SOLVING LINEAR EQUATIONS AND INEQUALITIES

- Keep it BALANCED! (Whatever you do to one side, you must do to the other)
- Isolate the variable by performing the INVERSE(opposite) operation
- Do inverse operations in the REVERSE order of PEMDAS

Variables on ONE Side

$3(a+2)-4a=9$

$3a+6-4a=9$

$-a+6=9$

$-6\ \ -6$

$-1a=3$

$\boxed{a=-3}$ ✓

$3y+2(y-4)=8$

$3y+2y-8=8$

$5y-8=8$

$+8\ \ +8$

$5y=16$

$\boxed{y=16/5}$ 3.2

Variables on BOTH Sides

$3k-14k+25=2-6k-12$

$-11k+25=-10-6k$

$+11k\ \ +11k$

$25=-10+5k$

$+10\ \ +10$

$35=5k$

$\boxed{k=7}$

$3(w+7)-5w=w+12$

$3w+21-5w=w+12$

$-2w+21=w+12$

$+2w\ \ +2w$

$21=3w+12$

$-12\ \ -12$

$9=3w$

$\boxed{w=3}$

Identity and Contradictions

$3x + 4x + 5 = 3 + 10x - 3x + 2$

$7x + 5 = 7x + 5$

$-7x \quad -7x$

$5 = 5$ True

infinitely many solutions

$8(y + 7) = 6y - 8 + 2y$

$8y + 56 = 8y - 8$

$-8y \quad -8y$

$56 \neq -8$ False

No Solution

$3(2 - 3x) = -7x - 2(x - 3)$

$6 - 9x = -7x - 2x + 6$

$6 - 9x = -9x + 6$

$+9x \quad +9x$

$6 = 6$ ✓

Infinitely many Solutions

$5(1 + 2m) = \frac{1}{2}(8 + 20m)$

$5 + 10m = 4 + 10m$

$5 \neq 4$

No Solution

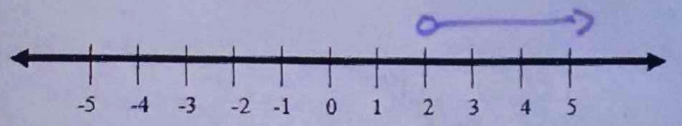
In your own words, describe how you can identify an equations that has …

… infinitely many solutions

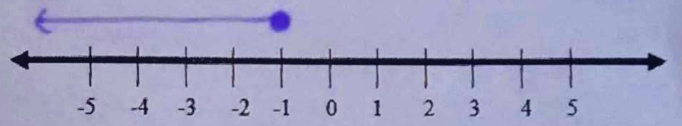
… no solution

Inequalities

Example: x > 2

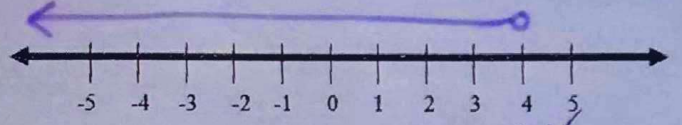


Example: x ≤ -1



Example: 4 > x

x<4



$-18 \leq -15$ ✓

$12 - 3(10) \leq -15$

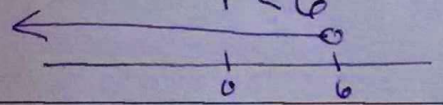
1) $5(6 + 3r) + 7 < 127$

$30 + 15r + 7 < 127$

$37 + 15r < 127$

$15r < 90$

$r < 6$

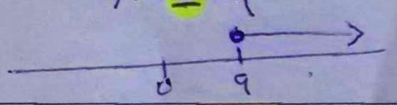


2) $12 - 3x \leq -15$

$-12 \quad -12$

$\frac{-3x}{-3} \leq \frac{-27}{-3}$

$x \geq 9$

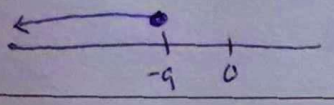


3) $15\left(\frac{1}{3}b + 3\right) \geq 6(b + 9)$

$5b + 45 \geq 6b + 54$

$-9 \geq 1b$

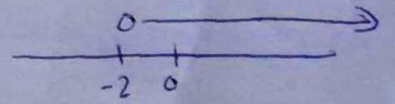
$b \leq -9$



4) $3d + 8 > -2d - 2$

$5d > -10$

$d > -2$



What do you need to do when you multiple or divide by a negative?

flip inequality symbol.