COLLEGE ALGEBRA

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GPS # 19 **2.6 COMBINING FUNCTIONS; COMPOSITE FUNCTIONS** Class Time: 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 $g(x) = 0$.]

20/20 Good Job!

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

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

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

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

$= -2x-3$

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

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

$= 8x-5$ D: $(-\infty, \infty)$

$-15x^2 + 23x - 4$ D: $(-\infty, \infty)$ 1

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

$-11+14+1 = 9$

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

$= -x^2+x+2$

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

$-9+2+3 = -4$

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

$= -7x^3+3x^2+14x-6$

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

-22

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

x^3-2x

h) $(gh)(-1) = (-1)^3-2(-1)$

$-1+2$

1

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

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

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

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

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

$= \frac{3(2x-1)}{3x} = \frac{2x-1}{x}$

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

b) $\left(\frac{f}{h}\right)(-2) = \frac{6(-2)-3}{3(-2)} = \frac{-12-3}{-6} = \frac{-15}{-6} = \frac{5}{2}$