099 §2.4 #s 1-64 odds

#s 1-64 Solve inequality. Give answer in set-builder and interval notation.

(1) $2x \leq 3$

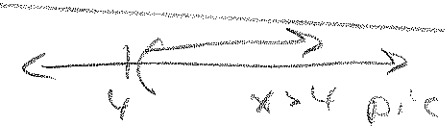
$\{x \mid x \leq \frac{3}{2}\}$

$x \in (-\infty, \frac{3}{2}]$

(3) $\frac{1}{2}x > 2$

$x > \frac{2}{\frac{1}{2}} = 2(\frac{2}{1}) = 4$

$\{x \mid x > 4\} = (4, \infty)$



(5) $-5x \leq 25$

$x \geq \frac{25}{-5}$

$\{x \mid x \geq -5\}$

$= [-5, \infty)$

(7) $-\frac{3}{2}x > -6$

$x < \frac{-6}{-\frac{3}{2}} = (-6)(-\frac{2}{3}) = 4$

$\{x \mid x < 4\} = (-\infty, 4)$

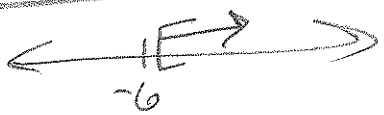
(9) $-12 \leq 2x$ meh

$2x \geq -12$ Ah

$x \geq \frac{-12}{2}$

$\{x \mid x \geq -6\}$

$= [-6, \infty)$



(11) $-1 \geq -\frac{1}{4}x$ meh

$-\frac{1}{4}x \leq -1$ Ah

$x \geq \frac{-1}{\frac{1}{4}} = (-1)(\frac{4}{1}) = 4$

$\{x \mid x \geq 4\} = [4, \infty)$

099 §2.4 #s 13-64

(13) $-3x+1 > 10$

$-3x > 9$

$x < \frac{9}{-3} = -3$

$\{x \mid x < -3\}$

$= (-\infty, -3)$

(15) $\frac{1}{2} - \frac{m}{12} \le \frac{7}{12}$

$\frac{1}{2} \cdot \frac{6}{6} - \frac{m}{12} \le \frac{7}{12}$

$\frac{6-m}{12} \le \frac{7}{12}$

$6 - m \le 7$

$-m \le 1$

$\{m \mid m \ge -1\} = [-1, \infty)$

(17) $\frac{1}{2} \ge -\frac{1}{6} - \frac{2}{9}x$

LCD = 2·3·3

$\frac{1}{2} \cdot \frac{3 \cdot 3}{3 \cdot 3} \ge -\frac{1}{2 \cdot 3} \cdot \frac{3}{3} - \frac{2x}{3 \cdot 3} \cdot \frac{2}{2}$

$\frac{9}{LCD} \ge \frac{-3-4x}{LCD}$

$9 \ge -3 - 4x$ mch

$-3 - 4x \le 9$ Ah

$-4x \le 12$

$x \ge \frac{12}{-4}$

$\{x \mid x \ge -3\}$

$= [-3, \infty)$

$x \ge -3$

pic

(19) $-40 \le 30 - 20y$

$-20y + 30 \ge -40$

$-20y \ge -70$

$y \le \frac{-70}{-20} = 3.5$

$\{y \mid y \le 3.5\}$

$= (-\infty, 3.5]$

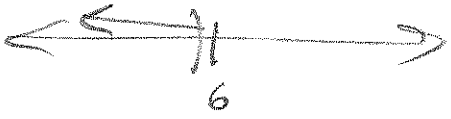
099 § 2.3 #5 21-27 odd

(21) $\frac{2}{3}x - 3 < 1$

$\frac{2}{3}x < 4$

$x < (4)\left(\frac{3}{2}\right) = 6$

$\{x \mid x < 6\} = (-\infty, 6)$

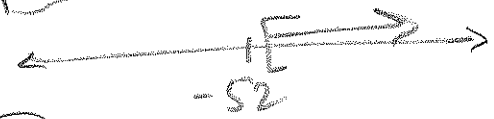


(23) $-\frac{1}{2}y + 10 \leq 36$

$-\frac{1}{2}y \leq 26$

$y \geq \frac{26}{-\frac{1}{2}} = 26\left(-\frac{2}{1}\right) = -52$

$\{y \mid y \geq -52\} = [-52, \infty)$



(25) $4 - \frac{1}{2}x < \frac{2}{3}x - 5$

$-4 - \frac{2}{3}x = -\frac{2}{3}x - 4$

$-\frac{1}{2}x - \frac{2}{3}x < -9$

$-\frac{3x}{6} - \frac{4x}{6} < -9$

$-\frac{7x}{6} < -9$

$x > -9\left(-\frac{6}{7}\right)$

$\{x \mid x > \frac{54}{7}\} = \left(\frac{54}{7}, \infty\right)$

(27) $.03x - .4 \leq .08x + 1.2$

$-.08x + .4 \quad -.08x + .4$

$-.05x \leq 1.6 \quad (\cdot 100)$

$-5x \leq 160$

$x \geq \frac{160}{-5} = -32$

$\{x \mid x \geq -32\} = [-32, \infty)$

099 §2.4 #s29-64

(29) $3 - \frac{x}{5} < 5 - \frac{x}{4}$ LCD $= 4 \cdot 5 = 20$

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

$\frac{60 - 4x}{LCD} < \frac{100 - 5x}{LCD}$

$-4x + 60 < -5x + 100$

$+5x - 60 = +5x - 60$

$\{x \mid x < 40\} = (-\infty, 40)$

(31) $2(3y + 1) \leq -10$

$6y + 2 \leq -10$

$6y \leq -12$

$y \leq \frac{-12}{6} = -2$

$\{y \mid y \leq -2\}$

$= (-\infty, -2]$

(33) $-(a + 1) - 4a \leq 2a - 8$

$-a - 1 - 4a \leq 2a - 8$

$-5a - 1 \leq 2a - 8$

$-2a + 1 = -2a + 1$

$-7a \leq -7$

$a \geq \frac{-7}{-7} = 1$

$\{a \mid a \geq 1\} = [1, \infty)$

099 §2.3 #s 35-64

(35) $\frac{1}{3}t - \frac{1}{2}(5-t) < 0$ LCD = 2.3

$\frac{t}{3}\cdot\frac{2}{2} - \frac{5-t}{2}\cdot\frac{3}{3} < 0$ Get everything over LCD

$\frac{2t-(15-3t)}{LCD} < 0$ Ditch LCD.

$2t-15+3t < 0$

$5t < 15$

$\{t \mid t < 3\} = (-\infty, 3)$

(37) $-2 \leq 5-7(2a+3)$

$-2 \leq 5-14a-21$

$-2 \leq -14a-16$ mek

$-14a-16 \geq -2$ Ah

$-14a \geq 14$

$a \leq \frac{14}{-14}$

$\{a \mid a \leq -1\} = (-\infty, -1]$

°99 §2.4 #s 39–64

3|9
3

(39) $-\frac{1}{3}(x+5) \le -\frac{2}{9}(x-1)$

$\frac{-(x+5)}{3} \cdot \frac{3}{3} \le \frac{-2(x-1)}{3 \cdot 3}$

$-3(x+5) \le -2(x-1)$

$-3x - 15 \le -2x + 2$

$-x \le 17$

$\{x \mid x \ge -17\} = [-17, \infty)$

(41) $5(x-2) - 7(x+1) \le -4x + 3$

$5x - 10 - 7x - 7 \le -4x + 3$

$-2x - 17 \le -4x + 3$

$2x \le 20$

$\{x \mid x \le 10\} = (-\infty, 10]$

(43) $\frac{2}{3}x - \frac{1}{3}(4x-5) < 1$

$\frac{2x - (4x-5)}{3} < \frac{3}{3}$

$2x - 4x + 5 < 3$

$-2x < -2$

$\{x \mid x > 1\} = (1, \infty)$

(45) $20x + 9300 > 18000$

$20x > 8700$

$x > \frac{8700}{20} = 435$

$\{x \mid x > 435\}$
$= (435, \infty)$

099 §2.4 #s 47-64

#s 47-56 are "continued or compound inequalities"

These are "AND" situations

(47) $-2 \le m-5 \le 2$ means

$-2 \le m-5$ AND $m-5 \le 2$!

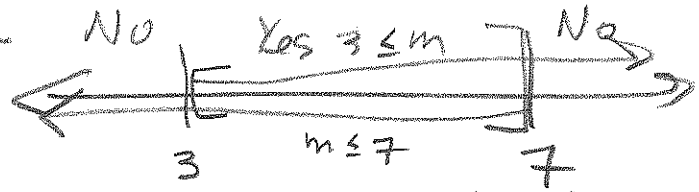
$-2 \le m-5 \le 2$

$+5 = +5 = +5$

$\{m \mid 3 \le m \le 7\}$

$= [3, 7]$

AND



One way to look at them.

(49) $-60 < 20a + 20 < 60$

$-80 < 20a < 40$

$\frac{-80}{20} < a < \frac{40}{20}$

$\{a \mid -4 < a < 2\}$

$= (-4, 2)$

(51) $.5 \le .3a - .7 \le 1.1$

$1.2 \le .3a \le 1.8$

$\frac{1.2}{.3} \le a \le \frac{1.8}{.3}$

$\{a \mid 4 \le a \le 6\}$

$= [4, 6]$

099 §2.4 #s 53-64

(53) $3 < \frac{1}{2}x + 5 < 6$

$-2 < \frac{1}{2}x < 1$

$\{x \mid -4 < x < 2\}$

$= (-4, 2)$

(55) $4 < 6 + \frac{2}{3}x < 8$

$-2 < \frac{2}{3}x < 2$

$(-2)(\frac{3}{2}) < x < 2(\frac{3}{2})$

$\{x \mid -3 < x < 3\}$

$= (-3, 3)$

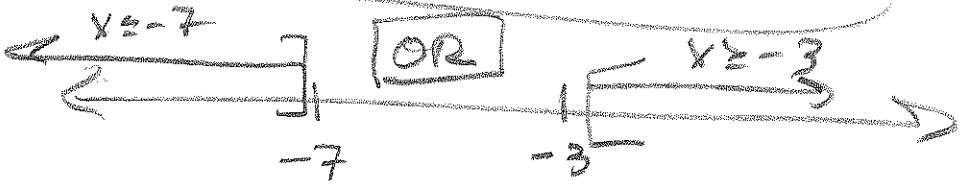
#s 57-64 are all "OR" situations

(57) $x + 5 \leq -2$ OR $x + 5 \geq 2$

$\{x \mid x \leq -7$ OR $x \geq -3\}$

$= (-\infty, -7] \cup [-3, \infty)$

See $|x+5| \geq 2$



(59) $5y + 1 \leq -4$ OR $5y + 1 \geq 4$

$5y \leq -5$ $\quad 5y \geq 3$

$\{y \mid y \leq -1$ OR $y \geq \frac{3}{5}\}$

$= (-\infty, -1] \cup [\frac{3}{5}, \infty)$

See $|5y+1| \geq 4$

099 §2.4 #s 61, 63

(61) $3x-1 > 2x+4$ OR $x-4 > 2x+6$

$x > 5$ OR $-x > 10$

$\{x \mid x > 5 \text{ OR } x < -10\}$

$= (5, \infty) \cup (-\infty, -10)$

(63) $3x+1 < -8$ OR $-2x+1 \leq -3$

$3x < -9$ $-2x \leq -4$

$\{x \mid x < -3$ OR $x \geq 2\}$

$= (-\infty, -3) \cup [2, \infty)$