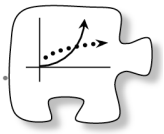
**CW#____** Name:_____

Period: A1 A2 A3 B1 B3

## 5.1.3 What can I do with inverses?

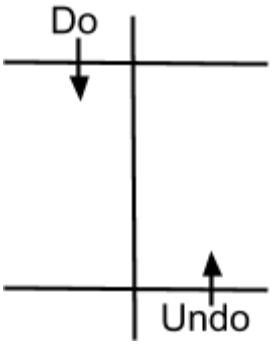
More Inverse Functions



**#40** Write the inverse function of the following functions, clearly showing all your steps.

a. **Solve using a Do/Undo table**

$f(x) = 2(x - 1)^3$




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

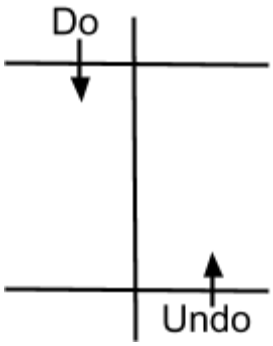
**Solve Algebraically**

$f(x) = 2(x - 1)^3$

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

b. **Solve using a Do/Undo table**

$f(x) = 3\left(\frac{x-9}{2}\right) + 20$




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

**Solve Algebraically**

$f(x) = 3\left(\frac{x-9}{2}\right) + 20$

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

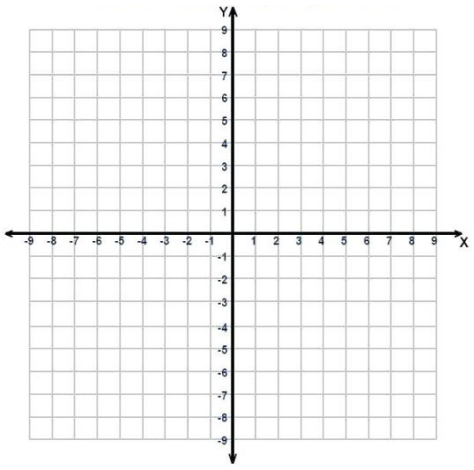
**#41** Adriena's strategy for checking that the functions $f(x)$ and $f^{-1}(x)$ are inverses of each other is to think of them as stacked function machines. She starts by choosing a number to drop into $f(x)$. Then she drops the output from $f(x)$ into $f^{-1}(x)$. If she gets her original number, she is pretty sure that the two functions are inverses.

With your team, using the pair of inverse functions from problem #40 (a), test Adriena's ideas.

**#42** Adriena had to find the inverse function of $f(x) = (x - 3)^2 + 2$. She got the equation $f^{-1}(x) = \sqrt{x-2} + 3$. Will her stacked function machine method work?

a. Adriena's friend Cemetra decided to check $f(-5)$ and use the resulting output as the input for the inverse function. Try this method with your team. What happened? Why did this happen?

b. How can you restrict the domain of $f(x)$ to make sure the functions are inverses of each other? Sketch a graph of the function and the inverse to confirm your answer.



**#43** Adriena and Statler are writing inverses of some other functions. They come up with these inverse pairs:

$i.\ f(x) = \frac{3}{5}x - 15$
$g(x) = \frac{5}{3}x + 25$

$ii.\ e(x) = \frac{(x-10)^2}{4}$
$d(x) = 4\sqrt{x} + 10$

a. Name three different methods Adriena and Statler can use to verify that these pairs of functions are actually inverses.

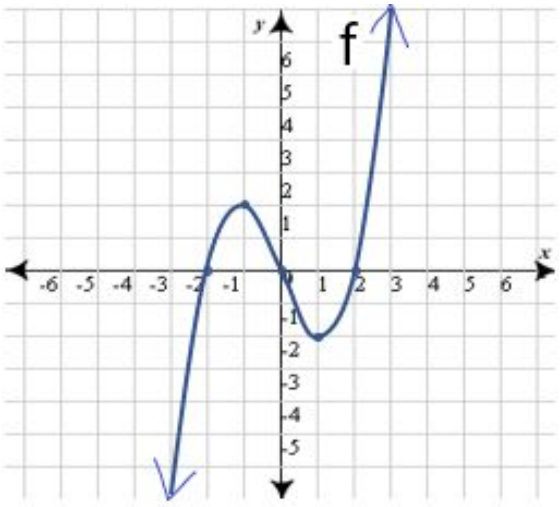
**STOP! Check with your teacher before moving on!!**

b. Help Adriena and Statler verify whether these pairs of functions are really inverses of each other by using your graphing calculator. If they are not, explain how you know. Then write the inverse function correctly. State the domains and ranges necessary to make each pair of functions inverses of each other.

| i. | ii. |
| --- | --- |
| Domain & Range restrictions? | Domain & Range restrictions? |

**Extra Practice:**

1. Consider the graph at right.
   a. State the domain and range of f. Is it a function?




   b. Draw the graph of the inverse of f. Draw and label the line of symmetry.

   c. Is the inverse a function?

   d. Explain how the graphs of inverses are related.

---

2. Determine the inverse of each equation below. Use a do/undo table or the x-y interchange (you choose).

| a. $g(x) = 8 - \frac{1}{2}x$ | b. $h(x) = \sqrt[3]{x-7} + 2$ | c. $k(x) = \frac{x}{x-5}$ |
|---|---|---|
| $g^{-1}(x) =$ | $h^{-1}(x) =$ | $k^{-1}(x) =$ |

Show or explain how you know the inverse equations are correct.

| | | |
|---|---|---|
| | | |

SOLUTIONS:

1. a. D & R are both all real numbers. It is a function. b. The line of symmetry is y = x; c. For each point on the graph of the original function, the coordinates are switched to make a point on the graph of the inverse. Inverses are always symmetric across y = x.

2. a. $g^{-1}(x) = 2x + 16$; b. $h^{-1}(x) = (x - 2)^3 + 7$; c. $k^{-1}(x) = \frac{-5}{x-1}$ .