

# Handout – Composition, part 1

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Math 115

## Example 1

Let  $f(x) = \underline{\hspace{2cm}}$  and  $g(x) = \underline{\hspace{2cm}}$ .

a.) Find the domain of  $f$ .

$\longrightarrow$  Domain of  $f$ :  $D_f = \{ x \mid \underline{\hspace{2cm}} \}$

b.) Find the domain of  $g$ .

$\longrightarrow$  Domain of  $g$ :  $D_g = \underline{\hspace{2cm}}$ .

c.) Create a table of values.

$x$	-6	-5	-4	3	4	5
$g(x)$						
$f(g(x))$						

d.) Find  $(f \circ g)(x) = f(g(x))$

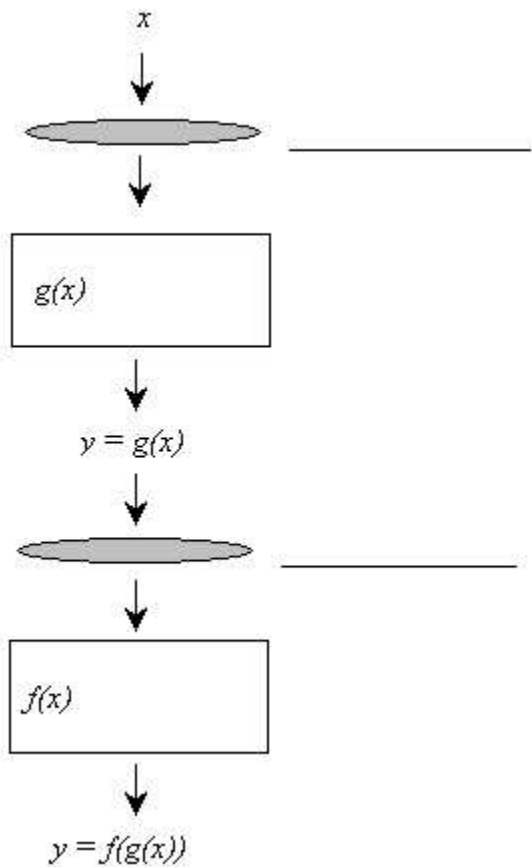
$f(g(x)) = \underline{\hspace{2cm}}$

e.) If we call the expression found in (d.) the apparent composition (AC), find  $D_{AC}$ .

Domain of AC:  $D_{AC} = \underline{\hspace{2cm}}$ .

f.) The domain of  $f(g(x))$  is  $\underline{\hspace{2cm}}$ .

g.) Domain of  $f(g(x)) : D_{f \circ g} = \underline{\hspace{2cm}}$ .



**Example 2**

Let  $f(x) = \frac{x}{x+4}$  and  $g(x) = 2 - x$ . Find  $f(g(x))$  and  $g(f(x))$  and the domains of each composition.

a.) Find the domain of  $f$  and  $g$ .

$$D_f = \underline{\hspace{10em}}$$

$$D_g = \underline{\hspace{10em}}$$

b.) Find  $f(g(x))$ .

$$f(g(x)) = \underline{\hspace{10em}}$$

c.) What is the domain of the apparent composition?

$$D_{AC} = \underline{\hspace{10em}}.$$

d.) What is  $D_{f \circ g}$ ?

$$D_{f \circ g} = \underline{\hspace{10em}}.$$

e.) Find  $g(f(x))$ .

$$g(f(x)) = \underline{\hspace{10em}}$$

f.) What is the domain of the apparent composition?

$$D_{AC} = \underline{\hspace{10em}}.$$

g.) What is  $D_{g \circ f}$ ?

$$D_{g \circ f} = \underline{\hspace{10em}}.$$

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### Example 3 (2.5 #81)

Let  $f(x) = \frac{2x+1}{x-2}$  and  $g(x) = \frac{x+2}{x-3}$ . Find  $f(g(x))$  and  $g(f(x))$  and the domains of each composition.

a.) Find the domain of  $f$  and  $g$ .

$$D_f = \underline{\hspace{10em}}$$

$$D_g = \underline{\hspace{10em}}$$

b.) Find  $f(g(x))$ .

$$f(g(x)) = \underline{\hspace{10em}}$$

c.) What is the domain of the apparent composition?

$$D_{AC} = \underline{\hspace{10em}}.$$

d.) What is  $D_{f \circ g}$ ?

$$D_{f \circ g} = \underline{\hspace{10em}}.$$

e.) Find  $g(f(x))$ .

$$g(f(x)) = \underline{\hspace{10em}}$$

f.) What is the domain of the apparent composition?

$$D_{AC} = \underline{\hspace{10em}}.$$

g.) What is  $D_{g \circ f}$ ?

$$D_{g \circ f} = \underline{\hspace{10em}}.$$

**Example 4 (2.5 #84)**

Let  $f(x) = \sqrt{x^2 + 8}$  and  $g(x) = \sqrt{x^2 - 9}$ . Find  $f(g(x))$  and  $g(f(x))$  and the domains of each composition.

a.) Find the domain of  $f$  and  $g$ .

$$D_f = \underline{\hspace{10em}}$$

$$D_g = \underline{\hspace{10em}}$$

b.) Find  $f(g(x))$ .

$$f(g(x)) = \underline{\hspace{10em}}$$

c.) What is the domain of the apparent composition?

$$D_{AC} = \underline{\hspace{10em}}.$$

d.) What is  $D_{f \circ g}$ ?

$$D_{f \circ g} = \underline{\hspace{10em}}.$$

e.) Find  $g(f(x))$ .

$$g(f(x)) = \underline{\hspace{10em}}$$

f.) What is the domain of the apparent composition?

$$D_{AC} = \underline{\hspace{10em}}.$$

g.) What is  $D_{g \circ f}$ ?

$$D_{g \circ f} = \underline{\hspace{10em}}.$$