

## Math 115E Activity 6

### Chapter 3 Section 3 Algebra of Functions

Algebraic Rules (better table)		
$ax + bx = (a + b)x$	$a(bx) = abx$	$a(b + c) = ab + ac$
$x^a \cdot x^b = x^{a+b}$	$(x^a)^b = x^{ab}$	$(xy)^a = x^a y^a$
$x^{-a} = \frac{1}{x^a}$	$\frac{x^a}{x^b} = x^{a-b}$	$\left(\frac{x}{y}\right)^a = \frac{x^a}{y^a}$
$(x + y)^2 \longrightarrow (x + y)(x + y) \longrightarrow x(x + y) + y(x + y) \longrightarrow x^2 + xy + xy + y^2 \longrightarrow x^2 + 2xy + y^2$		

#### Section 1:

Given the following functions  $f(x) = x^2 + x$ ,  $g(x) = 2 - 4x$ ,  $h(x) = x^2 - 1$ ,  $p(x) = x + 6$ ,  $k(x) = 2x + 2$

1. Find  $f(g(2))$

**30**

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

**$16x^2 - 20 + 6$**

2. Find  $g(f(2))$

**-22**

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

**$-4x^2 - 4x + 2$**

3. Find  $h(k(-4))$

**35**

7. Find  $h(k(x))$

**$4x^2 + 8x + 3$**

8. Find  $k(h(-4))$

**32**

12. Find  $k(h(x))$

**$2x^2$**

9. Find  $p(f(2))$

**12**

13. Find  $p(f(x))$

**$x^2 + x + 6$**

10. Find  $f(p(1))$

**56**

14. Find  $f(p(x))$

**$x^2 + 13x + 42$**

**Section 2:**

Given the following functions  $f(x) = x^2 + x$ ,  $g(x) = 2 - 4x$ ,  $h(x) = x^2 - 1$ ,  $p(x) = x + 6$ ,  $k(x) = 2x + 2$

15. Find  $f(x) \cdot g(x)$

19. Find  $g(x) \cdot f(x)$

16. Find  $g(-x) + h(x^2)$

20. Find  $p(x) + g(2x)$

17. Find  $k(x) \cdot k(x)$

21. Find  $h(x) \cdot p(x)$

**Section 3:**

23. Find  $f(x)(g(x) + k(x))$

26. Find  $f(k(x)) + p(h(x))$

24. Find  $g(x)(f(x) + k(x))$

27. Find  $f(f(x)) - k(k(x))$

25. Find  $k(x)(f(x) + g(x))$

28. Find  $h(x)f(x) + p(x)k(x)$