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**GOOD**

By the end of this lesson, I will be able to answer the following questions...

1. How do I perform **arithmetic combinations of functions** and how are they represented graphically?
2. How do I **build composite functions** and determine their domain?
3. How do I apply these skills to various scenarios?

# Vocabulary

1. **Sum:**  $(f + g)(x) = f(x) + g(x)$

2. **Difference:**  $(f - g)(x) = f(x) - g(x)$

3. **Product:**  $(fg)(x) = f(x) \cdot g(x)$

4. **Quotient:**  $\left(\frac{f}{g}\right)(x) = \frac{f(x)}{g(x)}$

5. **Composite:**  $(f \circ g)(x) = f(g(x))$

# Prerequisite Skills with Practice

Calculator exercise introducing the storage button and the variable button.



Given the following functions,  
perform the indicated operation.

$$f(x) = 2x - 1$$

$$g(x) = 6x^2 + x - 2$$

$$h(x) = \sqrt{x}$$

$$f(3) - g(-2)$$

$$\left(\frac{g}{f}\right)(x)$$

$$(g \circ f)(x)$$

$$3h(16x^4)$$

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

Composition of functions:  
Plugging functions into other  
functions.

$$f(x) = x^2 - 1$$

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

Given the functions on the the left, find  $(f \circ g)(x)$   
and  $(g \circ f)(x)$  Then evaluate the functions at 1,2 & 3  
your graphing calculator.

<b>x</b>	<b><math>(f \circ g)(x)</math></b>
<b>1</b>	
<b>2</b>	
<b>3</b>	

<b>x</b>	<b><math>(g \circ f)(x)</math></b>
<b>1</b>	
<b>2</b>	
<b>3</b>	

Before we start the next part....  
More domain practice.

$$f(x) = \frac{1}{x} \quad f(x) = \sqrt{x} \quad f(x) = \frac{1}{\sqrt{x}}$$

$$f(x) = \frac{2}{x^2 + 5x + 6} \quad f(x) = \frac{2}{\sqrt{x^2 + 5x + 6}}$$

Domains and composite functions

$$f(x) = \sqrt{x}$$

$$g(x) = \frac{1}{x}$$

$$h(x) = 3x^2 - 10x - 8$$

$$l(x) = x^2 - 16$$

$$(g \circ h)(x)$$

$$(l \circ f)(x)$$

$$(g \circ g)(x)$$

$$(f \circ l)(x)$$

$$(g \circ l)(-4)$$



A stone is thrown into a pond.  
A circular ripple is spreading  
over the pond in such a way  
that the radius is increasing at  
the rate of 5.3 feet per second  
Find a function,  $r(t)$ , for the  
radius in terms of "t". Find a  
Function,  $A(r)$ , for the area of  
the ripple in terms of "r".  
Find  $(A \circ r)(t)$



# THE END



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