

1. Find all numbers  $x$  satisfying the given inequality:

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

Case I:  $x \geq 3$ .

$$\frac{2x+1}{x-3} < 4 \implies 2x+1 < 4(x-3) \implies \frac{13}{2} < x$$

$x \geq 3$  and  $\frac{13}{2} < x$  is the same as  $\frac{13}{2} < x$ .

Case II:  $x < 3$ .

$$\frac{2x+1}{x-3} < 4 \implies 2x+1 > 4(x-3) \implies \frac{13}{2} > x$$

$x < 3$  and  $\frac{13}{2} > x$  is the same as  $x < 3$ .

$$(-\infty, 3) \cup (\frac{13}{2}, \infty)$$

2. Find all numbers  $x$  satisfying the given equation:

$$|x+1| + |x-2| = 7$$

Case I:  $x < -1$ .

$$|x+1| + |x-2| = 7 \implies -(x+1) - (x-2) = 7 \implies x = -3$$

Check:  $x = -3 < -1$ .

Case II:  $-1 \leq x < 2$ .

$$|x+1| + |x-2| = 7 \implies x+1 - (x-2) = 7 \implies 3 = 7. No solution.$$

Case III:  $2 \leq x$ .

$$|x+1| + |x-2| = 7 \implies x+1 + x-2 = 7 \implies x = 4$$

Check:  $2 \leq 4 = x$ .

$$x = -3 \text{ or } x = 4$$