Exercise 8

Describe the situation in which the distance that point x is from 10 is at least 15 units. Express this using absolute value notation.

[TYPO: Rewrite the first sentence as follows: "Describe all numbers x in which the distance from 10 to x is at least 15 units."]

Solution

The distance from 10 to x, represented by $|x-10|$, must be at least 15.

$$|x-10| \geq 15$$

Remove the absolute value sign by breaking up the inequality into two; using the logical operators, "and" or "or," if you have $<$ or $>$, respectively; and solving for x.

$$|x-10| \geq 15$$

$$x-10 \geq 15 \quad \text{or} \quad x-10 \leq -15$$

$$x \geq 15+10 \quad \text{or} \quad x \leq -15+10$$

Therefore,

$$x \geq 25 \quad \text{or} \quad x \leq -5.$$