M9 - 9.1 - Inequalities Notes

The Alligator Eats the Bigger Thing

$$5 < 8$$

5 is less than 8

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5 is less than 8
$$5 < 8$$

8 is greater than 5
$$8 > 5$$

Greater than: $>$
Greater than or equal to: $\geq$
Less than: $<$
Less than or equal to: $\leq$
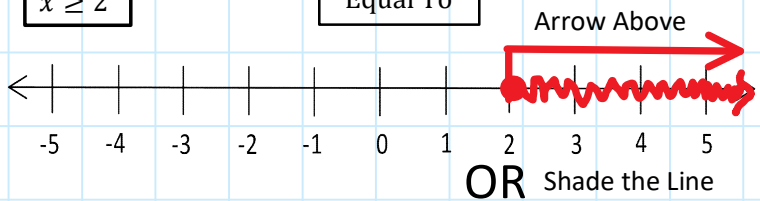Does not equal: $\neq$

7 is less than or equal to 7. $\boxed{7 \leq 7}$

Equal To $\geq \leq$

9 is greater than or equal to 7. $\boxed{9 \geq 7}$

Sketching Inequalities

$\boxed{x \geq 2}$

$\leq, \geq$ ● | Closed Dot
Equal To

Arrow Above

-5 -4 -3 -2 -1 0 1 2 3 4 5

OR Shade the Line

Steps:

Put a **Closed Dot** at 2 on the Number Line $x = 2$

Draw a Line with an Arrow to the Right $x > 2$

$\boxed{x \geq 2}$

$x \geq 2$

Left Hand
Thumb Points Greater Than

$x \geq 2$ Interval Notation $[2, \infty)$

Equal To $[\ ]$ [Square Brackets]

$\boxed{(-\infty, \infty)}$

$\boxed{x < 3}$

$<, >$ ○ | Open Dot
Arrow Below   Not Equal to

-5 -4 -3 -2 -1 0 1 2 3 4 5

Shade the Line

Steps:

Put an **Open Dot** at 3 on the Number Line $x < 3$

Draw a Line with an Arrow to the Left $x < 3$

$\boxed{x < 3}$
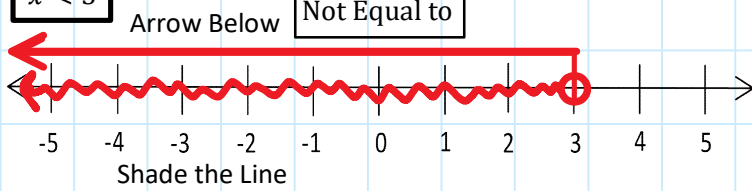
$x < 3$

Right Hand
Thumb Points Less Than

$x < 3$ Interval Notation $(-\infty, 3)$

Not Equal to $(\ )$ (Round Brackets)

Between

$x \geq 2$ $x < 3$

Line Between

1   2   3   4   5

Shade Between

$\boxed{2 \leq x < 3}$

Side by Side in Order* $x \geq 2$ $x < 3$
Mirror Left $2 \leq x$ $x < 3$

Bring Together $2 \leq x < 3$

Interval Notation

[2,3)

Smaller #, Less Than, Variable, Less Than, Bigger #

$\boxed{-x \leq 4}$

$-x \leq 4$ Divide by a Negative
$x \geq -4$ Change Direction of Sign

Proofs

$-x \leq 4$ $\boxed{-4 \leq x}$ Bring it
$+x \quad +x$ $x \geq -4$ Over
$0 \leq 4 + x$ Mirror
$-4 \quad -4$ Add x
$-4 \leq x$ Subtract 4
$x \geq -4$ Mirror

Mirror

$a \longrightarrow b$ Points to b
$b \longleftarrow a$ Points to b