



## Inverse of a One-to-One Function

### • Example 1

Find the inverse  $g^{-1}$  of the function

$$g(x) = \frac{-5x - 8}{-7x - 1}$$

defined for every real number  $x$  such that  $-7x - 1 \neq 0$ .

If  $g^{-1}$  is the inverse of the function  $g$ , we must have, for any pair of numbers  $x$  and  $y$ ,

$$g(x) = y \text{ if and only if } g^{-1}(y) = x.$$

Thus, to find the inverse  $g^{-1}$ , we write

$$g(x) = \frac{-5x - 8}{-7x - 1} = y$$

and solve for  $x$ .

Multiplying both sides of the last equation by  $-7x - 1$ , we obtain

$$-5x - 8 = y(-7x - 1).$$

Gathering the terms in  $x$  gives

$$(7y - 5)x = -y + 8,$$

and thus finally, for any  $y$  such that  $7y - 5 \neq 0$

$$x = g^{-1}(y) = \frac{-y + 8}{7y - 5}$$

### • • • CHECK YOURSELF 1

Find the inverse  $f^{-1}$  of the function.

$$f(x) = 2x - 2$$

---

### • • • CHECK YOURSELF ANSWER

1.  $f^{-1}(x) = \frac{1}{2}x + 1.$

---

# 4.17 Exercises

Name \_\_\_\_\_

Section \_\_\_\_\_

Date \_\_\_\_\_

## A N S W E R S

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

5. \_\_\_\_\_

6. \_\_\_\_\_

If  $h(x) = 2x + 8$ , find each of the following

1.  $h(4)$

2.  $h^{-1}(4)$

3.  $h(h^{-1}(4))$

4.  $h^{-1}(h(4))$

5.  $h(h^{-1}(x))$

6.  $h^{-1}(h(x))$