Classwork 7, 8 MATH 1113 Harrison Chapman Name: Key

8:00 or 9:30

1. Find the following values for the given functions.

$$f(x) = x + 3 \qquad g(x) = x^2$$

a) $(f+g)(6)$

$(6+3) + (6)^2 = 9 + 36 = \boxed{45}$

b) $(f-g)(6)$

$(6+3) - (6^2) = 9 - 36 = \boxed{-27}$

c) $(fg)(6)$

$(6+3) \cdot (6^2) = 9 \cdot 36 = \boxed{324}$

d) $(f/g)(6)$

$(6+3)/(6^2) = 9/36 = \boxed{1/4}$

e) $(f \circ g)(6)$

$f(g(6)) = f(6^2) = (6^2) + 3 = \boxed{39}$

f) $(g \circ f)(6)$

$g(f(6)) = g(6+3) = (6+3)^2 = \boxed{81}$

2. Find the following functions and their domains, given,

$$f(x) = \sqrt{x-2} \qquad g(x) = \sqrt{x-2}$$

a) $(f+g)(x)$

$(\sqrt{x-2}) + (\sqrt{x-2}) = 2\sqrt{x-2}$

Domain: $[2, \infty)$

b) $(f-g)(x)$

$(\sqrt{x-2}) - (\sqrt{x-2}) = 0$

Domain: $[2, \infty)$

c) $(fg)(x)$

$(\sqrt{x-2})(\sqrt{x-2}) = x-2$

Domain: $[2, \infty)$

d) $(f/g)(x)$

$(\sqrt{x-2}) / (\sqrt{x-2}) = 1$

Domain: $(2, \infty)$

e) $(f \circ g)(x)$

$f(g(x)) = f(\sqrt{x-2}) = \sqrt{(\sqrt{x-2}) - 2}$

Domain: $[6, \infty)$

need: $x \geq 2$ and $(\sqrt{x-2}) \geq 2$

$x - 2 \geq 4$

$x \geq 6$

3. Two functions are defined by the tables,

t	9	0	3	8	4
$T(t)$	3	8	0	9	6

x	9	0	3	8	4
$G(x)$	0	9	8	3	6

Find the values, if possible (if not possible, say DNE):

a) $(G \circ T)(0)$

$G(T(0)) = G(8) = 3.$

b) $(T \circ T)(0)$

$T(T(0)) = T(8) = 9.$

c) $(G \circ G)(0)$

$G(G(0)) = G(9) = 0$

d) $(T \circ G)(4)$

$T(G(4)) = T(6)$ DNE

4. If $f(t) = t^2 - 3$ and $g(x) = x + 8$, solve the equation $(f \circ g)(x) = 0$.

$f(g(x)) = 0$

$f(x+8) = 0$

$(x+8)^2 - 3 = 0$

$(x+8)^2 = 3$

$x + 8 = \pm\sqrt{3}$

$x = 8 + \sqrt{3}, \quad 8 - \sqrt{3}.$