Exercise 6

Describe all numbers x that are at a distance of 4 from the number 8. Express this using absolute value notation.

Solution

The distance from x to 8, represented by $|x - 8|$, must be equal to 4.

$$|x - 4| = 8$$

Remove the absolute value sign by placing $\pm$ on the right side.

$$x - 4 = \pm 8$$

$$x - 4 = 8 \quad \text{or} \quad x - 4 = -8$$

Add 4 to both sides of each equation.

$$x = 12 \quad \text{or} \quad x = -4$$

Therefore, $x = \{-4, 12\}$.