COLLEGE ALGEBRA

NAME: Holly Gasper

GPS # 19 2.6 COMBINING FUNCTIONS; COMPOSITE FUNCTIONS

Class Time: TTh 11:30 Date: 2-14-08

Useful Definitions:

If $f(x)$ and $g(x)$ define functions, then

* $(f+g)(x) = f(x)+g(x)$
* $(f-g)(x) = f(x)-g(x)$
* $(fg)(x) = f(x)g(x)$

[The domain of the new function is the intersection of the domains of $f(x)$ and $g(x)$.]

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

[The domain of the quotient function is the intersection of the domains of $f(x)$ and $g(x)$, excluding any values of x where $g(x) = 0$.]

$a^n \cdot a^m = a^{n+m}$

* never want the domain $g(x)$ to be zero

1. For each pair of functions, find $(f+g)(x)$, $(f-g)(x)$ and $(fg)(x)$ Give the domain.

$f(x) = 3x-4$ and $g(x) = -5x+1$

$f(x) = (3x-4)+(-5x+1)$

$f(x) = -2x-3$

$D: (-\infty, \infty)$

$f(x) = (3x-4)-(-5x+1)$

$f(x) = 8x-5$

$D: (-\infty, \infty)$

$f(x) = (3x-4)(-5x+1)$

$f(x) = -15x^2+23x-4$

$D: (-\infty, \infty)$

2. Let $f(x) = 7x-3$, $g(x) = -x^2+2$ and $h(x) = -x$. Find the following.

a) $(f+g)(x) = (7x-3)+(-x^2+2)$ $-x^2+7x-1$

b) $(f+g)(2) = (7(2)-3)+(-(2)^2+2)$ $-4+14-1 = 9$

c) $(g-h)(x) = (-x^2+2)-(-x)$

d) $(g-h)(-3) = (-(-3)^2+2)-(-(-3)$

e) $(fg)(x) = (7x-3)(-x^2+2)$ $-7x^3+3x^2+14x-6$

f) $(fg)(2) = (7(2)-3)(-(2)^2+2)$ $-9-3+2 = -10$ $= -22$

g) $(gh)(x) = (-x^2+2)(-x)$ x^3-2x

h) $(gh)(-1) = (-(-1)^2+2)(-(-1))$ $-1+2 = 1$

3. Find the quotient $\left(\frac{f}{g}\right)(x)$ and give the domain.

$f(x) = -10x^2+5x$ and $g(x) = -5x+5$

$f(x) = \frac{-10x^2+5x}{-5x+5} = \frac{5x(-2x+1)}{5(-x+1)} = \frac{x(-2x+1)}{(-x+1)}$

domain: $\{x \mid x \neq 1\}$ or $D: (-\infty, 1) \cup (1, \infty$

4. Let $f(x) = 6x-3$ and $h(x) = 3x$. Find the following.

a) $\left(\frac{f}{h}\right)(x) = \frac{6x-3}{3x} = \frac{3(2x-1)}{3x}$ $\frac{2x-1}{x}$

b) $\left(\frac{f}{h}\right)(-2) = \frac{6(-2)-3}{3(-2)} = \frac{5}{2}$

$D: \{x \mid x \neq 0\}$