2.4 Solving Multi-Step Inequalities

When multiplying or dividing by a negative number you MUST reverse the sign.

$-7x + 5 = -23$ verses $-7x + 5 > -23$

$$-5 \quad -5$$

$$\frac{-7x}{-7} = \frac{-28}{-7}$$

$$\boxed{x = 4}$$

$$\frac{-7x}{-7} > \frac{-28}{-7}$$

$$\boxed{x < 4}$$

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Examples:

a) $9r + 15 \leq 24 + 10r$

$$-9r \qquad -9r$$

$$15 \leq 24 + r$$

$$-24 \quad -24$$

$$\boxed{-9 \leq r}$$

LOL $\boxed{r \geq -9}$

b) $\left(\dfrac{4x - 2}{5}\right) > (-4) \cdot 5$

$$4x - 2 > -20$$

$$+2 \qquad +2$$

$$\frac{4x}{4} > \frac{-18}{4} \div 2$$

$$\boxed{x > -\dfrac{9}{2}}$$

c) $3(z + 1) + 11 < -2(z + 13)$

$$3z + 3 + 11 < -2z - 26$$

$$3z + 14 < -2z - 26$$

$$+2z \qquad +2z$$

$$5z + 14 < -26$$

$$-14 \quad -14$$

$$\frac{5z}{5} < \frac{-40}{5}$$

$$\boxed{z < -8}$$

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2.4 Solving Multi Step Inequalities with work

Your Turn:

d) $5n - 3(n - 6) \geq 0$

$5n - 3n + 18 \geq 0$

$2n + 18 \geq 0$

$\ -18\ \ -18$

$\dfrac{2n}{2} \geq \dfrac{-18}{2}$

$\boxed{n \geq -9}$

$\boxed{n \geq -9} \checkmark$

e) $3 + 5t \leq 3(t + 1) - 4(2 - t)$

$3 + 5t \leq 3t + 3 - 8 + 4t$

$3 + 5t \leq 7t - 5$

$\ -5t\ \ \ -5t$

$3 \leq 2t - 5$

$+5 \ +5$

$\dfrac{8}{2} \leq \dfrac{2t}{2}$

$\boxed{4 \leq t}$

$\boxed{t \geq 4} \checkmark$

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==Unique solutions.==

Examples:

a) $3x + 1 = 3x + 1 \checkmark$

$\ -1 \ -1$

inf many sol. $\dfrac{3x}{3} = \dfrac{3x}{3} \checkmark$

$x = x \checkmark$

$\boxed{\mathbb{R}}$

∞

b) $3x + 1 < 3x + 2$

$\ -1 \phantom{< 3x}\ -1$

$3x < 3x + 1$

$-3x \ \ -3x$

$\boxed{\mathbb{R}} \qquad 0 < 1 \checkmark$

Your Turn:

c) $3x + 7 < 3x + 2$

$\ -7 \phantom{< 3x}\ -7$

$3x < 3x - 5$

$-3x \ \ -3x$

$0 < -5$ ✗

$\boxed{\emptyset}$

it...

$x \leq x$

$\Rightarrow \boxed{\mathbb{R}}$

d) $3x + 1 < 3x + 1$

$\ -1 \phantom{< 3x}\ -1$

$\dfrac{3x}{3} < \dfrac{3x}{3}$

$x < x$ ✗

$\boxed{\emptyset}$

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2.4 Solving Multi-step Inequalities

HW: pg. 77

A:12 - 16(e), 24 - 30(e), 33, 34, 36, 41 - 43

B: 8 - 32(e), 33, 34, 36, 41 - 43

C: 8, 12, 16, 20, 24, 28, 30, 32, 33, 43