

Exercise 9

Find all function values $f(x)$ such that the distance from $f(x)$ to the value 8 is less than 0.03 units. Express this using absolute value notation.

Solution

The distance from $f(x)$ to 8, represented by $|f(x) - 8|$, must be less than 0.03.

$$|f(x) - 8| < 0.03$$

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 $f(x)$.

$$f(x) - 8 < 0.03 \quad \text{and} \quad f(x) - 8 > -0.03$$

$$-0.03 < f(x) - 8 < 0.03$$

$$-0.03 + 8 < f(x) < 0.03 + 8$$

Therefore,

$$7.97 < f(x) < 8.03.$$