

Algebra 1

Our Goal: To learn to find the inverse of a function

Warm Up: Check and discuss homework

Today's Homework:

- 10.4 Textbook Exercises, p.572-573: 4-32 (evens)
- **iready due today, if needed**

Previous Homework

10.3 Textbook Exercises, p.564: 4-34 (evens)

Find the equation of the function.

1. (0, 8), (1, 12), (2, 16), (3, 20)

x	y
0	8
1	12
2	16
3	20

$$y = mx + b$$
$$y = 4x + 8$$



Core Concept
Inverse Relation
 When a relation contains (a, b) , the inverse relation contains (b, a) .

Write the inverse of the relation, then write the equation of the inverse.

~~$(0, 8), (4, 12), (8, 16), (12, 20)$~~

$(8, 0), (12, 1), (16, 2), (20, 3)$

x	y
8	0
12	1
16	2
20	3

$y = mx + b$
 $y = \frac{1}{4}x - 2$

$f(x) = 4x + 8$
 $f^{-1}(x) = \frac{1}{4}x - 2$
 $f(7) = 36 \quad f^{-1}(36) = 7$

Core Concept
Finding Inverses of Functions Algebraically

Step 1 Set y equal to $f(x)$.
 Step 2 Switch x and y in the equation.
 Step 3 Solve the equation for y .

Find the inverse of $f(x) = 4x - 9$.

$y = 4x - 9$
 $x = 4y - 9$
 $x + 9 = 4y$
 $y = \frac{x + 9}{4}$ f^{-1}

Find the inverse of the function. Then graph the function and its inverse.

3. $f(x) = 6x$

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

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

$$y = -x + 5$$

$$x = -y + 5$$

$$x - 5 = -y$$

$$y = -x + 5$$

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

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

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

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

$$f^{-1}(x) = \frac{x+1}{0.25}$$

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

Find the inverse of $f(x) = x^2, x \geq 0$. Then graph the function and its inverse.

desmos syntax:

- $f(x) = \{ x \geq 0 : x^2 \}$
- $y = f(x)$
- $x = f(y)$

 **Core Concept****Horizontal Line Test**

The inverse of a function f is also a function if and only if no horizontal line intersects the graph of f more than once.

Consider the function $f(x) = x^2 + 3$

Determine whether the inverse of f is a function.

Consider the function $f(x) = \sqrt{x+2}$.

Determine whether the inverse of f is a function.

Then find the inverse.