Sec 1.7.3
Absolute Value Inequalities

$$|x| < 6$$

whatever is **INSIDE** the absolute value bars is within 6 units of zero...

$$-6 < x < 6$$

Solve, expressing the solution in both interval and set notations.

$$|x - 4| < 3$$

$$-3 < x - 4 < 3$$

$$1 < x < 7$$

$$(1, 7) \qquad \{x \mid 1 < x < 7\}$$

x-4

is

within

3 units of 0

...INSIDE

the 3's

Solve, expressing your answer in interval and set notations.

$$-2|3x+5| + 7 \geq -13$$

$$-2|3x+5| \geq -20$$

$$|3x+5| \leq 10$$

$$-10 \leq 3x+5 \leq 10$$
$$-15 \leq 3x \leq 5$$
$$-5 \leq x \leq 5/3$$

whatever is inside the abs val is WITHIN 10 units of 10..."inside" 10.

$$[-5, \; 5/3]$$

$$\{ x \mid -5 \leq x \leq 5/3 \}$$

$$7 < |5 - 2x|$$

$$|5 - 2x| > 7$$

$$5 - 2x < -7 \quad \text{or} \quad 5 - 2x > 7$$
$$-2x < -12 \qquad\qquad -2x > 2$$
$$x > 6 \qquad\qquad\qquad x < -1$$

$$(-\infty, -1) \cup (6, \infty)$$

$$\{x \mid x < -1 \text{ or } x > 6\} \quad \text{least} \rightarrow \text{greatest}$$

$$\left| x - \frac{11}{3} \right| + \frac{7}{3} > 1$$

$$\left| x - \frac{11}{3} \right| > -\frac{4}{3}$$

all reals

$\mathbb{R}$

∘∘∘ abs. value $\geqslant 0$
∘∘∘ always $> -4/3$

$|x| < 0$
or
$|x| < -1$

∅

Suggested Practice
Sec 1.7
59-93
multiples of 3

60. $(-5, 5)$

63. $(-1, 7)$

66. $\left[\dfrac{-19}{3}, 7\right]$

69. $(-\infty, -3) \cup (3, \infty)$

72. $(-\infty, -7] \cup [1, \infty)$

75. $(-\infty, -5] \cup [3, \infty)$

78. $(-\infty, -8) \cup (16, \infty)$

81. $[2, 6]$

84. $(-\infty, -2) \cup (8, \infty)$

87. $(-1, 9)$

90. $(-\infty, 2) \cup (6, \infty)$

93. $(-\infty, -6] \cup [24, \infty)$

end of Test #1's
material