

Algebra 2.6 Inequalities

Write the following in interval notation

① $x > 5$ $(5, \infty)$ ② $4 < x$ $(4, \infty)$ same as $x > 4$

③ $x \leq 3$ $(-\infty, 3]$ ④ $5 \geq x > -1$ $(-1, 5]$

⑤ $0 < x \leq 7$ $(0, 7]$

Write the following as an equality

① $[-1, \infty)$ $x \geq -1$ ② $(-\infty, 0)$ $x < 0$

③ $(5, 7)$ $5 < x < 7$ ④ $[-1, 8)$ $-1 \leq x < 8$

Solve $-5x + 2 \leq -3x + 8$

$$-2x \leq 6$$

$$x \geq -3 \quad [-3, \infty)$$

// when dividing by a neg. #, switch signs

Solve $-9 \leq \frac{1}{2}x - 3 < 5$

$$-6 \leq \frac{1}{2}x < 8$$

$$-12 \leq x < 16 \quad [-12, 16)$$

Solve $\frac{x}{x-3} > 0$ when is it positive?

$$\downarrow$$
$$x - 3 > 0$$

$$x > 3 \quad (3, \infty)$$

Solve $\frac{2}{5-x} < 0$ when is it negative

$$\downarrow$$
$$5 - x < 0$$

$$-x < -5 \quad x > 5 \quad (5, \infty)$$

Solve $\frac{5}{2x+7} > 0$ denominator must be negative to make answer positive

$$\downarrow$$
$$2x + 7 < 0$$

$$x < -\frac{7}{2} \quad (-\infty, -\frac{7}{2})$$

Algebra 2.6 Inequalities cont.

Absolute Values in Inequalities

General Rules

$$|x| < a \text{ then } -a < x < a$$

$$|x| > a \text{ then } x < -a \text{ or } x > a$$

$$\text{solve } |x| \geq 5 \quad x \leq -5 \quad x \geq 5 \quad (-\infty, -5] \cup [5, \infty)$$

$$\text{solve } |x| < 12 \quad -12 < x < 12 \quad (-12, 12)$$

$$\text{solve } |x| < -3 \quad \text{no solution } \emptyset$$

$$\text{solve } |x| > -4 \quad (-\infty, \infty)$$

$$\text{solve } |6x-1| \leq 8$$

$$-8 \leq 6x-1 \leq 8$$

$$-\frac{7}{6} \leq x \leq \frac{9}{6} \quad \left(-\frac{7}{6}, \frac{3}{2}\right)$$

$$\text{solve } \left|\frac{4x-9}{2}\right| \geq 11$$

$$\frac{4x-9}{2} \leq -11$$

$$\frac{4x-9}{2} \geq 11$$

$$-\frac{13}{4} \geq x \geq \frac{31}{4}$$

$$(-\infty, -\frac{13}{4}] \cup [\frac{31}{4}, \infty)$$

$$4x-9 \leq -22$$

$$4x-9 \geq 22$$

$$x \leq -\frac{13}{4}$$

$$x \geq \frac{31}{4}$$

$$\text{solve } 1 < |x| < 5 \quad \text{abs value wedged between 2 #'s} \quad \left(\leftarrow \bullet \bullet \rightarrow\right)$$

$$|x| > 1 \quad |x| < 5 \quad (-5, -1) \cup (1, 5)$$

$$\text{solve } -2 \leq |x| \leq 4 \quad \text{same as } 0 \leq |x| \leq 4 \quad \left(\leftarrow \bullet \bullet \rightarrow\right)$$

$$[-4, 4]$$

$$\text{solve } 3 < |x| \leq 7 \quad \left(\leftarrow \bullet \bullet \rightarrow\right)$$

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

solve $C = \frac{5}{9}(F-32)$ What values of F correspond to the values of C , such that $30 \leq C \leq 40$?

$$30 \leq \frac{5}{9}(F-32) \leq 40$$

$$\left(\frac{9}{5}\right) 30 \leq \frac{9}{5} \left(\frac{5}{9}(F-32)\right) \leq 40 \left(\frac{9}{5}\right)$$

$$54 \leq F-32 \leq 72$$

$$86 \leq F \leq 104 \quad [86, 104]$$