Section 3.5 Guided Notebook

Section 3.5 The Algebra of Functions; Composite Functions

- ☐ Work through Objective 1
- ☐ Work through Objective 2
- ☐ Work through Objective 3
- ☐ Work through Objective 4
- ☐ Work through Objective 5

Section 3.5 The Algebra of Functions; Composite Functions

Work through the video in the introduction and learn about the Algebra of Functions.

Write down 4 definitions below and give one example of each:

1. The sum of f and g

2. The difference of f and g

3. The product of f and g

4. The quotient of f and g

Section 3.5 Objective 1 Evaluating a Combined Function

Work through Example 1 and take notes here:

Let $f(x)=\frac{12}{2x+4}$ and $g(x)=\sqrt{x}$. Find each of the following:

a. $(f+g)(1)$

b. $(f-g)(1)$

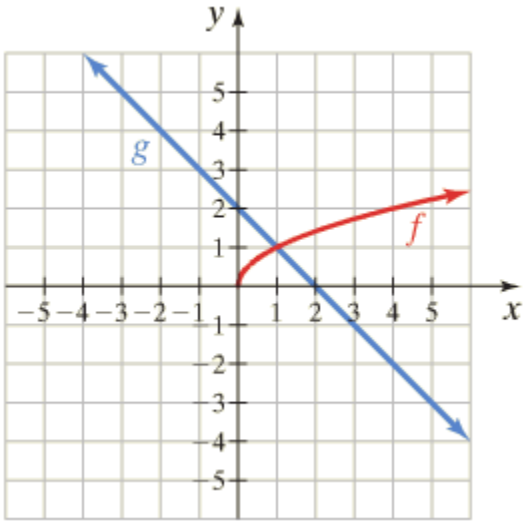
c. $(fg)(4)$

d. $\left(\frac{f}{g}\right)(4)$

Work through the interactive video that accompanies Example 2 and take notes here:

Use the graph to evaluate each expression or state that it is undefined:

a. $(f+g)(1)$



b. $(f-g)(0)$

c. $(fg)(4)$

d. $\left(\frac{f}{g}\right)(2)$

Section 3.5 Objective 2 Finding the Intersection of Intervals

In order to find the domain of a combined function, you MUST be able to find the intersection of two or more intervals. Watch the video that accompanies Example 3 and take notes here:

Find the intersection of the following sets and graph the set on a number line.

a) $[0,\infty)\cap(-\infty,5]$

b) $((-\infty,-2)\cup(-2,\infty))\cap[-4,\infty)$

Section 3.5 Objective 3 Finding Combined Functions and Their Domains

Work through the video that accompanies Objective 3 and take notes here:

Work through the video that accompanies Example 4 and take notes here:
Let $f(x) = \sqrt{x+1}$ and $g(x) = x^2 - 16$.

a. Find $f + g$ and determine the domain of $f + g$.

b. Find $\frac{f}{g}$ and determine the domain of $\frac{f}{g}$.

Work through the video that accompanies Example 5 and take notes here:

Let $f(x)=\frac{x+2}{x-3}$ and $g(x)=\sqrt{4-x}$.

a. Find $f + g$ and determine the domain of $f + g$.

b. Find $f - g$ and determine the domain of $f - g$.

c. Find fg and determine the domain of fg.

d. Find $\frac{f}{g}$ and determine the domain of $\frac{f}{g}$.

Section 3.5 Objective 4 Forming and Evaluating Composite Functions

Carefully work through the video that accompanies Objective 4 and take notes here. **MAKE SURE THAT YOU CAN DEFINE THE COMPOSITE FUNCTION:**

Work through the interactive video that accompanies Example 6 and take notes here:

Let $f(x) = 4x + 1$, $g(x) = \dfrac{x}{x - 2}$, and $h(x) = \sqrt{x + 3}$.

a) Find the function $f \circ g$.

b) Find the function $g \circ h$.

c) Find the function $h \circ f \circ g$.

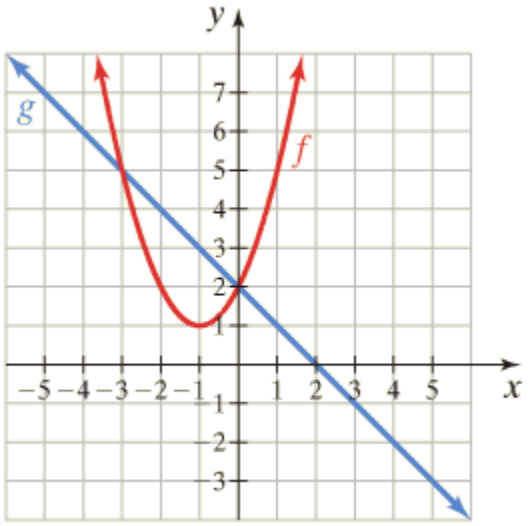
d) Evaluate $(f \circ g)(4)$, or state that it is undefined.

e) Evaluate $(g \circ h)(1)$, or state that it is undefined.

f) Evaluate $(h \circ f \circ g)(6)$, or state that it is undefined.

Work through the interactive video that accompanies Example 7 and take notes here:
Use the graph to evaluate each expression or state that it is undefined:

a) $(f \circ g)(4)$



b) $(g \circ f)(-3)$

c) $(f \circ f)(-1)$

d) $(g \circ g)(4)$

e) $(f \circ g \circ f)(1)$

Section 3.5 Objective 5 Determining the Domain of Composite Functions

Work through the video that accompanies Objective 5 and take notes here.

Carefully write down how to find the domain of a composite function and give an example of how to find the domain of a composite function.

Work through the interactive video that accompanies Example 8 and take notes here.

Let $f(x) = \frac{-10}{x-4}$, $g(x) = \sqrt{5-x}$, and $h(x) = \frac{x-3}{x+7}$.

a) Find the domain of $f \circ g$.

b) Find the domain of $g \circ f$.

c) Find the domain of $f \circ h$.

d) Find the domain of $h \circ f$.