Math 9 Name: _____
Ch. 6 – Linear Equations and Inequalities Block: ____

6.4 – Solving Linear Inequalities

Recall that an equation has only one solution, but an inequality has many solutions.

Equation	Inequality
$x + 3 = 5$	$x + 3 < 5$
Solution(s): $x=2$ is the only solution	Solution(s): $x=1$, $x=-2$, $x=0.5$ ∴ there are many solutions (infinite!)

$1+3<5$
$-2+3<5$
$0.5+3<5$

To solve an inequality, we use the same strategy as for solving an equation with one exception:

If you multiply or divide both sides of the inequality by a NEGATIVE NUMBER, the inequality sign must be reversed.

Let's see why this is the case... Is this inequality true or false? $2 < 6$ True

- Multiply both sides of the inequality by 2. Is the resulting inequality still true?

$2(2) < 2(6)$ still,
$4 < 12$ True!

- Multiply both sides of the inequality by -2. Is the resulting inequality still true?

$-2(2) < -2(6)$
$-4 < -12$ now FALSE!
FLIP
but $-4 > -12$ is true

$-13 \not> 13$

Ex. 1: Solve each inequality

(a) $k + 8 > -13$

$-8 \quad -8$

$k > -21$

(b) $6.2 \leq x - 4.5$

$+4.5 \quad +4.5$

$10.7 \leq x$

OR $x \geq 10.7$

(c) $-25 \leq 5y + 5$

$-5 \quad -5$

$\frac{-30}{5} \leq \frac{5y}{5}$

$-6 \leq y$ OR $y \geq -6$

(d) $-6y \not\geq 24$

$\frac{-6}{-6} \leq \frac{-6}{-6}$

$y \leq -4$

*REVERSE SINCE ÷ BY NEG!!!

(e) $4x - 19 < 24 + 3x$

$-3x \quad -3x$

$x - 19 < 24$

$+19 \quad +19$

$x < 43$

(f) $-3(p + 2) \geq 12 - p$

$-3p - 6 \geq 12 - p$

$+p \quad +p$

$-2p - 6 \geq 12$

$+6 \quad +6$

$-2p \geq 18$

$\frac{-2p}{-2} \leq \frac{18}{-2}$

$p \leq -9$

FLIP SIGN.

Ex. 2: A super-slide charges $1.25 to rent a mat and $0.75 per ride. If Jason has $10.25, how many rides can he go on? Write and solve an appropriate inequality.

$1.25 + 0.75r \leq 10.25$

$-1.25 \quad -1.25$

since can spend up to $10.25

$\frac{0.75r}{0.75} \leq \frac{9.00}{0.75}$

$r \leq 12$ ∴ can go on 12 rides or less

$0 \leq r \leq 12$, r must be an integer