

Key

# 4-7 Day 2 Practice & Extend

Find the inverse of each relation. State the domain and range of each.

1. Relation Inverse

x	y
-4	-2
-2	-1
0	1
2	0
4	2

x	y
-2	-4
-1	-2
1	0
0	2
2	4

2.

Relation Inverse

x	y
1	8
2	6
3	4
4	2
5	0

x	y
8	1
6	2
4	3
2	4
0	5

Relation

Domain:  $\{-4, -2, 0, 2, 4\}$

Range:  $\{-2, -1, 1, 0, 2\}$

Inverse

D:  $\{-2, -1, 1, 0, 2\}$

R:  $\{-4, -2, 0, 2, 4\}$

← they switch b/c we switch the x & y terms!

Find the inverse of each function.

3.  $f(x) = 8x - 5$

$$x = 8y - 5$$

$$\frac{x+5}{8} = \frac{8y}{8}$$

4.  $f(x) = 6(x+7)$

$$x = 6(y+7)$$

$$x = 6y + 42$$

$$\frac{x-42}{6} = \frac{6y}{6}$$

5.  $f(x) = \frac{3}{4}x + 9$

$$x = \frac{3}{4}y + 9$$

$$\frac{4}{3}(x-9) = \left(\frac{3}{4}y\right)\left(\frac{4}{3}\right)$$

$$4x - 12 = y$$

$$f^{-1}(x) = \frac{1}{8}x + \frac{5}{8}$$

$$f^{-1}(x) = \frac{1}{6}x - 7$$

$$f^{-1}(x) = 4x - 12$$

6.  $f(x) = -16 + \frac{2}{5}x$

$$x = -16 + \frac{2}{5}y$$

$$\frac{5}{2}(x+16) = \left(\frac{2}{5}y\right)\frac{5}{2}$$

$$\frac{5}{2}x + 40 = y$$

$$f^{-1}(x) = \frac{5}{2}x + 40$$

7.  $f(x) = \frac{3x+5}{4}$

$$4(x) = \frac{3y+5}{4} \cdot 4$$

$$4x = 3y + 5$$

$$\frac{4x-5}{3} = \frac{3y}{3}$$

$$\frac{4}{3}x - \frac{5}{3} = y$$

$$f^{-1}(x) = \frac{4}{3}x - \frac{5}{3}$$

8.  $f(x) = \frac{-4x+1}{5}$

$$5(x) = \frac{-4y+1}{5} \cdot 5$$

$$5x = -4y + 1$$

$$\frac{5x-1}{-4} = \frac{-4y}{-4}$$

$$f^{-1}(x) = -\frac{5}{4}x + \frac{1}{4}$$

Two functions are inverses of one another if and only if:  $f[g(x)] = x$  and  $g[f(x)] = x$ .

Use composition of functions to determine if each pair of functions are inverses of one another.

Ex.  $f(x) = 3x + 9$  and  $g(x) = \frac{1}{3}x - 3$

or  $f(g(x)) = 3(\frac{1}{3}x - 3) + 9$   
 $y = x - 9 + 9$

$y = x$  ✓

$f(x)$  &  $g(x)$   
are inverses

1.  $f(x) = 2x - 10$  and  $g(x) = \frac{1}{2}x + 5$

$f(g(x)) = 2(\frac{1}{2}x + 5) - 10$

$y = x + 10 - 10$

$y = x$  ✓

$f(x)$  &  $g(x)$  are  
inverses

2.  $f(x) = -6x$  and  $g(x) = \frac{1}{6}x$

$f(g(x)) = -6(\frac{1}{6}x)$

$y = -x$

no!

$y \neq -x$

$f(x)$  &  $g(x)$  are  
not inverses

3.  $f(x) = 8x - 10$  and  $g(x) = \frac{x+10}{8}$

$f(g(x)) = 8(\frac{x+10}{8}) - 10$

$y = x + 10 - 10$

$y = x$  ✓

yes!  $f(x)$  &  $g(x)$   
are inverses  
of one another