

Problem 12

If $\mathbb{R}_f = [-2, 3) \cup (3, 5)$

What is the range of $-2f\left(\frac{1}{3}x + 5\right) + 1$?

Answer

$$\boxed{(-9, -5) \cup (-5, 5]}$$

Explanation

The range is unaffected by transformations to the argument of f . Thus, we only need to look at $-2f(x) + 1$.

Since multiplying the function by -2 would multiply all of the y-values in the range by -2 ; and then adding 1 to the function results in adding 1 to the y-values in the range, we get:

$$[-2, 3) \cup (3, 5) \rightarrow (-10, -6) \cup (-6, 4] \rightarrow (-9, -5) \cup (-5, 5]$$