Exercise 18

For the following exercises, use function composition to verify that $f(x)$ and $g(x)$ are inverse functions.

$$f(x) = -3x + 5 \text{ and } g(x) = \frac{x-5}{-3}$$

Solution

To evaluate $f(g(x))$, plug the formula for $g(x)$ where x is in the formula for $f(x)$.

$$f(g(x)) = -3\frac{x-5}{-3} + 5$$

$$= (x-5) + 5$$

$$= x$$

To evaluate $g(f(x))$, plug the formula for $f(x)$ where x is in the formula for $g(x)$.

$$g(f(x)) = \frac{(-3x+5) - 5}{-3}$$

$$= \frac{-3x}{-3}$$

$$= x$$

Therefore, $f(x)$ and $g(x)$ are inverse functions.