -3x$

$48 = x - 12$

$+12 \quad +12$

$60 = x$

distributing with fractions... multiply by the common denominator to eliminate the fractions before distributing

Ex: $(2)\frac{1}{2}(4x + 8) = (2)4(x + 2)$

$4x + 8 = 8(x + 2)$

$4x + 8 = 8x + 16$

$-4x \quad -4x$

$8 = 4x + 16$

$-16 \quad -16$

$\frac{-8}{4} = \frac{4x}{4}$ $-2 = x$

how many solutions to an equation?

one	$x = a$
infinite	$a = a$
zero	$a \neq b$

one solution - different coefficients

ex: $2x + 3 = 4x - 7$

$x = 5$

infinite solutions - same equation

ex: $2(x + 3) = 2x + 6$

$2x + 6 = 2x + 6$

same coefficients and constants

zero solutions - same coefficients, different constants

ex: $2x + 3 = 2x + 4$

$3 \neq 4$