Your Name: September 16th 2025

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 $f(g(2))$

   $16x^2 - 20 + 6$

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

   $16x^2 - 20 + 6$

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

   $16x^2 - 20 + 6$

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

   $16x^2 - 20 + 6$

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

   $16x^2 - 20 + 6$

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

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

   $16x^2 - 20 + 6$

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

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

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

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

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

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

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

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

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

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

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

Section 3:

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

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

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

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

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

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