Section 4-3: Solving and Graphing Inequalities

Review:

$x + 10 = 13$

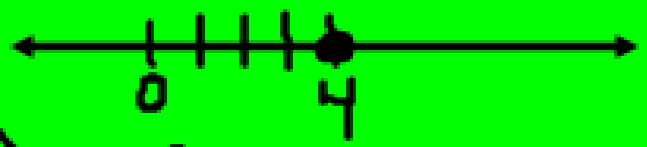
$-10 \quad -10$

$x = 3$

$y - 7 = -3$

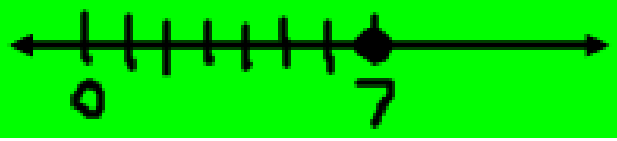
$+7 \quad +7$

$y = 4$



$\frac{2a}{2} = \frac{14}{2}$

$a = 7$



$\frac{b}{3} = \frac{-2 \cdot 3}{3}$

$b = -6$

An "Inequality" is ...

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Examples of Inequalities:

$x < 4$ $\quad\quad$ $y \geq -3$

$m + 2 > 5$ $\quad\quad$ $n - 4 \leq -1$

To solve an inequality, follow the same steps you used to solve equations.

IBS (Inverse, Balance, Simplify)

$x - 2 = 4$

$+2 \quad +2$

$x = 6$

$x - 2 < 4$

$+2 \quad +2$

$x < 6$

Whenever you multiply or divide by a negative number, you must flip the sign.

$-2x < 4$

$\frac{-2x}{-2} \quad \frac{4}{-2}$

$x > -2$

Also, when you flip the whole inequality be sure to flip the sign as well.

$3 \leq x$

$x \geq 3$

$3 \leq 5$

$5 \geq 3$

Why do we flip the sign when multiplying/dividing by a negative?

$$\frac{4}{-2} < \frac{10}{-2}$$

$$-2 > -5$$

$$(-3)\,3 > -2(-3)$$

$$-9 < 6$$

Ex 1: $w + 7 < 12$

$-7 \quad -7$

$w < 5$

Ex 2: $12 \geq 2y$

$\frac{12}{2} \geq \frac{2y}{2}$

$6 \geq y$

$y \leq 6$

Ex 3: $5x > 30$

$\frac{5x}{5} > \frac{30}{5}$

$x > 6$

Ex 4: $\frac{(-2)z}{-2} \leq \frac{4}{(-2)}$

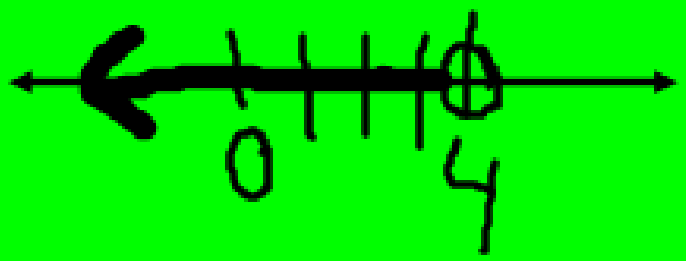
$z \geq -8$

What do these solutions mean and how do you graph them?

$x < 4$

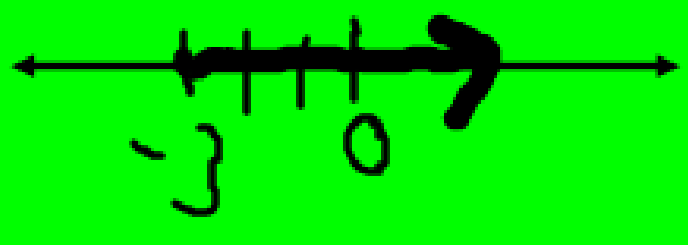
x could be 3, 3.9, -100, -2

x cannot be 4



$y \geq -3$

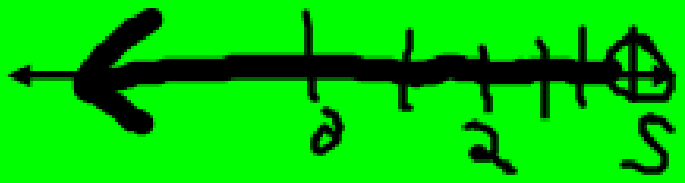
y could be -3, -2, 1, 5000, ...



Ex 1: $x - 3 < 2$

$+3 \quad +3$

$x < 5$



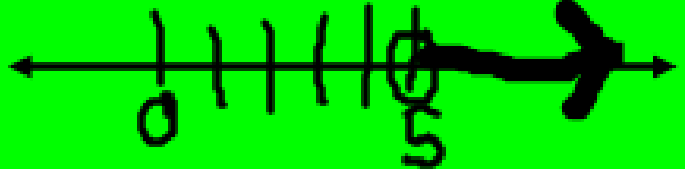
Ex 2: $\frac{8}{4} \geq \frac{4y}{4}$

$2 \geq y$

$y \leq 2$

Ex 3: $\frac{4w}{4} > \frac{20}{4}$

$w > 5$



Ex 4: $\frac{(-4)z}{-1} \leq \frac{4(-1)}{-1}$

$z \geq -4$