

GDB No.1 (Solution)

Question:

Solve the inequality $|7x - 9| \geq x + 3$

Solution: Given $|7x - 9| \geq x + 3$

$$\pm(7x - 9) \geq x + 3$$

$$(7x - 9) \geq x + 3 \quad , \quad -(7x - 9) \geq x + 3$$

$$7x - 9 \geq x + 3 \quad , \quad 7x - 9 \leq -(x + 3)$$

$$7x - x \geq 3 + 9 \quad , \quad 7x - 9 \leq -x - 3$$

$$6x \geq 12 \quad , \quad 7x + x \leq -3 + 9$$

$$x \geq \frac{12}{6} \quad , \quad 8x \leq 6$$

$$x \geq 2 \quad , \quad x \leq \frac{6}{8}$$

$$x \geq 2 \quad , \quad x \leq \frac{3}{4}$$

$$\Rightarrow x \in [2, +\infty) \quad , \quad x \in (-\infty, \frac{3}{4}]$$

The solution is $(-\infty, \frac{3}{4}] \cup [2, +\infty)$ The solution ends here.

In case of equality the question becomes like this:

Given $|7x - 9| = x + 3$

$$\pm(7x - 9) = x + 3$$

$$(7x - 9) = \pm(x + 3)$$

$$(7x - 9) = (x + 3) \quad , \quad (7x - 9) = -(x + 3)$$

$$7x - x = 3 + 9 \quad , \quad 7x - 9 = -x - 3$$

$$6x = 12 \quad , \quad 7x + x = -3 + 9$$

$$x = \frac{12}{6} \quad , \quad 8x = 6$$

$$x = 2 \quad , \quad x = \frac{6}{8} = \frac{3}{4}$$

The solution is $\{2, \frac{3}{4}\}$