

Lesson 3-1 and 3-2

Solving Inequalities by Addition and Subtraction



ADDITION PROPERTY OF INEQUALITIES - If any number is added to each side of a true inequality, the resulting inequality is also true.

Example A $3 > -5$

$3 + 2 > -5 + 2$

$5 > -3$

Ex. B



Example B $n - 12 < 65$

$n - 12 + 12 < 65 + 12$

$n < 77$

$\{n | n < 77\}$

[This is called SET-BUILDER NOTATION.]



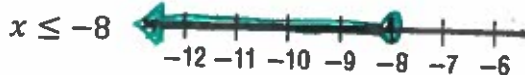
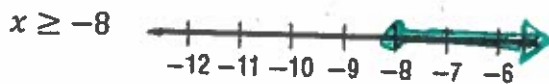
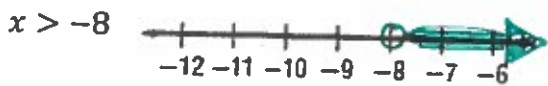
Example C $k - 4 > 10$

$k - 4 + 4 > 10 + 4$

$k > 14$

$\{k | k > 14\}$

GRAPHING ON THE NUMBER LINE -(A KWIK REVVOO)



Example D $12 \geq y - 9$

$$12 + 9 \geq y - 9 + 9$$

(add 9 to each side)

$$21 \geq y$$

(Simplify)

$$y \leq 21$$

(Rewrite so the variable is on the left)

$$\{y \mid y \leq 21\}$$

(set-builder notation)



(graph solution)



SUBTRACTION PROPERTY OF INEQUALITY - If any number is subtracted from each side of a true inequality, the resulting inequality is also true.

Example E $q + 23 < 14$

$$q + 23 - 23 < 14 - 23$$

(Subtract 23 from each side)

$$q < -9$$

(Simplify)

$$\{q \mid q < -9\}$$

(set-builder notation)



(graph solution)

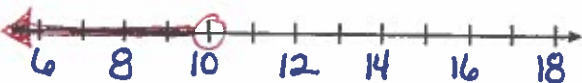
Example F $8 > x - 2$

$$8 + 2 > x - 2 + 2$$

$$10 > x$$

$$x < 10$$

$$\{x \mid x < 10\}$$

Example G $m + 15 \leq 13$

$$m + 15 - 15 \leq 13 - 15$$

$$m \leq -2$$

$$\{m \mid m \leq -2\}$$



Lesson 3-1 and 3-2

Solving Inequalities by Addition and Subtraction

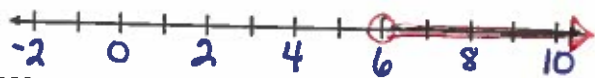
VARIABLES ON BOTH SIDES

Example H $12n - 4 \leq 13n$

$$\begin{aligned} 12n - 12n - 4 &\leq 13n - 12n \\ -4 &\leq n \\ n &\geq -4 \\ \{n \mid n \geq -4\} \end{aligned}$$

Example J $5x + 4 > 4x + 10$

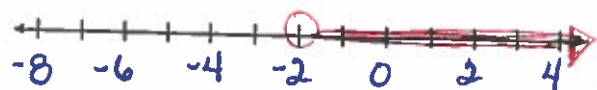
$$\begin{aligned} 5x - 4x + 4 &> 4x - 4x + 10 \\ x + 4 &> 10 \\ x + 4 - 4 &> 10 - 4 \\ x &> 6 \\ \{x \mid x > 6\} \end{aligned}$$



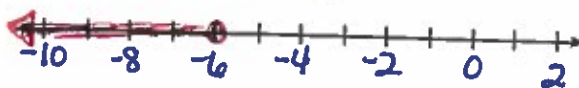
WRITING AND SOLVING INEQUALITIES

Ex. K Seven times a number is greater than 6 times that number minus two.

$$\begin{aligned} 7n &> 6n - 2 \\ 7n - 6n &> 6n - 6n - 2 \\ n &> -2 \\ \{n \mid n > -2\} \end{aligned}$$

Example I $3p - 6 \geq 4p$

$$\begin{aligned} 3p - 3p - 6 &\geq 4p - 3p \\ -6 &\geq p \\ p &\leq -6 \\ \{p \mid p \leq -6\} \end{aligned}$$

Ex. L Three times a number is less than two times that number plus 5.

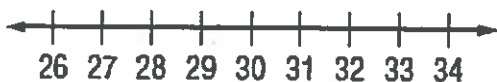
$$\begin{aligned} 3n &< 2n + 5 \\ 3n - 2n &< 2n - 2n + 5 \\ n &< 5 \\ \{n \mid n < 5\} \end{aligned}$$



TRY THESE ON YOUR OWN

PRACTICE:

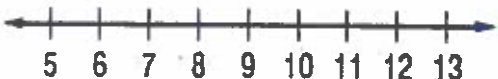
1. $t - 12 \geq 16$



3. $n - 8 < -13$



5. $16 \leq y + 9$



2. $r + \frac{1}{4} > \frac{3}{8}$

4. $3r + 6 > 4r$



6. $9k + 12 > 8k$

1. $-8 \geq x - 15$

2. $4x + 3 < 5x$

3. $8x > 7x - 4$

4. $12 + x \leq 9$

