ABSOLUTE VALUE INEQUALITIES

1. ISOLATE THE ABSOLUTE VALUE EXPRESSION.
2. SOLVE THE EXPRESSION AS AN EQUALITY (EQUAL SIGN) TO FIND THE CRITICAL POINTS.
3. TEST NUMBERS IN EACH REGION TO DETERMINE THE SOLUTION SET.

SOLVE: $|1-3x|-4 \geq 3$

STEP 1: $|1-3x|-4 \geq 3$

$+4 \quad +4$

$|1-3x| \geq 7$

STEP 2:

$1 - 3x = 7$ OR $1 - 3x = -7$

$-1 \quad -1$ $\quad$ $-1 \quad -1$

$-3x = 6$ $\quad$ $-3x = -8$

$-3 \quad -3$ $\quad$ $-3 \quad -3$

$x = \mathbf{-2}$ $\quad$ $x = \mathbf{8/3}$

STEP 3:

REGION A | REGION B | REGION C

========== <<<<<<<<<<<<<<<<<<<<

| | | | | | | | | | | | | | |

-3 **-2** 0 **8/3** 4

$|1-3(-3)|-4 \geq 3$ $\quad$ $|1-3(0)| \geq 3$ $\quad$ $|1-3(4)|-4 \geq 3$

$6 \geq 3$ $\quad$ $-3 \geq 3$ $\quad$ $7 \geq 3$

TRUE $\quad$ FALSE $\quad$ TRUE

SOLUTION SET:

Set Builder Notation: $\{x | x \leq -2 \text{ or } x \geq 8/3\}$

Interval Notation: (- 4 , 2] U [8/3 , 4)