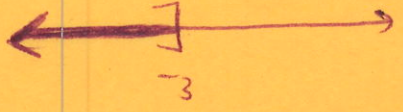
Inequalities Key

a. $x+4 \leq 1$

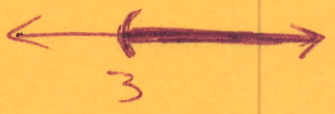
$-4 \quad -4$

$x \leq -3$



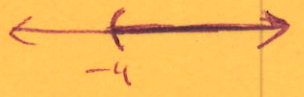
$(-\infty, -3]$

b. $\frac{3x}{3} > \frac{-9}{3} \Rightarrow x > -3$



$(-3, \infty)$

c. $\frac{-5x}{-5} < \frac{20}{-5}$ $\quad x > -4$



$(-4, \infty)$

d. $7x+3 < 9x-3x$

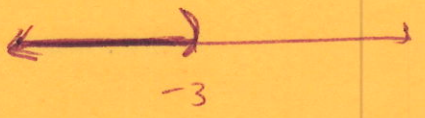
$7x+3 < 6x$

$-6x \quad -6x$

$x+3 < 0$

$-3 \quad -3$

$x < -3$



$(-\infty, -3)$

e. $3x+9 \leq 5(x-1)$

$3x+9 \leq 5x-5$

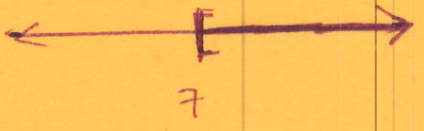
$-9 \quad -9$

$3x \leq 5x-14$

$-5x \quad -5x$

$-2x \leq -14 \Rightarrow x \geq 7$

$\frac{-2x}{-2} \leq \frac{-14}{-2}$



$[7, \infty)$

f. $-7x+4 > 3(4-x)$

$-7x+4 > 12-3x$

$+3x \quad +3x$

$-4x+4 > 12$

$-4 \quad -4$

$-4x > 8$

$\frac{-4x}{-4} > \frac{8}{-4}$

$x < -2$

$(-\infty, -2)$

g. $3(x+2)-6 > -2(x-3)+14$

$3x+6-6 > -2x+6+14$

$3x > -2x+20$

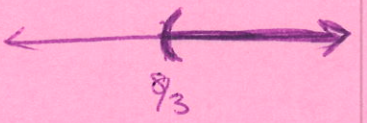
$+2x \quad +2x$

$\frac{5x}{5} > \frac{20}{5} \Rightarrow x > 4$

$(4, \infty)$

h. $\frac{4}{3} \cdot \frac{3}{4} x > \frac{2}{1} \cdot \frac{4}{3}$

$x > \frac{8}{3}$



$(8/3, \infty)$

i. $-2(x-4)-3x \leq -4(x+1)+2x$

$-2x+8-3x \leq -4x-4+2x$

$-5x+8 \leq -2x-4$

$+2x \quad +2x$

$-3x+8 \leq -4$

$-8 \quad -8$

$\frac{-3x}{-3} \leq \frac{-12}{-3}$

$x \geq 4$

$[4, \infty)$

j. $20\left[\frac{1}{4}(x+4) < \frac{1}{5}(2x+3)\right] * 20$

$5(x+4) < 4(2x+3)$

$5x+20 < 8x+12$

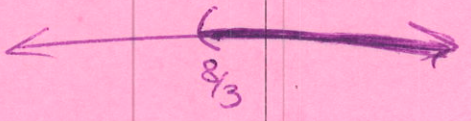
$-5x \quad -5x$

$20 < 3x+12$

$-12 \quad -12$

$\frac{8}{3} < \frac{3x}{3}$

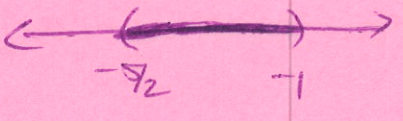
$\Rightarrow x > \frac{8}{3}$



$(8/3, \infty)$

k. $\frac{-5}{2} < \frac{2x}{2} < \frac{-2}{2}$

$-\frac{5}{2} < x < -1$



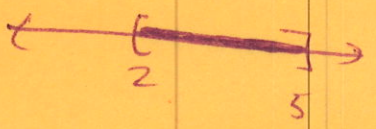
$(-5/2, -1)$

l. $4 \le 5x - 6 \le 19$

$+6 \quad +6 \quad +6$

$\frac{10}{5} \le \frac{5x}{5} \le \frac{25}{5}$

$2 \le x \le 5$



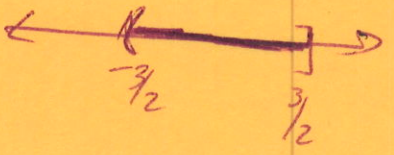
$[2, 5]$

m. $-1 \le 4 + 2x \le 7$

$-4 \quad -4 \quad -4$

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

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



$(-\frac{3}{2}, \frac{3}{2})$

n. $-5 \le 2(x+4) < 8$

$-5 \le 2x + 8 < 8$

$-8 \quad -8 \quad -8$

$\frac{-13}{2} \le \frac{2x}{2} < \frac{0}{2}$

$-\frac{13}{2} \le x < 0$

$[-\frac{13}{2}, 0)$

2. $\left(\frac{146 + 201 + x}{3} \ge 180\right) * 3$

$146 + 201 + x \ge 540$

$347 + x \ge 540$

$-347 \quad -347$

$x \ge 193$

Ben must bowl a 193 or higher to average 180 or better

[redacted]. $\frac{5.3t}{5.3} \ge \frac{200}{5.3}$

$t \ge 37.7358\ldots$

must bake for more than 38 minutes.

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

$+4 \quad +4$

$12 < x < 14$

5. $\left(\frac{73+83+85+2x}{5} \geq 80\right) \cdot 5$

$241 + 2x \geq 400$
$-241 \quad -241$

$\frac{2x}{2} \geq \frac{159}{2}$

$x \geq 79.5$

Eric needs to score 79.5% or higher on the final to ensure a grade of B or better.

$\left(\frac{73+83+85+2x}{5} \geq 90\right) \cdot 5$

$241 + 2x \geq 450$
$-241 \quad -241$

$\frac{2x}{2} \geq \frac{209}{2}$

$x \geq 104.5$

Unless there is extra credit available, Eric cannot get an A.

6. It's pretty much the same except when multiplying or dividing by a negative. In this case you have to flip the direction of the inequality.

Writing the solution is also different. Linear equations have only 3 possible cases: ① one solution; ② all solutions, ③ no solution. There are many more ways to write inequalities all these options are available and more.