LESSON MAKER PRO

Function Chain Quest

Build outputs by feeding one function into another.

HIGH SCHOOL · MA.912.F.3.5

MA.912.F.3.5 "Solve mathematical and real-world problems involving composite functions."

NAME _____ DATE _____

THE BIG IDEA

A composite function, written (f o g)(x), means put x into g first, then put that result into f. Work from the inside function to the outside function, and substitute carefully.

WORKED EXAMPLE

Let f(x)=x+11 and g(x)=x-13. Find (f o g)(17).

1. Evaluate inside: g(17)=17-13=4.
2. Use that output in f: f(4)=4+11=15.

Answer: (f o g)(17)=15

PRACTICE 6 problems

1 Let f(x)=x+6 and g(x)=3x. Find (f o g)(2).

ANSWER _____

2 Let $f(x)=x^2$ and g(x)=x-8. Find (g o f)(9).

ANSWER _____

3 Let p(x)=12-x and $q(x)=x^2+7$. Find p(q(x)).

ANSWER _____

4 Function t has t(0)=6. Function u has u(6)=8. Find (u o t)(0).

ANSWER _____

5 Let f(x)=x/7+6 and g(x)=8x. Find (f o g)(x).

ANSWER _____

6 Let $f(x)=x^2+9$ and g(x)=12-x. Find (g o f)(x).

ANSWER _____

APPLY IT Show your work

1 A gaming club uses g(w)=w+7 to give badge points for w tournament wins. It then uses f(p)=2p+3 to turn p badge points into prize tickets. If you have 9 wins, how many prize tickets do you have after both rules?

WORK SPACE

ANSWER _____

2 Your film club estimates raw footage with g(c)=3c, where c is the number of short clips. The editor uses f(r)=r-8 to find the minutes in the final cut after trimming r raw minutes. If the club starts with 10 clips, how many minutes are in the final cut?

WORK SPACE

ANSWER _____

CHALLENGE One step up

Let f(x)=2x+7 and g(x)=x^2-6. Solve (f o g)(x)=31. Explain your reasoning with an equation.

WORK SPACE AND ANSWER

ANSWER KEY

Function Chain Quest

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Let f(x)=x+6 and g(x)=3x. Find (f o g)(2).	**12**
2	Let f(x)=x^2 and g(x)=x-8. Find (g o f)(9).	**73**
3	Let p(x)=12-x and q(x)=x^2+7. Find p(q(x)).	**5-x^2**
4	Function t has t(0)=6. Function u has u(6)=8. Find (u o t)(0).	**8**
5	Let f(x)=x/7+6 and g(x)=8x. Find (f o g)(x).	**8x/7+6**
6	Let f(x)=x^2+9 and g(x)=12-x. Find (g o f)(x).	**3-x^2**

PART 2 · APPLY IT

1. **35 prize tickets** Compute g(9)=16 badge points. Then compute f(16)=35 prize tickets.
2. **22 minutes** Compute g(10)=30 raw minutes. Then compute f(30)=22 minutes.

CHALLENGE

2(x^2-6)+7=31, so x^2=18. Therefore, x=3sqrt(2) or x=-3sqrt(2).

Accept equivalent algebraic forms, including 8x/7+6 or (8x+42)/7. For the challenge, accept x=3sqrt(2) or x=-3sqrt(2), or x=±3sqrt(2).