1/28/2020 Tuesday

1314/0214 College Algebra
Brice
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page 1

"OR" Statement

(1) $-2(z-3) \le 14$ or $7+z<10$

① $-2(z-3) \le 14$

$-2z+6 \le 14$

$-2z \le 8$ multiply or divide by negative number, flip the si

$z \ge -4$

$[-4, \infty)$

② $7+z<10$

$z<3$

$(-\infty, 3)$

* Put both solutions sets on the same number line.

Anywhere there is a mark is a part of your final solution set.

$(-\infty, \infty)$

The solution set is the set of all real numbers.

"AND" Statement

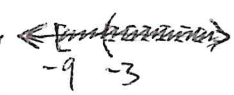
(2) $-6(y-1) \le 60$ and $18-y<21$

① $-6y+6 \le 60$

$-6y \le 54$

$y \ge -9$

$[-9, \infty)$



$(-3, \infty)$ is the solution set for this "AND" statement

② $18-y<21$

$-y<3$

$y>-3$

$(-3, \infty)$

* Put both solution sets on the same number line (with different colors)

Inequalities Involving Absolute Values

(A) When solving an absolute value <u>less than</u> (or equal to) some number ($|\cdot| <$ number or $|\cdot| \leq$ number)

Example (3)

$4|y+2| \leq 4$

$|y+2| \leq 1$

$-1 \leq y+2 \leq 1$

$-3 \leq y \leq -1$

$[-3, -1]$

Procedure:

① Isolate the absolute value

② Translate the absolute value into a double inequality

- the expression inside absolute value stays the same
- "sandwitch" that expression inbetween the number and its opposite.

(B) When solving an absolute value greater than (or equal to) some number ($|\cdot| >$ number or $|\cdot| \geq$ number)

Example (4)

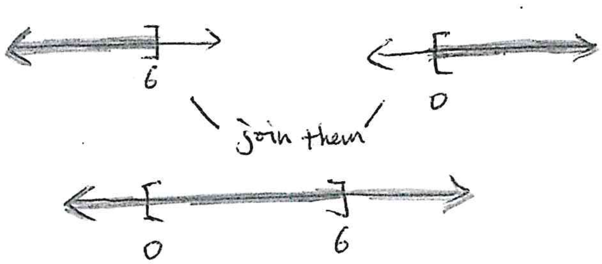
$8|3-w| \geq -24$

$|3-w| \geq -3$

$3-w \geq -3$ or $3-w \leq 3$

$-w \geq -6$ $\quad$ $-w \leq 0$

$w \leq 6$ $\quad$ $w \geq 0$



Procedure:

① Isolate the absolute

② Translate to two non-absolute value inequalities

- the expression inside absolute value stays the same
- this expression is either greater than (or equal to) that number

<u>OR</u> this expression is less than (or equal to) that number's opposite

(C) Exceptions

① An absolute value equals a negative number.
The solution set is an empty set. There is <u>NO</u> solutio

② An absolute value less than a negative number.
There is also no solution.

③ An absolute value greater than a negative number.
The solution set is <u>all real numbers</u> because it is <u>ALWAYS</u> true that any absolute value is nonnegativ

$(-\infty, \infty)$