Solving Multi-Step Inequalities

Example 1

Solve each of the following:

Review: $4x + 11 = 35$

This is a linear equation!

$4x = 35 - 11$

$\frac{4x}{4} = \frac{24}{4}$

$x = 6$

$x = 6$ is the only solution to the equation!

New: $4x + 11 > 35$

This is a linear inequality

$4x > 35 - 11$

$\frac{4x}{4} > \frac{24}{4}$

$x > 6$

Any value greater than 6 (BUT not equal to) is a solution to the inequality!

Practice the following before moving on to the next example: Page 365 #3ab, 4ab

Example 2

Solve each of the following:

Review: $\frac{x}{4} + 3 = 8$

$\frac{x}{4} = 8 - 3$

"Undo" division by 4.

$\frac{x}{4} \cdot 4 = 5 \cdot 4$

$x = 20$

This is the only solution!

New: $\frac{x}{4} + 3 \leq 8$

$\frac{x}{4} \leq 8 - 3$

$\frac{x}{4} \cdot 4 \leq 5 \cdot 4$

$x \leq 20$

Any value less than OR equal to 20 is a solution to the inequality!

Practice the following before moving on to the next example: Page 365 #3c, 4c

Outcomes: PR4 - Single variable linear inequalities

Example 3

AKA checking

Solve each of the following and verify the solution:

Review: $5-2x=10x+29$

Need to collect like terms.

$-29+5=10x+2x$

$\frac{-24}{12}=\frac{12x}{12}$

$-2=x$

Verify

$5-2x=10x+29$

$5-2(-2)=10(-2)+29$

$5+4=-20+29$

$9=9$ ✓

New: $5-2x\geq 10x+29$

$-29+5\geq 10x+2x$

$\frac{-24}{12}\geq\frac{12x}{12}$

$-2\geq x$

Any value less than or equal to -2 is a solution.

To verify an inequality, choose a value in the solution!

ex) $x=-3,-4\ldots$

Verify $x=-3$

$5-2x\geq 10x+29$

$5-2(-3)\geq 10(-3)+29$

$5+6\geq -30+29$

$11\geq -1$ ✓ True statement!

STOP Practice the following before moving on to the next example: Page 365 # 6abc, 7abc

Example 4

More difficult because involves fractions.

Solve each of the following:

Review: $-1=-\frac{1}{4}(1-2y)$

Option 1 Keep fractions

$-1=-\frac{1}{4}+\frac{2}{4}y$

$-1+\frac{1}{4}=\frac{2}{4}y$

$-\frac{3}{4}=\frac{2}{4}y$

$-\frac{3}{4}\div\frac{2}{4}=y$

$-\frac{3}{4}\cdot\frac{4}{2}=y$

$-\frac{12}{8}=y$

$-\frac{3}{2}=y$

Option 2 Get rid of fractions

$4\cdot(-1)=\left(-\frac{1}{4}\right)\cdot 4+\left(\frac{2}{4}y\right)\cdot 4$

$-4=-1+2y$

$-4+1=2y$

$-\frac{3}{2}=\frac{2y}{2}$

$-\frac{3}{2}=y$

New: $-1\geq -\frac{1}{4}(1-2y)$

$4\cdot(-1)\geq\left(-\frac{1}{4}\right)\cdot 4+\left(\frac{2}{4}y\right)\cdot 4$

$-4\geq -1+2y$

$-4+1\geq 2y$

$-3\geq 2y$

$-\frac{3}{2}\geq y$

Chose to get rid of fractions... you could keep like Option 1 if you want.

Any value less than or equal to $-\frac{3}{2}$ (-1.5) is a solution!

ex) $y=-2,-2.4,-3.678$

STOP Practice the following: Page 365 # 6d, 7d

Outcomes:	PR4 - Single variable linear inequalities