LESSON MAKER PRO

# Function Mashups

*Build one function inside another.*

**HIGH SCHOOL · HSF-BF.A.1c**

**CCSS.Math.Content.HSF-BF.A.1c** "(+) Compose functions. For example, if T(y) is the temperature in the atmosphere as a function of height, and h(t) is the height of a weather balloon as a function of time..."

NAME _____ DATE _____

## THE BIG IDEA

To find f(g(x)), apply g first, then use that output as the input of f. Replace every x in f(x) with g(x), then simplify. The order matters because f(g(x)) is usually not equal to g(f(x)).

## WORKED EXAMPLE

Let f(x)=8x-5 and g(x)=x^2+6. Find f(g(x)).

1. f(g(x))=8g(x)-5
2. =8(x^2+6)-5
3. =8x^2+48-5
4. =8x^2+43

**Answer: f(g(x))=8x^2+43**

## PRACTICE 6 problems

**1** Let f(x)=2x+7 and g(x)=x-4. Find f(g(x)).

**ANSWER** _____

**2** Let p(x)=x^2-3 and q(x)=2x. Find p(q(x)).

**ANSWER** _____

**3** Let m(x)=7-x and n(x)=x+9. Find m(n(x)).

**ANSWER** _____

**4** Let a(x)=3x and b(x)=x^2-1. Find b(a(x)).

**ANSWER** _____

**5** Let r(x)=4x+2 and s(x)=3-x. Find r(s(x)).

**ANSWER** _____

**6** Let u(x)=x/2+7 and v(x)=4x-3. Find u(v(x)).

**ANSWER** _____

## APPLY IT Show your work

**1** A gaming channel's number of followers, in hundreds, is F(v)=3v+2, where v is its number of posted videos. The channel posts V(w)=7w+4 videos after w weeks. Write F(V(w)) and state what it represents.

WORK SPACE

**ANSWER** _____

**2** For a drone video project, the temperature at h kilometers above ground is T(h)=31-4h degrees Celsius. The drone's height after t minutes is H(t)=3t+2 kilometers. Write T(H(t)) and state what it represents.

WORK SPACE

**ANSWER** _____

## CHALLENGE One step up

**CHALLENGE**

Let f(x)=2x-1 and g(x)=x^2+4. Solve f(g(x))=9.

_____

_____

**ANSWER KEY**

# Function Mashups

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## PART 1 · PRACTICE

| # | PROBLEM | ANSWER |
|---|---|---|
| 1 | Let f(x)=2x+7 and g(x)=x-4. Find f(g(x)). | **f(g(x))=2x-1** |
| 2 | Let p(x)=x^2-3 and q(x)=2x. Find p(q(x)). | **p(q(x))=4x^2-3** |
| 3 | Let m(x)=7-x and n(x)=x+9. Find m(n(x)). | **m(n(x))=-x-2** |
| 4 | Let a(x)=3x and b(x)=x^2-1. Find b(a(x)). | **b(a(x))=9x^2-1** |
| 5 | Let r(x)=4x+2 and s(x)=3-x. Find r(s(x)). | **r(s(x))=14-4x** |
| 6 | Let u(x)=x/2+7 and v(x)=4x-3. Find u(v(x)). | **u(v(x))=2x+11/2** |

## PART 2 · APPLY IT

1. **F(V(w))=21w+14. It represents the channel's follower count, in hundreds, after w weeks.** Substitute V(w) for v in F(v): 3(7w+4)+2=21w+14. The input is weeks, and the output is followers in hundreds.
2. **T(H(t))=23-12t. It represents the drone's temperature in degrees Celsius after t minutes.** Substitute H(t) for h in T(h): 31-4(3t+2)=23-12t. The composition gives temperature as a function of time.

## CHALLENGE

**x=-1 or x=1**

Accept algebraically equivalent expressions, such as 14-4x for item 5. For word problems, require both the composed rule and a correct description of its input and output units.