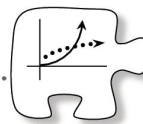


5.1.1 How can I “undo” a function?

“Undo” Equations



#1 Guess My Number

When I add 4 to my number and then multiply the sum by 10, I get -70. What’s my number?

What is the number?

Do		
Undo		

#2 Anita has a function machine. When she puts 3 into the machine, 7 comes out. When she puts 4 in, 9 comes out, and when she puts -3 in, -5 comes out.

a. What is this machine is doing to the input to generate an output?

x		
y		

<p>b. Anita’s function machine suddenly starts working backwards. If 7 is pulled back into this machine, what value do you think will come out of the top?</p>	<p>c. What would you expect to come out the top if 9 is entered? If -5 is entered? Explain.</p>
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d. Backwards function machine in a table.

What is Anita’s backwards function machine is doing?

x		
y		

c. Write equations for Anita’s original function machine and for her backwards machine. How are the two functions related?

#3 Given the function $f(x) = 5x + 2$

a. Write an equation for the inverse.

Equation:



b. An “undo” function is called an **inverse function** and has the notation $f^{-1}(x)$. Note that the -1 is not a negative exponent. It is the mathematical symbol that indicates the inverse function of $f(x)$. Write an equation for $f^{-1}(x)$, Keiko’s “undo” function machine.

c. Make a table for $f(x)$ and $f^{-1}(x)$ what do you notice?

#4 Keiko is working with a new function, $g(x)$. She writes down the following steps for $g(x)$:

- Add 5.
- Divide by 2.
- Cube it.
- Multiply by 6.

a. What is the equation for $g(x)$? What is the output when 3 is the input?

b. Help Keiko write down the steps (in words) for the inverse machine, $g^{-1}(x)$, and then write its equation.

c. Verify that your equation in part (b) correctly “undoes” the output of $g(x)$ in part (a).

#5 What are the inverse functions for each of the functions below? Use function notation. Justify that each equation for the inverse works. Solve for a/b inverses algebraically. Use a do/undo table for c/d

a. $f(x) = 3x - 6$

Algebra

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

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

b. $g(x) = x^3 - 5$

Algebra

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

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

c. $p(x) = 2(x + 3)^3$

Do/Undo

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

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

d. $t(x) = \frac{10(x-4)}{3}$

Do/Undo

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

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