Section 1.8 Combinations of Functions: Composite Functions

Objective: In this lesson you learned how to find arithmetic combinations and compositions of functions.

I. Arithmetic Combinations of Functions (Pages 76–77)

Just as two real numbers can be combined with arithmetic operations, two functions can be combined by the operations of

to create new functions. A combined function like this is called an **arithmetic combination of functions.**

The domain of an arithmetic combination of functions f and g consists of . . .

Let f and g be two functions with overlapping domains. Complete the following arithmetic combinations of f and g for all x common to both domains:

1) Sum: (f + g)(x) = _____ 2) Difference: (f - g)(x) = _____ 3) Product: (fg)(x) = _____ 4) Quotient: $\left(\frac{f}{g}\right)(x) =$ _____

Example: Let f(x) = 7x - 5 and g(x) = 3 - 2x. Find (f - g)(4).

II. Composition of Functions (Pages 78–79)

The composition of the function *f* with the function *g* is defined as $(f \circ g)(x) =$ _____. *What you should learn* How to find the composition of one function with another function

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What you should learn How to add, subtract, multiply, and divide functions For the composition of the function f with g, the domain of $(f \circ g)$ is . . .

For two functions *f* and *g*, to find $(f \circ g)(x), \ldots$

Example: Let f(x) = 3x + 4 and let $g(x) = 2x^2 - 1$. Find (a) $(f \circ g)(x)$ and (b) $(g \circ f)(x)$.

III. Application (Page 80)

The function f(x) = 0.06x represents the sales tax owed on a purchase with a price tag of x dollars and the function g(x) = 0.75x represents the sale price of an item with a price tag of x dollars during a 25% off sale. Using one of the combinations of functions discussed in this section, write the function that represents the sales tax owed on an item with a price tag of x dollars during a 25% off sale. *What you should learn* How to use combinations of functions to model and solve real-life problems

Additional notes

Homework Assignment

Page(s)

Exercises