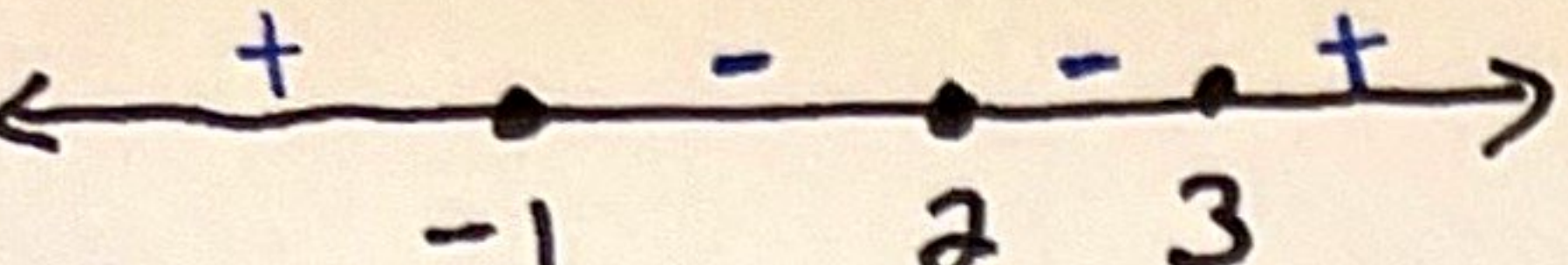
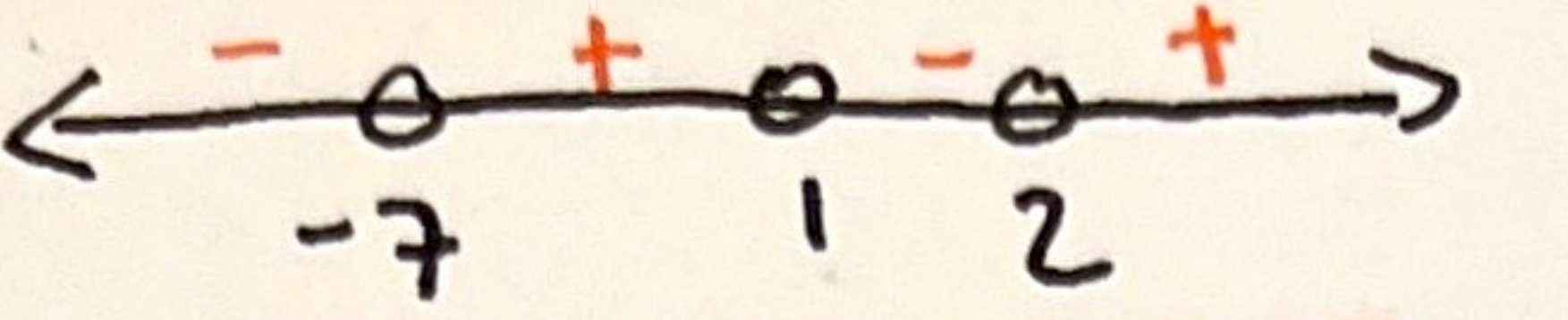


Inequalities Problem Set

1) 
 $\therefore [-1, 3]$

2) $\frac{(x-1)(x^2+x+1)}{(x+7)(x-2)} > 0$

 $\therefore (-7, 1) \cup (2, \infty)$

3) $\frac{2x-9}{x+1} = 8$ or $\frac{2x-9}{x+1} = -8$
 $\Rightarrow 2x-9 = 8x+8$ or $2x-9 = -8x-8$
 $\therefore x = -\frac{17}{6}, \frac{1}{10}$

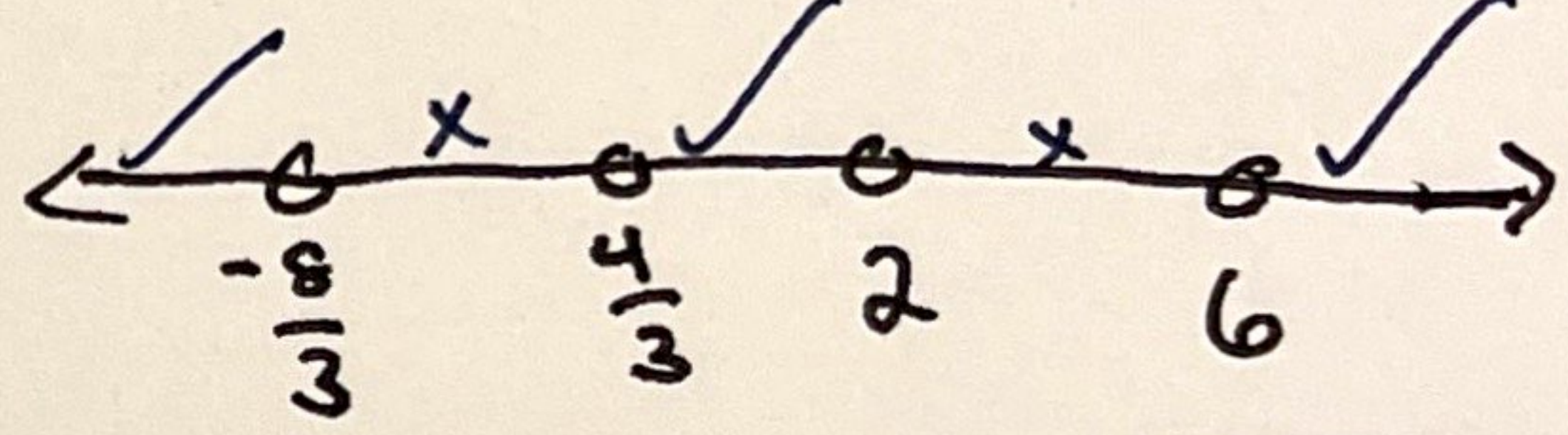
4) $|x|^2 - 5|x| - 14 = 0$
 $\Rightarrow (|x|-7)(|x|+2) = 0$
 $\Rightarrow |x| = 7, |x| = -2$
 $\therefore x = \pm 7$

5) $x^2 - 3x - 7 = 3$ or $x^2 - 3x - 7 = -3$
 $\Rightarrow x^2 - 3x - 10 = 0$ or $x^2 - 3x - 4 = 0$
 $\therefore x = 5, -2, 4, -1$

6) $7|x+4| - 5 \leq 30$
 $\Rightarrow |x+4| \leq \frac{30+5}{7} = 5$
 $\Rightarrow -5 \leq x+4 \leq 5$
 $\therefore [-9, 1]$

7) $6 - |x+3| - |x-2| < 0$
 $x < -3$: $6 - (-3-x) - (2-x) < 0$
 $\Rightarrow 2x+7 < 0$
 $\Rightarrow x < -\frac{7}{2}$
 $-3 \leq x < 2$: $6 - (x+3) - (2-x) < 0$
 $\Rightarrow 1 < 0$ (no solution)
 $x \geq 2$: $6 - (x+3) - (x-2) < 0$
 $\Rightarrow -2x+5 < 0$
 $\Rightarrow x > \frac{5}{2}$
 $\therefore (-\infty, -\frac{7}{2}) \cup (\frac{5}{2}, \infty)$

8) $|3x+4| - |x-3| \geq 5$
 $x < -\frac{4}{3}$: $-3x-4 - (3-x) \geq 5$
 $\Rightarrow -2x-7 \geq 5$
 $\Rightarrow x \leq -6$
 $-\frac{4}{3} \leq x < 3$: $3x+4 - (3-x) \geq 5$
 $\Rightarrow 4x+1 \geq 5$
 $\Rightarrow x \geq 1$
 $x \geq 3$: $3x+4 - (x-3) \geq 5$
 $\Rightarrow 2x+7 \geq 5$
 $\Rightarrow x \geq -1$
 $\therefore (-\infty, -6] \cup [1, \infty)$

9) $|13x-5| - 7 = 6$
 $\Rightarrow |13x-5| = 13$ or $|13x-5| = -1$
 $\Rightarrow 13x-5 = 13$ or $13x-5 = -1$
 $\Rightarrow x = 6, -\frac{8}{13}, \frac{4}{13}, 2$

 $\therefore (-\infty, -\frac{8}{13}) \cup (\frac{4}{13}, 2) \cup (6, \infty)$

10) $|x+1| \geq x^2 - 4x - 5$
 $\Rightarrow x+1 \geq x^2 - 4x - 5$ or $x+1 \leq -x^2 + 4x + 5$
 $\Rightarrow x^2 - 5x - 6 \leq 0$ or $x^2 - 3x - 4 \leq 0$
 $\Rightarrow (x-6)(x+1) \leq 0$ or $(x-4)(x+1) \leq 0$
 $\Rightarrow x \in [-1, 6]$ or $x \in [-1, 4]$
 $\therefore x \in [-1, 6]$

Graph:

