

6.2 Practice Problems

1. Find $f \circ g$ and $g \circ f$ determine whether each pair of functions f and g are inverses of each other. $f(x) = 3x + 4$ and $g(x) = \frac{x-4}{3}$

$$\begin{aligned} (f \circ g)(x) &= f(g(x)) = 3\left(\frac{x-4}{3}\right) + 4 & (g \circ f)(x) &= \frac{3x+4-4}{3} \\ &= x - 4 + 4 & &= \frac{3x}{3} \\ &= x & &= x \end{aligned}$$

$$\begin{aligned} (f \circ g)(x) &= (g \circ f)(x) \\ &= x \end{aligned}$$

f, g are inverses to each other

The following functions are one-to-one. For each function **a.** Find an equation for $f^{-1}(x)$, the inverse function. **b.** Verify that your equation is correct by graphing the two functions in the same window. Use these directions for problems 2-4.

2. ~~$f(x) = 3x + 4$~~ $f(x) = 7x - 5$

$$y = 7x - 5$$

$$x = 7y - 5$$

$$+5 \quad +5$$

$$\frac{x+5}{7} = \frac{7y}{7}$$

$$\frac{x+5}{7} = y$$

$$f^{-1}(x) = \frac{x+5}{7}$$

3. $f(x) = x^3 - 5$

$$y = x^3 - 5$$

$$x = y^3 - 5$$

$$+5 \quad +5$$

$$x + 5 = y^3$$

$$\sqrt[3]{x+5} = \sqrt[3]{y^3}$$

$$\sqrt[3]{x+5} = y$$

$$f^{-1}(x) = \sqrt[3]{x+5}$$

4. $f(x) = \frac{3x+1}{x-7}$

$y = \frac{3x+1}{x-7}$

$x = \frac{3y+1}{y-7}$

$x(y-7) = 3y+1$

$xy - 7x = 3y + 1$

$xy - 3y = 7x + 1$

$\frac{y(x-3)}{x-3} = \frac{7x+1}{x-3}$

$y = \frac{7x+1}{x-3}$

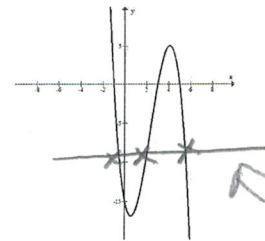
$f^{-1}(x) = \frac{7x+1}{x-3}$

5. If the range of f is $[-4, \infty)$ then the domain of f^{-1} is $[-4, \infty)$.

6. Determine if the function is a one-to-one function. $\{(2,3), (1,0), (7,3), (-9,4)\}$ **NO**

7. Determine if the graph of the function is a one-to-one function.

NO
fails horizontal
line test



8. Use the graph to answer the questions.

a. $g^{-1}(2) = 3$

b. $f^{-1}(2) = 1$

c. $g(2) = 0$

d. $f(4) = -1$

