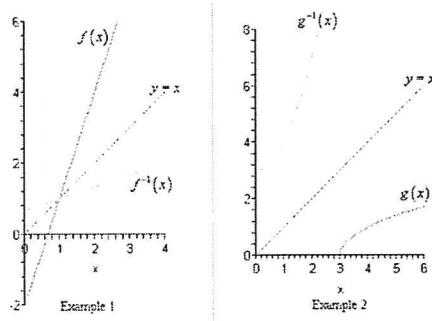


## Inverse Functions

There are a few different ways we can find the inverses of functions.

### 1. Graphically

The inverse of a function is found in a graph by reflecting the function over the line  $y=x$ .



Notice in each example how the original function is reflected over the line  $y=x$ .

### 2. Table of Values

To find the inverse function if you're given a table, all you have to do is switch the x and y coordinates.

Example:

| Original |   | Inverse |   |
|----------|---|---------|---|
| x        | y | x       | y |
| 0        | 3 | 3       | 0 |
| 1        | 5 | 5       | 1 |
| 2        | 7 | 7       | 2 |

Your Turn:

| Original |    | Inverse |    |
|----------|----|---------|----|
| x        | y  | x       | y  |
| -1       | -2 | -2      | -1 |
| 0        | 0  | 0       | 0  |
| 1        | 2  | 2       | 1  |

### 3. Equation

To find the inverse of an equation you first switch the x and y variables. Then solve the new equation for y. Show your work below.

Example:  $y = 2x + 3$

Switch the variables x and y and then solve for y. Show your work below.

$$x = 2y + 3$$

$$x - 3 = 2y$$

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

Do Homework: WS + pg 501 #2-17

**LESSON  
7-2****Practice B****Inverses of Relations and Functions****Use inverse operations to write the inverse of each function.**

1.  $f(x) = 15x - 10$

$$\begin{aligned} x &= 15y - 10 \\ y &= \frac{x+10}{15} \end{aligned}$$

2.  $f(x) = 10 - 4x$

$$\begin{aligned} x &= 10 - 4y \\ y &= \frac{-x+10}{4} \end{aligned}$$

3.  $f(x) = 12 - 9x$

$$\begin{aligned} x &= 12 - 9y \\ y &= \frac{-x+12}{9} \end{aligned}$$

4.  $f(x) = 5x + 2$

$$\begin{aligned} x &= 5y - 2 \\ y &= \frac{x+2}{5} \end{aligned}$$

5.  $f(x) = x + 6$

$$\begin{aligned} x &= y + 6 \\ y &= x - 6 \end{aligned}$$

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

$$\begin{aligned} x &= y + \frac{1}{2} \\ y &= x - \frac{1}{2} \end{aligned}$$

7.  $f(x) = -\frac{x}{12}$

$$\begin{aligned} x &= -12y \\ y &= -\frac{x}{12} \end{aligned}$$

8.  $f(x) = \frac{x-12}{4}$

$$\begin{aligned} x &= y + 12 \\ y &= \frac{4x+12}{4} \end{aligned}$$

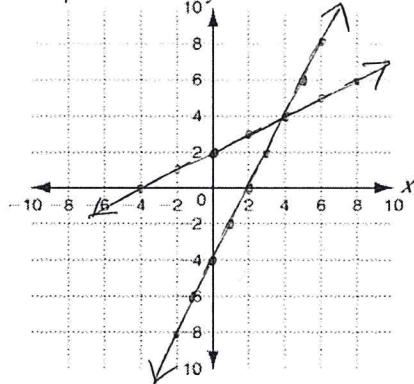
9.  $f(x) = \frac{3x+1}{6}$

$$\begin{aligned} x &= \frac{3y+1}{6} \\ y &= \frac{6x+1}{3} \end{aligned}$$

**Graph each function. Then write and graph its inverse.**

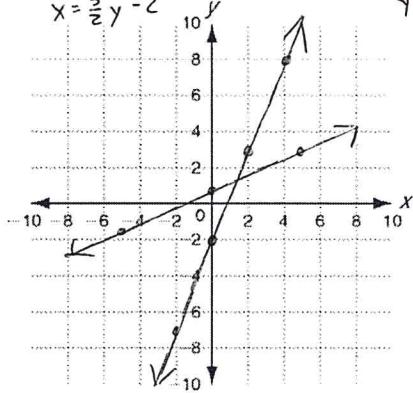
10.  $f(x) = 2x - 4$

$$y = \frac{x+4}{2}$$



11.  $f(x) = \frac{5}{2}x - 2$

$$y = \frac{2}{5}(x+2)$$

**Solve.**

12. Dan works at a hardware store. The employee discount is determined by the formula  $d = 0.15(c - 10)$ . Use the inverse of this function to find the cost of the item for which Dan received an \$18.00 discount.

$$c = 0.15(d - 10)$$

$$\frac{c}{0.15} = d - 10$$

- a. Find the inverse function that models cost as a function of the discount.  
 $c = 18$   
b. Evaluate the inverse function for  $\frac{18}{0.15}$ .  
c. What was Dan's final cost for this item?

$$d = \frac{c}{0.15} + 10$$

$$\$ 130$$

$$\$ 112$$

# Mr. Ward Answer Key

pg 501

2. See Graph

3. See Graph

4.  $y = x + 3$

$$x = y + 3$$

$$\boxed{y = x - 3}$$

5.  $y = 4x$

$$x = 4y$$

$$\boxed{y = \frac{x}{4}}$$

6.  $y = \frac{x}{2}$

$$x = y/2$$

$$\boxed{y = 2x}$$

7.  $y = x - 2\frac{1}{2}$

$$x = y - 2\frac{1}{2}$$

$$\boxed{y = x + 2\frac{1}{2}}$$

8.  $y = 5x - 1$

$$x = 5y - 1$$

$$x + 1 = 5y$$

$$\boxed{y = \frac{x+1}{5}}$$

9.  $y = \frac{x}{2} + 3$

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

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

$$\boxed{y = 2x - 6}$$

10.  $y = 3 - \frac{1}{2}x$

$$x = 3 - \frac{1}{2}y$$

$$x - 3 = -\frac{1}{2}y$$

$$\boxed{y = -2x + 6}$$

11.  $y = \frac{1}{2}(3 - 3x)$

$$x = \frac{1}{2}(3 - 3y)$$

$$2x = 3 - 3y$$

$$2x - 3 = -3y$$

$$\boxed{y = -\frac{2}{3}x + 1}$$

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

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

$$\frac{1}{4}x = y + 1$$

$$\boxed{y = \frac{1}{4}x - 1}$$

13.  $y = \frac{3x-5}{2}$

$$x = \frac{3y-5}{2}$$

$$2x = 3y - 5$$

$$2x + 5 = 3y$$

$$\boxed{y = \frac{2}{3}x + \frac{5}{3}}$$

14. See Graph

$$y = 5 - 2x$$

$$x = 5 - 2y$$

$$x - 5 = -2y$$

$$\boxed{y = -\frac{1}{2}x + \frac{5}{2}}$$

See Graph

15. See Graph

$$y = \frac{y}{4} + 2$$

$$x = \frac{y}{4} + 2$$

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

$$\boxed{y = 4x - 8}$$

See Graph

16. See Graph

$$y = 10 + 0.6x$$

$$x = 10 + 0.6y$$

$$x - 10 = 0.6y$$

$$\boxed{y = \frac{x-10}{0.6}}$$

See Graph

17.  $C = \frac{5}{9}(F - 32)$

$$\frac{9}{5}C = F - 32$$

$$\boxed{F = \frac{9}{5}C + 32}$$

$$F = \frac{9}{5}(16) + 32$$

$$\boxed{F = 61^\circ}$$