Name _____ Date _____

Special Cases and Equations That Become Linear

No solution

$2(x+3) = 2x+5$

$2x+6 = 2x+5 \mid -2x$

$6 = 5$ false

the solution set is $\varnothing$

Every number is a solution

$3(x-1) = 3x-3$

$3x-3 = 3x-3 \mid -3x$

$-3 = -3$ true

the solution set is $\mathbb{R}$

Remember

If simplifying gives $0 \times x = b$: for $b \neq 0$ the equation has **no solution**, and for $b = 0$ **every real number** is a solution. **A product is 0** if at least one factor is 0: $(x-2)(3x+1) = 0$ means $x-2 = 0$ or $3x+1 = 0$.

1 ON YOUR OWN How many solutions does the equation have? Circle.

$4x - 2 = 2(2x-1)$

one / **none** / **every** x

$5 - x = -(x-7)$

one / **none** / **every** x

$3(x+1) = x+3+2x$

one / **none** / **every** x

$2x+1 = 2(x+1)$

one / **none** / **every** x

$6x - 4 = 2(3x+1)$

one / **none** / **every** x

$4(x-1) = 2x+2$

one / **none** / **every** x

2 ON YOUR OWN Solve.

$(x-2)(3x+1) = 0 \rightarrow$ ☐

$x(x+5) = 0 \rightarrow$ ☐

$(2x-3)(x+4) = 0 \rightarrow$ ☐

Names (group) _____ Date _____

3 ON YOUR OWN **Equations with x in a denominator.** First write the condition (a denominator cannot be 0), then solve and check whether the solution meets the condition.

Equation	Condition	Solution
$\frac{3}{x-1} = \frac{2}{x}$		
$\frac{x+1}{x-2} = 2$		
$\frac{x}{x-3} = \frac{3}{x-3}$		

4 IN A GROUP Why can the condition "eat" a solution? Explain using the third equation.

5 IN A GROUP Make up one equation with no solution and one for which every number is a solution.

★ ON YOUR OWN **Exit card.** $(x+3)(2x-1) = 0$ →