Math 9 – Unit 3: Solving Equations

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Lesson #5: Solving Inequalities

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Learning Goal: We are learning to solve inequalities.

An equation utilizes the equal (=) sign, and when you solve an equation, you get one answer. An inequality uses the greater or less then symbols ($<, >, \leq, \geq$), and when solving an inequality, we get infinite answers! The math of solving an inequality is THE SAME as solving an equation except for one stipulation (which we will get to in the third example). In order to represent the infinite answers, you need to graph the solution on a number line.

Solve each inequality, then graph the solution on a number line.

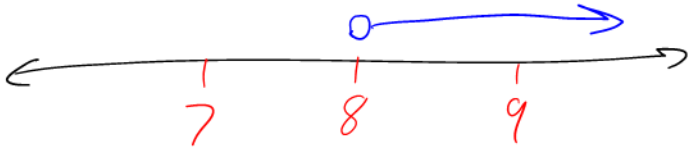
> or < → ○

≥ or ≤ → ●

a) $7p > 56$

÷7 ÷7

$p > 8$



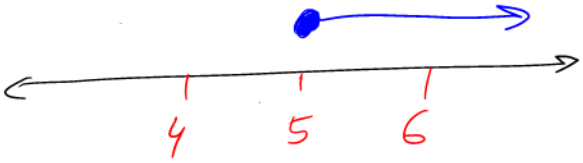
b) $-5 \leq k - 10$

+10 +10

$5 \leq k$

mirror it...

$k \geq 5$



BIG NOTE: When you multiply or divide an inequality by a negative, you need to flip around the inequality sign.

c) $-45 \leq -5y$

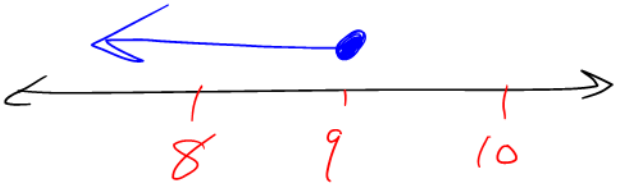
÷-5 ÷-5

$9 \geq y$

$y \leq 9$

$-45 \not\leq -50$

$-45 < -40$ ✓



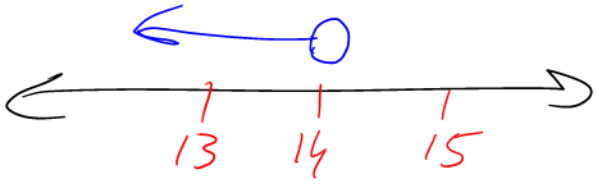
d) $16 > 9 + \frac{m}{2}$

$-9 \quad -9$

$2(7) > \left(\frac{m}{2}\right)2$

$14 > m$

$m < 14$



e) $7(w+6) \geq 38 + 8w$

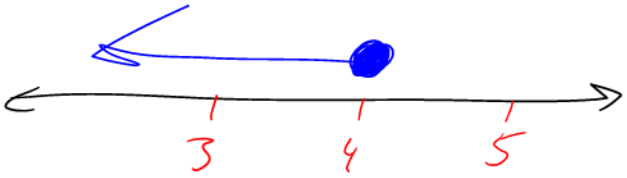
Bigger

$7w + 42 \geq 38 + 8w$

$-7w \quad -38 \quad -38 \quad -7w$

$4 \geq w$

$w \leq 4$



f) $5(n-6)+8 \leq -2(5-4n)-4n$

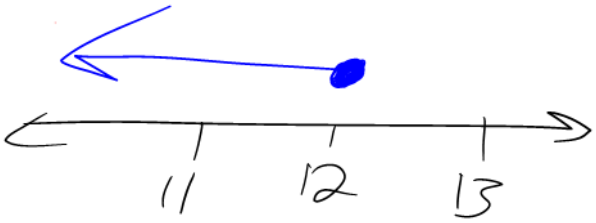
$5n - 30 + 8 \leq -10 + 8n - 4n$

Bigger

$5n - 22 \leq -10 + 4n$

$-4n \quad +22 \quad +22 \quad +4n$

$n \leq 12$



CD is 50

g) $\frac{651}{25} < \frac{39}{10} + \frac{27n}{10}$ (×2, ×5, ×5)

$1302 < 195 + 135n$

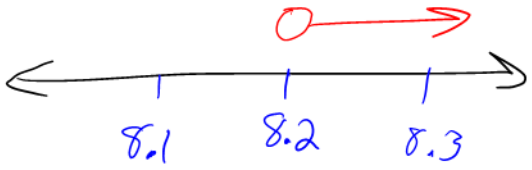
$-195 \quad -195$

$1107 < 135n$

$\frac{1107}{135} < \frac{135n}{135}$

$8.2 < n$

$n > 8.2$



CD is 6

h) $\frac{2(3y+5)}{3} - \frac{(y-3)}{6} \leq -2$ (×2, ×6, ×6)

$2(3y+5) - 1(y-3) \leq -12$

$6y + 10 \quad -y + 3 \leq -12$

$5y + 13 \leq -12$

$-13 \quad -13$

$5y \leq -25$

$\frac{5y}{5} \leq \frac{-25}{5}$

$y \leq -5$

Success Criteria:

- I can graph an inequality on a number line
- I can recognize what to do to an inequality when it is multiplied/divided by a negative
- I can recognize that solving an inequality follows the same rules as solving an equation