12) §1.7 #s 1-17, 19, 22, 23, 26, 27, 34, 35, 38, 39, 41, 45, 47, 50, 53, 56, 60, 62, 63, 67, 74, 77, 79, 81, 84, 91, 93

#s 7-14 Write as SET for the interval or an interval for the inequality (which I turn into a set)

(7) $(-\infty, 12) = \{x \mid x < 12\}$

(8) $(-\infty, -3] = \{x \mid x \leq 3\}$

(9) $[-7, \infty) = \{x \mid x \geq -7\}$

(10) $(1.2, \infty) = \{x \mid x > 1.2\}$

(11) $\{x \mid x \geq -8\} = [-8, \infty)$

(12) $\{x \mid x < 54\} = (-\infty, 54)$

(13) $\{x \mid x < \frac{\pi}{2}\} = (-\infty, \frac{\pi}{2})$

(14) $\{x \mid x \geq \sqrt{3}\} = [\sqrt{3}, \infty)$

Book confuses a condition on a set with the set itself. Intervals are COLLECTIONS OR SETS, not just a condition/requirement for membership.

$(-\infty, -3] = x \leq -3$ is incorrect. To use an equals sign, they both must be sets.

$(-\infty, -3] = \{x \mid x \leq -3\}$ = The set of all x, where x is less than or equal to negative 3.

#s 15-26 Write the solution set using interval notation and graph it.

(15) $3x - 6 < 9$

$3x < 15$

$x < \frac{15}{3} = 5$

$\{x \mid x < 5\} = (-\infty, 5) =$ 

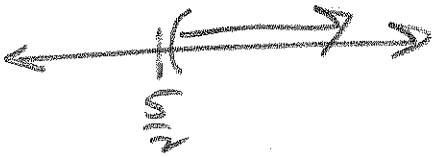
12) §1.7

(16) $2x+1 < 6$

$2x < 5$

$x < \frac{5}{2}$

$\{x \mid x < \frac{5}{2}\} = (\frac{5}{2}, \infty)$

$=$ 

(17) $7 - 5x \leq -3$

$-5x \leq -10$

$x \geq \frac{-10}{-5} = 2$

$\{x \mid x \geq 2\} = [2, \infty) =$ 

The number line graphs are the visual, but the set notation and interval notation are how we typically represent these sets of numbers. You might use a number line to see it, but I don't ask for such graphs on tests.

(19) $\frac{1}{2}x - 4 < \frac{1}{3}x + 5$ $\quad LCD = 2 \cdot 3 = 6$

$\frac{3}{3} \cdot \frac{x}{2} - \frac{4}{1} \cdot \frac{6}{6} < \frac{2}{2} \cdot \frac{x}{3} + \frac{5}{1} \cdot \frac{6}{6}$

$\frac{3x - 24}{LCD} < \frac{2x + 30}{LCD}$

$3x - 24 < 2x + 30$

$x < 54$

Right Now the LCD is all constants. When we start variables in the denominator, we won't be able to throw away the LCD.

$\{x \mid x < 54\} = (-\infty, 54) =$ 

121 §1.7

(22) $\frac{5-x}{3} \leq -2$

$5-x \leq -6$

$-x \leq -11$

$x \geq 11$

$\{x \mid x \geq 11\} = [11, \infty)$

What's wrong with this?

(1) $\frac{5-x}{3} \leq -2$

(2) $5-x \leq -6$

FALSE (3) $\frac{-x}{-1} \leq \frac{-11}{-1}$

FALSE (4) $x \geq 11$

What is wrong is that #3 doesn't follow from #2, and #4 doesn't follow from #3! Two lies in a search for truth?!

(23) $\frac{2x-3}{-5} \geq 0$

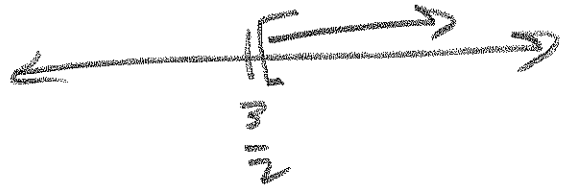
$-5\left(\frac{2x-3}{-5}\right) \leq -5(0)$ optional step.

$2x-3 \leq 0$

$2x \leq 3$

$x \leq \frac{3}{2}$

$\{x \mid x \leq \frac{3}{2}\} = [\frac{3}{2}, \infty) =$



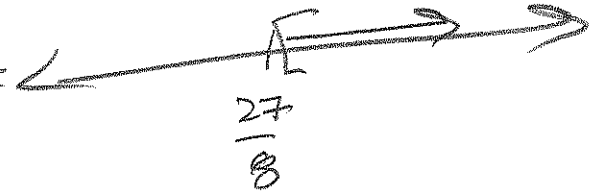
(26) $-5x \leq 3(x-9)$

$-5x \leq 3x-27$

$-8x \leq -27$

$x \geq \frac{-27}{-8} = \frac{27}{8}$

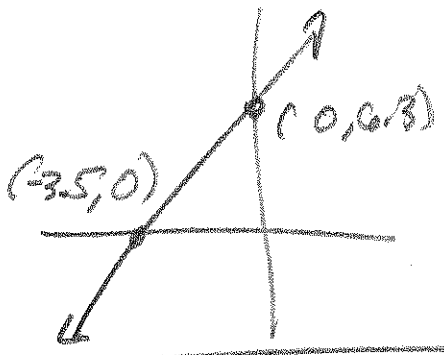
$\{x \mid x \geq \frac{27}{8}\} = [\frac{27}{8}, \infty) =$



121 §1.7

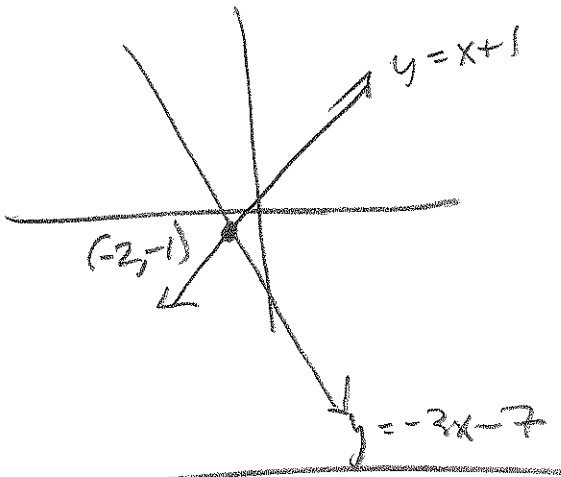
#27-34 Solve each inequality by reading the graph.

(27) $1.8x + 6.3 < 0$



$\{x \mid x < -3.5\} = (-\infty, -3.5)$

(30) $x + 1 > -3x - 7$



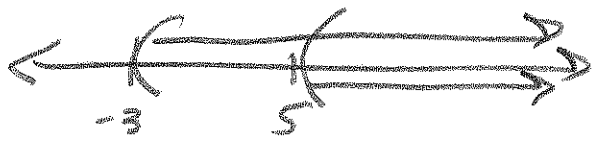
Looking for where $y = x + 1$ is above $y = -3x - 7$

$\{x \mid x > -2\} = (-2, \infty)$

12/5/1.7

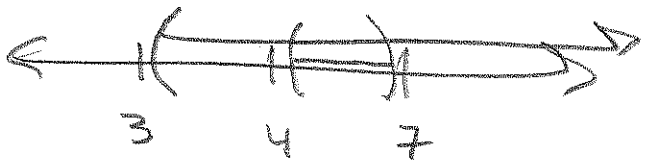
#'s 35-44 Write as a single interval

(35) $(-3,\infty) \cup (5,\infty) = (-3,\infty)$



$\cup$ OR

(38) $(4,7) \cap (3,\infty) = (4,7)$

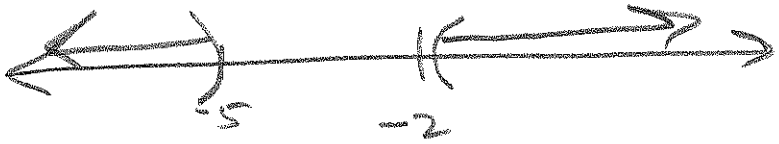


$\cap$ AND

(39) $(-\infty,-2) \cap (-5,\infty) = (-5,-2)$

$\cap$ AND

(41) $(-\infty,-5) \cap (-2,\infty) = \emptyset$



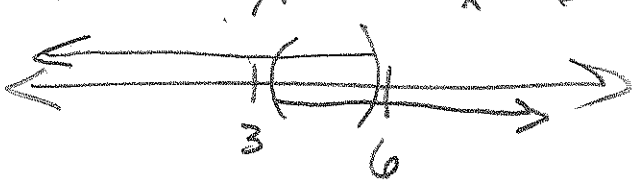
$\cap$ AND No number that's both less than -5 and greater than -2

#'s 45-58 Solve the compound inequalities. Answers in interval notation and graph. INTERVALS REPORT GRAPH TO FIGURE OUT INTERVALS

(45) $5 > 8 - x$ and $1 + 5x < 4$

$-3 > -x$ $\quad -5x < 3$

$3 < x$ AND $x < 6$



$= (3,6)$

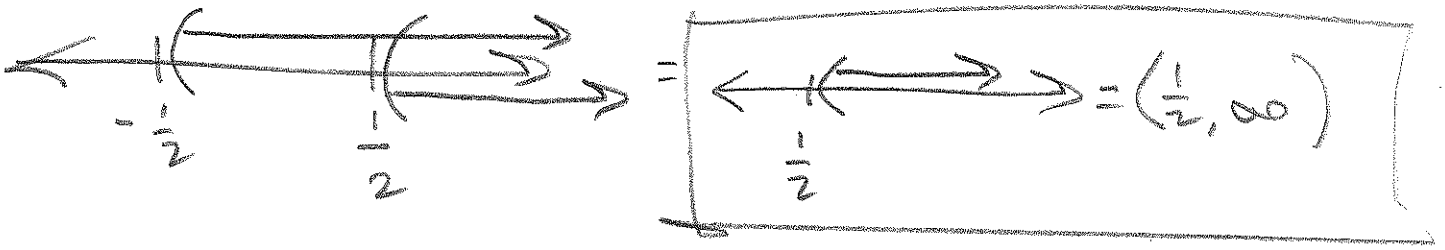
121 §1.7

(47) $\frac{2x-5}{-2} < 2$ and $\frac{2x+1}{3} > 0$

$2x-5 > -4$ $\qquad$ $2x+1 > 0$

$2x > 1$ $\qquad$ $2x > -1$

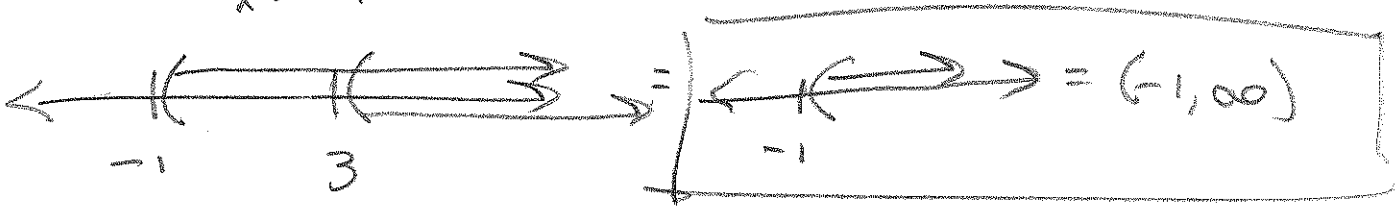
$x > \frac{1}{2}$ AND $x > -\frac{1}{2}$



(50) $5+x > 3-x$ OR $2x-3 > x$

$2x > -2$ $\qquad$ $x > 3$

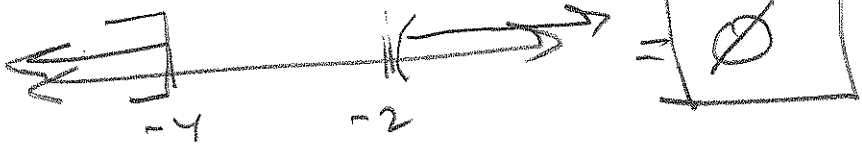
$x > -1$ OR



(53) $1 - \frac{3}{2}x < 4$ and $\frac{1}{4}x - 2 \leq -3$

$-\frac{3}{2}x < 3$ $\qquad$ $\frac{1}{4}x \leq -1$

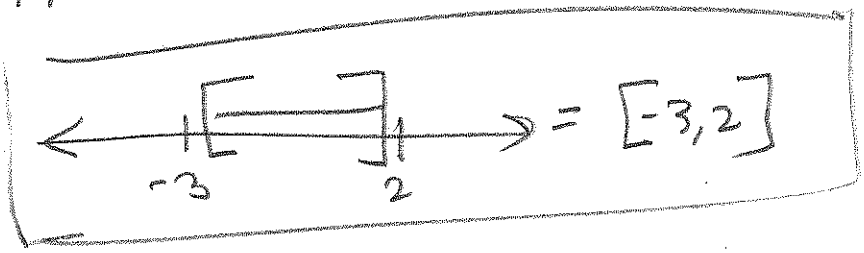
$x > 3\left(-\frac{2}{3}\right) = -2$ AND $\qquad$ $x \leq -1\left(\frac{4}{1}\right) = -4$



(56) $-3 \leq 4x + 9 \leq 17$

$-12 \leq 4x \leq 8$

$-3 \leq x \leq 2$



121 §1.7

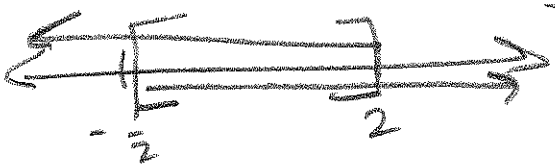
#59-76 Solve each absolute value inequality. Write solution set w/ interval & graph!

(60) $|4x-3| \le 5$

$4x-3 \le 5$ AND $4x-3 \ge -5$

$4x \le 8$ $\quad 4x \ge -2$

$x \le 2$ AND $x \ge -\frac{1}{2}$



$= [-\frac{1}{2}, 2]$

(62) Note $|6-x| = |-1(x-6)| = |-1||x-6| = 1|x-6| = |x-6|$

$|6-x| < 6$

$6-x < 6$ and $6-x > -6$

$-x < 0$ $\quad -x > -12$

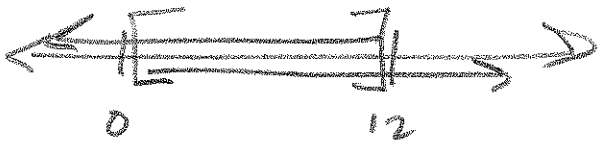
$x > 0$ AND $x < 12$

$|x-6| < 6$

$x-6 < 6$ AND $x-6 > -6$

$x < 12$ AND $x > 0$

See? Same!

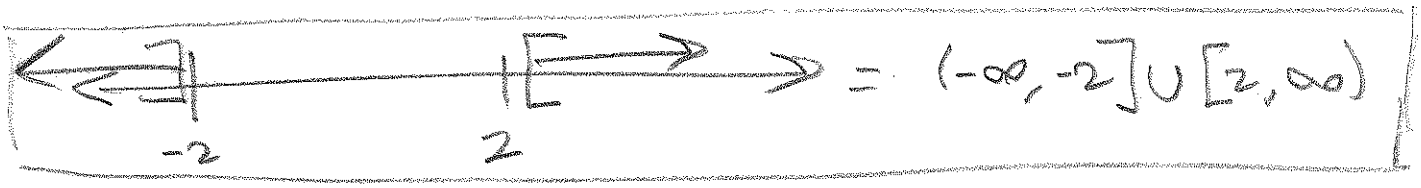


$= [0, 12]$

(63) $|x-1| \ge 1$

$x-1 \ge 1$ OR $x-1 \le -1$

$x \ge 2$ OR $x \le -2$



$= (-\infty, -2] \cup [2, \infty)$

12.1 §1.7

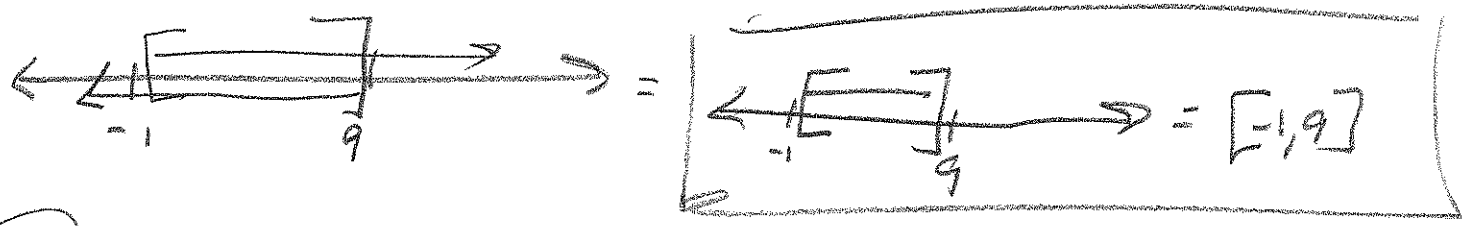
(67) $5 \geq |4-x|$

$|4-x| \leq 5$ like $|ax+b|$ on left

$|x-4| \leq 5$ easier

$x-4 \leq 5$ and $x-4 \geq -5$

$x \leq 9$ and $x \geq -1$



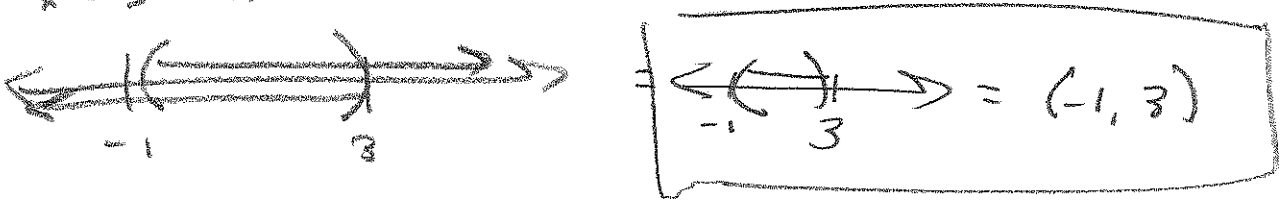
(74) $3|x-1|+2 < 8$

$3|x-1| < 6$

$|x-1| < 2$

$x-1 < 2$ AND $x-1 > -2$

$x < 3$ AND $x > -1$



#s 77-84 Write an inequality of the form

$|x-a| < k$ or $|x-a| > k$

(77) $(-5, 5)$ Mid: $\frac{-5+5}{2} = 0$

$|x-0| < 5$ Radius: $\frac{5-(-5)}{2} = \frac{10}{2} = 5$

or just $\boxed{|x| < 5}$

121 §1.7

(79) $(-\infty, -3) \cup (3, \infty)$

MID: $\frac{-3+3}{2} = 0$

Radius: $\frac{3-(-3)}{2} = \frac{6}{2} = 3$

$|x-0| > 3$ or $\boxed{|x| > 3}$

(81) $(4, 8)$

MID: $\frac{4+8}{2} = 6$

Radius $= \frac{8-4}{2} = 2$

$\boxed{|x-6| < 2}$

(84) $(-\infty, -1) \cup (5, \infty)$

MID: $\frac{5+(-1)}{2} = 2$

Radius: $\frac{5-(-1)}{2} = 3$

$\boxed{|x-2| > 3}$

#s 91-96 For what values of x is each of the following expressions a real number?

(91) $\sqrt{x-2}$

Need $x-2 \geq 0$

$\boxed{\{x \mid x \geq 2\}}$

(93) $\frac{1}{\sqrt{2-x}}$

Need $2-x \geq 0$ and $\sqrt{2-x} \neq 0$ $\Big\}$ $2-x > 0$, $-x > -2$

$\boxed{\{x \mid x < 2\}}$