Name_____ Period_____

7.5 Warm Up

Composing the Numbers

Evaluate each composition using the following functions:

$f(x) = 3x - 4$ $g(x) = 2x^2 - 1$ $h(x) = \sqrt{x-3}$

1. $f\big(g(h(12))\big)$

$h(12) = \sqrt{x-3}$

$\sqrt{12-3}$

$\sqrt{9} = 3$

$g(3) = 2(3)^2 - 1 = 17$

$f(17) = 3(17) - 4 = 47$

2. $(h \circ g \circ f)(-2)$

$h(g(f(-2)))$

$f(-2) = 3(-2) - 4 = -10$

$g(\ ) = 2(10)^2 - 1 = 199$

$h(199) = \sqrt{199-3} = 14$

3. $g\left(h\left(f\left(\frac{11}{3}\right)\right)\right)$

$f\left(\frac{11}{3}\right) = 3\left(\frac{11}{3}\right) - 4 = 7$

$h(7) = \sqrt{7-3} = 2$

$g(2) = 2(2)^2 - 1$

$= 7$

Name_____ Period_____

7.5 Warm Up

Composing the Numbers

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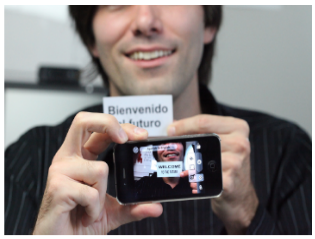
1. $f\big(g(h(12))\big)$ 2. $(h \circ g \circ f)(-2)$ 3. $g\left(h\left(f\left(\frac{11}{3}\right)\right)\right)$

7.5 Translating My Composition

A Solidify Understanding Task



All this work with modeling rides and waiting lines at the local amusement park may have you wondering about the variety of ways of combining functions. In this task we continue building new functions from old, familiar ones.

Suppose you have the following "starter set" of functions.

$f(x) = x + 5$

$g(x) = x^2$

$h(x) = 3x$

$j(x) = 2^x$

$k(x) = x - 1$

create your own composite function, write it here, and on the back of the warm up.

Give it to a partner>>

decode on back >>

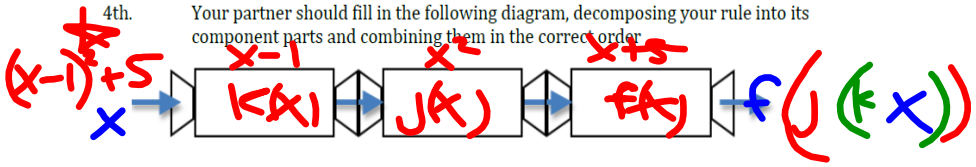
Do the following steps with this set of functions:

1st. Build a composite function using any three of the above function rules in any order

2nd. Write your final function rule as a single algebraic expression in terms of x

3rd. Give your function rule to your partner, you should also receive a function rule from your partner

4th. Your partner should fill in the following diagram, decomposing your rule into its component parts and combining them in the correct order.



$f(x) = x + 5$ ✓

$g(x) = x^2$ ✓

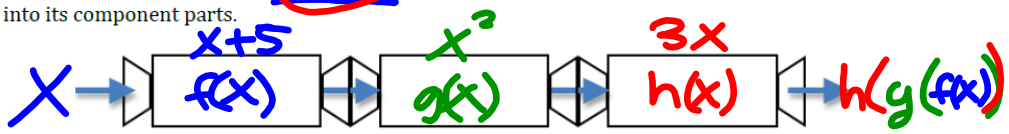
$h(x) = 3x$ ✓

$j(x) = 2^x$

$k(x) = x - 1$

1. First, let's try this example:

Your partner gives you $f_1(x) = 3(x+5)^2$. Complete this diagram to decompose this composition into its component parts.



2. To test your decomposition you can try running a number or two through your chain of function machines, and see if you get the same results as when you evaluate the function rule for the same numbers. What do you notice when you do this?

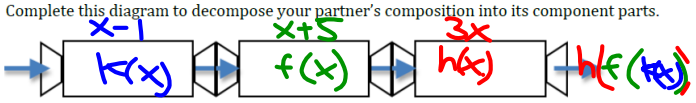
Write your partners Function! > Decode

3. Now it's your turn! Create your own function rule using the set of functions given at the beginning of this task and following the four steps given above. Your partner should do the same and give you his or her function rule.

Ex: * 3(x-1)+5

Record the function rule you received here:

Complete this diagram to decompose your partner's composition into its component parts.



Test your decomposition for a few values. Make any adjustments necessary based on your test results.

4. Instead of giving you the function rule, suppose your partner gives you the following input-output table. Can you create the composition function rule based on this information? Describe how you used the numbers in this table to create your rule.

x	$f(x)$
0	5 ½
1	6
2	7
3	9
4	13
5	21

5. Is function composition commutative? Give reasons to support your answer.

communative: means parts can move and it won't change the answer.

No. The parts of the equation can't move. The order matters or you get a different answer.

4. Instead of giving you the function rule, suppose your partner gives you the following input-output table. Can you create the composition function rule based on this information? Describe how you used the numbers in this table to create your rule.

x	$f(x)$
0	5 ½
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Name Modeling With Functions | 7.5

Ready, Set, Go!

Ready Topic: Using a table to find the value of a composite function

Use the table to find the indicated function values.

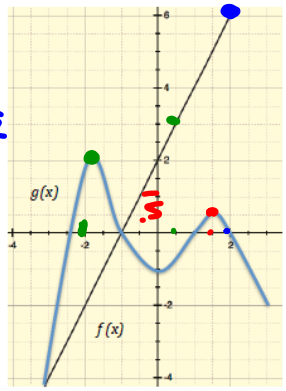
x	$f(x)$	$g(x)$
-2	2	3
-1	1	-2
0	3	-24
1	-1	-1
2	0	-8
3	19	0

1. $f(g(3))$ 2. $f(g(1))$ 3. $g(f(-2))$ 4. $g(f(-1))$

5. $g(f(0))$ 6. $g(g(-2))$ 7. $f(f(0))$ 8. $g(f(1))$

9. Do the graphs ever intersect each other? How do you know?

Use the graph to find the indicated values.



10. $f(g(-2))$ 11. $f(g(-1))$

12. $f(g(1.5))$ 13. $f(f(0))$

Set

Topic: Creating a composite function given its components

Let $f(x) = x^2, g(x) = 5x, and\ h(x) = \sqrt{x} + 2.$

Express each function as a composite of $f, g, and/or\ h.$

14. $F(x) = x^4$ 15. $G(x) = 5x^2$ 16. $P(x) = x + 2$

17. $R(x) = 5\sqrt{x} + 10$ 18. $Q(x) = 25x$ 19. $H(x) = 25x^2$

20. $D(x) = \sqrt{\sqrt{(x)} + 2} + 2$ 21. $B(x) = x + 4\sqrt{x} + 4$ 22. $K(x) = \sqrt{5x} + 2$

Go

Topic: Finding the zeros of a polynomial

Solve for all of the values of x. Identify any restrictions on x.

23. $x^2 + 6 = 5x$ 24. $5x^3 = 45x$ 25. $x^4 - 26x^2 + 25 = 0$

26. $1 + \frac{1}{x} = \frac{12}{x^2}$ 27. $\frac{x}{6} - \frac{1}{2} - \frac{3}{x} = 0$ 28. $\frac{1}{x^2} = 9$