Algebra 2

Ch. 7 Handout 7.6

Function Operations

Function Operations

Addition	$(f+g)(x)=f(x)+g(x)$
Multiplication	$(f\cdot g)(x)=f(x)\cdot g(x)$
Subtraction	$(f-g)(x)=f(x)-g(x)$
Division	$\left(\dfrac{f}{g}\right)(x)=\dfrac{f(x)}{g(x)}, g(x)\neq 0$

The domains of the sum, difference, product, and quotient functions consist of the x-values that are in the domain of both *f* and *g*. However, the domain of a quotient function does not contain any x-values for which g (x) = 0.

Addition $(f+g)(x)=f(x)+g(x)$

Subtraction $(f-g)(x)=f(x)-g(x)$

1. Let $f(x)=-2x+6$ and $g(x)=5x-7$.
Find f + g and f - g and their domains.

$(f+g)(x)$

$f(x)+g(x)$

$(-2x+6)+(5x-7)$

$3x-1$

D: all real #'s

$(f-g)(x)$

$f(x)-g(x)$

$(-2x+6)-(5x-7)$

$-2x+6-5x+7$

$-7x+13$

D: all Real #'s

Multiplication $(f \cdot g)(x) = f(x) \cdot g(x)$

Division $\left(\frac{f}{g}\right)(x) = \frac{f(x)}{g(x)}, g(x) \neq 0$

2. Let $f(x) = x^2 + 1$ and $g(x) = x^4 - 1$. Find $f \cdot g$ and $\frac{f}{g}$ and their domains.

$(f \cdot g)(x)$

$f(x) \cdot g(x)$

$(x^2+1)(x^4-1)$

$x^6 - x^2 + x^4 - 1$

$x^6 + x^4 - x^2 - 1$

D: all real #'s

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

$= \frac{x^2+1}{x^4-1}$

$= \frac{x^2+1}{(x^2+1)(x^2-1)}$

$= \frac{\cancel{(x^2+1)}}{\cancel{(x^2+1)}(x-1)(x+1)}$

$\frac{1}{(x-1)(x+1)}$

D: all real #'s except −1, 1

$(x^2+1)(x-1)(x+1) = 0$

~~$x^2+1=0$~~ $x-1=0$ $x+1=0$

~~$\sqrt{x^2} = \sqrt{-1}$~~ $x=1$ $x=-1$

Steps
1. factor
2. Domain by setting den = 0
3. simplify expression

Composition of Functions

The composition of function g with function f is written as $g \circ f$ and is defined as $(g \circ f)(x) = g(f(x))$.

1. Evaluate the inner function $f(x)$ first
2. Then use your result as the input of the outer function $g(x)$

3. Let $f(x) = x - 2$ and $g(x) = x^2$. Find $(g \circ f)(-5)$ and $(f \circ g)(-3)$.

4. Let $f(x) = x^3$ and $g(x) = x^2 + 7$. Find $(g \circ f)(2)$.

$$h(x) = x + 1,\ k(x) = x^2 + 2x - 4, \text{ find } (k \circ h)(a)$$

A store offers a 20% discount on all items. You have a coupon worth $3.

a) Use functions to model discounting an item by 20% and to model applying the coupon.

Let x = original price

b) Use a composition of your two functions to model how much you would pay for an item if the clerk applies the discount first and then the coupon.

c) Use a composition of your two functions to model how much you would pay for an item if the clerk applies the coupon first and then the discount.

d) How much more is any item if the clerk applies the coupon first?

Assignment:

Day 1: Pgs 400-404 (1-18 (find domain), 46-56 evens (find domain))

5. A store offers a 20% discount on all items. You have a coupon worth \$3.

a) Use functions to model discounting an item by 20% and to model applying the coupon.
Let x = original price

b) Use a composition of your two functions to model how much you would pay for an item if the clerk applies the discount first and then the coupon.

5. A store offers a 20% discount on all items. You have a coupon worth $3.

c) Use a composition of your two functions to model how much you would pay for an item if the clerk applies the coupon first and then the discount.

d) How much more is any item if the clerk applies the coupon first?

Any item would cost __________ more.