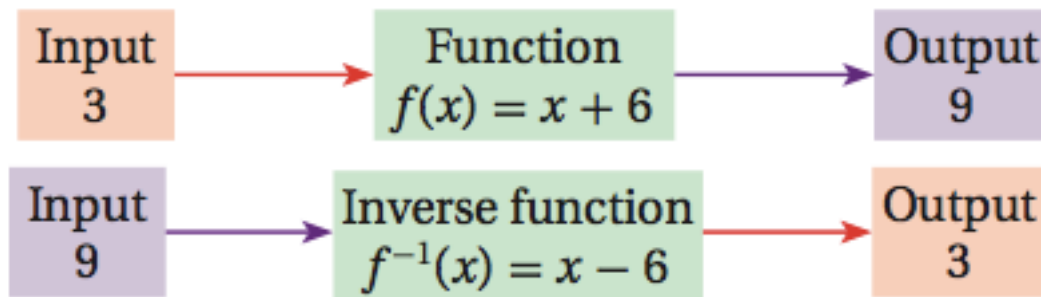


# Inverse Functions

## 7.2

Functions that undo each other are inverse functions.



To find the inverse function, swap the  $x$  and  $y$  and solve for  $y$ .

I do:

Find the inverse function of

$$y = 2x + 3$$

Original Function	$y = 2x + 3$
Swap "x" and "y"	$x = 2y + 3$
Solve for y	$\begin{aligned} x - 3 &= 2y \\ \frac{x - 3}{2} &= y \end{aligned}$

We Do:

Find the inverse function of

$$y = \frac{1}{3}x - 10$$

Original Function	$y = \frac{1}{3}x - 10$
Swap "x" and "y"	
Solve for y	

Find the inverse function of

$$y = \frac{x - 3}{2}$$

Original Function	
Swap "x" and "y"	
Solve for y	

You Try:

Odd Talk, Even Write

On your Whiteboards with your partner

1) Find the inverse function of

$$y = \frac{2x - 3}{4}$$

2) Find the inverse function of

$$y = 4(x + 1)$$

Given the line  $y=2x$ , discuss with your partner  
how the inverse graph would look like?

To graph the inverse of a line, reflect it across  $y=x$ .

### **Retailing Application**

A clerk needs to price a digital camera returned by a customer. The customer paid a total of \$103.14, which included a gift-wrapping charge of \$3 and 8% sales tax. What price should the clerk mark on the tag?

**Step 1** Write an equation for the total cost as a function of price.

$$c = 1.08(p + 3) \quad \text{Cost } c \text{ is a function of price } p.$$

**Step 2** Find the inverse function that models price as a function of cost.

$$c = 1.08(p + 3)$$

$$c = 1.08p + 3.24 \quad \text{Distribute.}$$

$$c - 3.24 = 1.08p \quad \text{Subtract 3.24 from both sides.}$$

$$\frac{c - 3.24}{1.08} = p \quad \text{Divide to isolate } p.$$

**Step 3** Evaluate the inverse function for  $c = \$103.14$ .

$$p = \frac{103.14 - 3.24}{1.08} = 92.50$$

The clerk should mark the tag as \$92.50.

**Check**  $c = 1.08(92.50 + 3)$  *Substitute.*

$$= 1.08(95.50)$$

$$= 103.14 \checkmark$$