

Warm up:

1. Find the inverse: $\{(5, -2), (-1, 0), (-4, -4)\}$
2. Find the inverse: $y = -4x + 5$
3. Find the inverse: $y = (x + 2)^2$
4. Find the inverse: $y = \sqrt{x} - 2$

Warm up:

1. Find the inverse: $\{(5, -2), (-1, 0), (-4, -4)\}$

$$(-2, 5), (0, -1), (-4, -4)$$

2. Find the inverse: $y = -4x + 5$

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

3. Find the inverse: $y = (x + 2)^2$

$$y^{-1} = \sqrt{x} - 2$$

4. Find the inverse: $y = \sqrt{x} - 2$

$$y^{-1} = (x + 2)^2$$

SWBAT explore functions and their inverses through tables and graphs.

Agenda:

Warm up

Notes

practice

Vocabulary

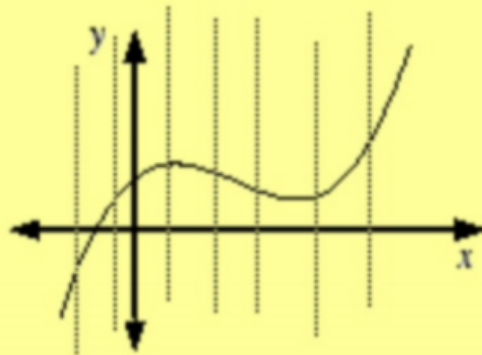
invertable: a **function** is **invertible** if and only if its inverse relation is a **function**

one-to-one: A **function** for which every element of the range of the **function** corresponds to exactly **one** element of the domain.

For a function to be one-to-one it must pass both the vertical line test and the horizontal line test.

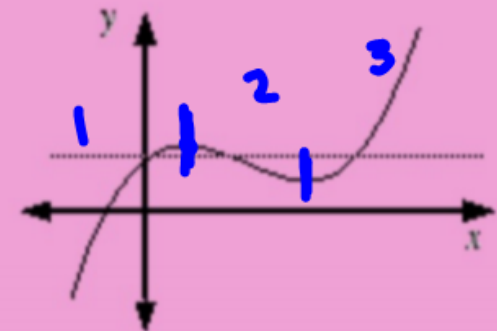
Vertical Line Test

The graph is a function since there are no vertical lines that hit the graph more than once.



Horizontal Line Test

This function is not one-to-one since there is a horizontal line that hits the graph more than once.



x	$f(x)$
-9	27
-4	12
-2	6
0	0
3	-9

Is the table invertible? Does the inverse *function* exist? *yes*

Find the following:

1. $f(-4) = 12$

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

3. $f^{-1}(-9) = 3$

x	$f^{-1}(x)$
27	-9
12	-4
6	-2
0	0
-9	3

x	y
-3	6
-2	0
-1	-4
0	-6
1	-6
2	-4
3	0
4	6

Is the table invertible? Does the inverse *function* exist?

If yes, then

Find the following:

1. $f(4)$

2. $f^{-1}(6)$

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

x	$f(x)$
-9	27
-4	12
-2	6
0	0
3	-9

Is the table invertible? Does the inverse function exist?

Find the following:

- $f(-4) = 12$
- $f^{-1}(12) = -4$
- $f^{-1}(\underline{-9}) = 3$

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27	-9
12	-4
6	-2
0	0
-9	3

x	y
-3	6
-2	0
-1	-4
0	-6
1	-6
2	-4
3	0
4	6

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0	0
-9	3

x	y
-3	6
-2	0
-1	-4
0	-6
1	-6
2	-4
3	0
4	6

Is the table not invertible? Does the inverse function exist?

If yes, then

Find the following:

- $f(4)$
- $f^{-1}(6)$
- $f^{-1}(-4)$

Example 1

Determine whether the function $f(x)$ represented in the table is invertible. Use the table to find $f(1)$ and $f(2)$, as well as $f^{-1}(3)$ and $f^{-1}(4)$ if the inverse function exists.

x	0	1	2	3	4	5
$f(x)$	3	4	1	5	0	2

1. Determine whether the inverse function $f^{-1}(x)$ exists.
2. Find the function value $f(1)$.
3. Find the function value $f(2)$.
4. Find the inverse function value $f^{-1}(3)$.
5. Find the inverse function value $f^{-1}(4)$.
6. Summarize your findings.

Example 1

Determine whether the function $f(x)$ represented in the table is invertible. Use the table to find $f(1)$ and $f(2)$, as well as $f^{-1}(3)$ and $f^{-1}(4)$ if the inverse function exists.

x	0	1	2	3	4	5
$f(x)$	3	4	1	5	0	2

1. Determine whether the inverse function $f^{-1}(x)$ exists.

It is one to one so, yes it does!

2. Find the function value $f(1)$.

normal
so start
w/ x 4

3. Find the function value $f(2)$.

normal 1

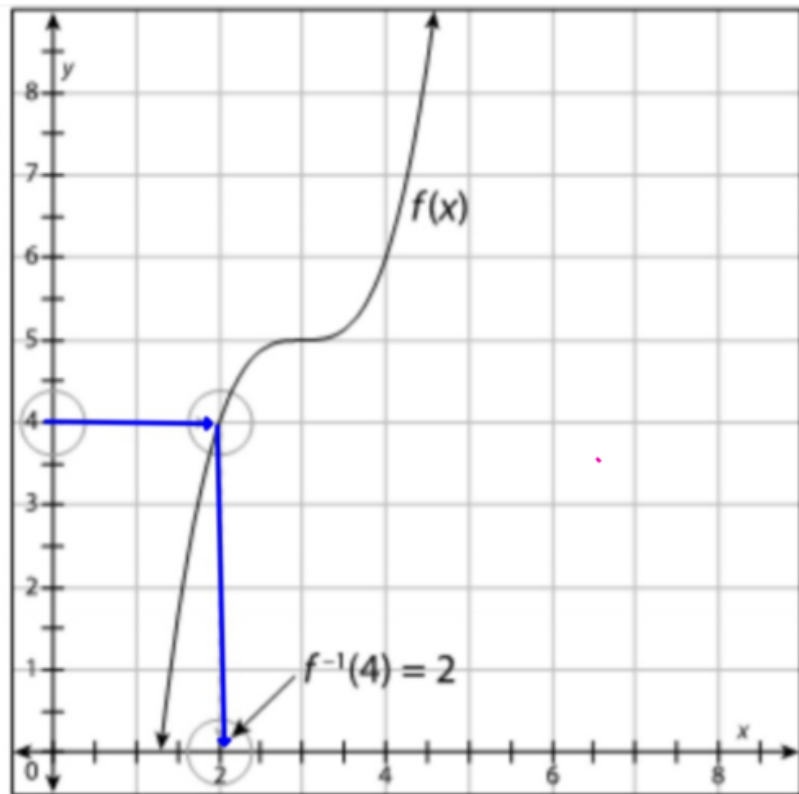
4. Find the inverse function value $f^{-1}(3)$.

inverse
so start
w/ y 0

5. Find the inverse function value $f^{-1}(4)$.

inverse 1

6. Summarize your findings.

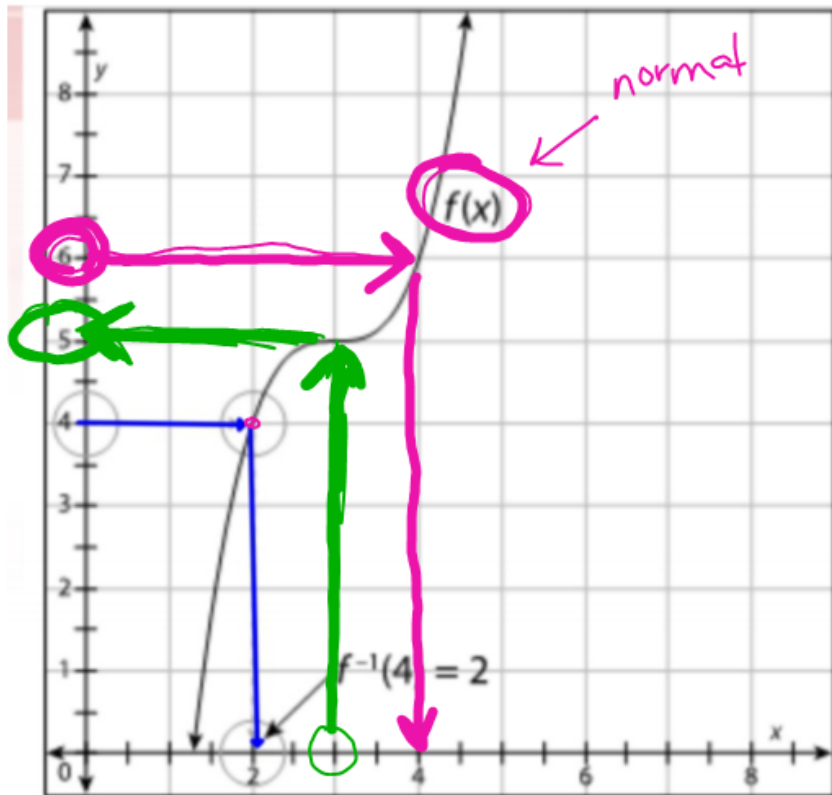


Finding the value of the
inverse:

$$f^{-1}(4) = 2$$

$$f^{-1}(\varphi) =$$

$$f(3) =$$



Finding the value of the
inverse:

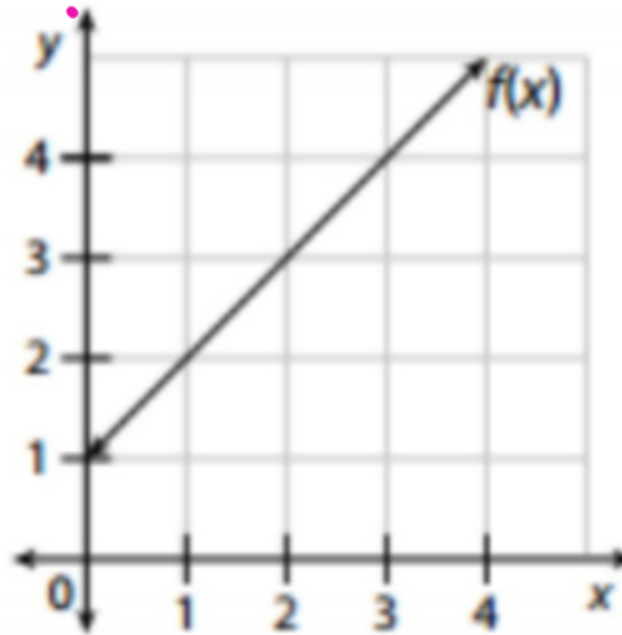
$$\underline{f^{-1}(4)} = 2$$

$$f^{-1}(5) = 3$$

$$f(3) = 5$$

Example 2

Use the graph of the function $f(x)$ to find $f(1)$, $f(2)$, $f^{-1}(3)$, and $f^{-1}(4)$.



Example 2

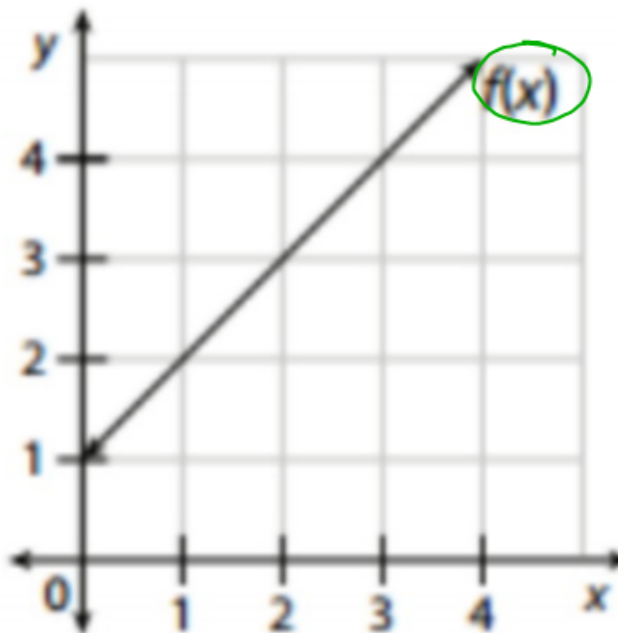
Use the graph of the function $f(x)$ to find $f(1)$, $f(2)$, $f^{-1}(3)$, and $f^{-1}(4)$.

$$f(1) = 2$$

$$f(2) = 3$$

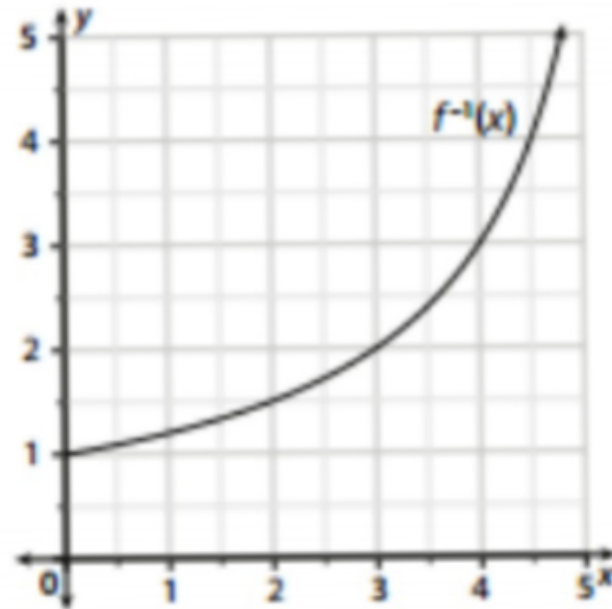
$$f^{-1}(3) = 2$$

$$f^{-1}(4) = 3$$



Example 3

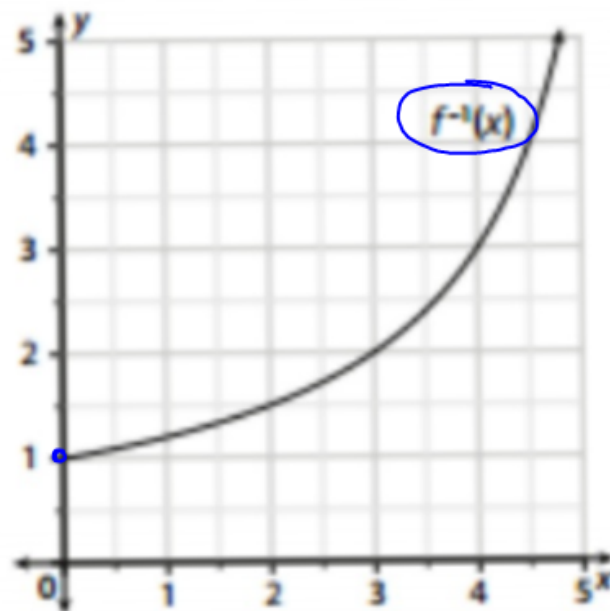
Use the graph of the inverse function $f^{-1}(x)$ to find $f(1)$, $f(2)$, $f^{-1}(3)$, and $f^{-1}(4)$.



Example 3

Use the graph of the inverse function $f^{-1}(x)$ to find $f(1)$, $f(2)$, $f^{-1}(3)$, and $f^{-1}(4)$.

$$\begin{aligned}f(1) &= 0 \\f(2) &= 3 \\f^{-1}(3) &= 2 \\f^{-1}(4) &= 3\end{aligned}$$



Problem-Based Task 8.3: Catering Costs and Counts

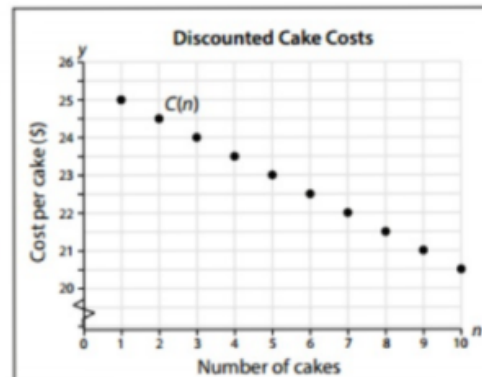
Caitlin's Catering Company provides food service for events of all sizes. One of Caitlin's specialties is lemon cream layer cake. The table shows the number of lemon cream layer cakes, $L(p)$, that she supplies as a function of the number of people p attending the event.

Number of people, p	Number of cakes, $L(p)$
24	1
48	2
72	3
96	4
120	5
144	6
168	7
192	8
216	9
240	10

SMP

1 ✓ 2 ✓
3 ✓ 4 ✓
5 ✓ 6 ✓
7 ✓ 8 ✓

If the cost per cake for a certain event is \$22.50, how many people are expected to attend the event?



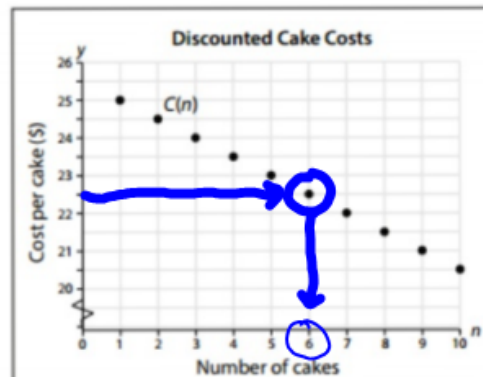
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240	10

SMP

1 ✓ 2 ✓
3 ✓ 4 ✓
5 ✓ 6 ✓
7 ✓ 8 ✓

If the cost per cake for a certain event is \$22.50, how many people are expected to attend the event?



22.50 → 6 cakes
144 people

Practice Problems (1-10)

