Math S-Xab Summer 2004
Worksheet: Functions Working Together
July 1, 2004

1. Suppose that we have the following table of values.

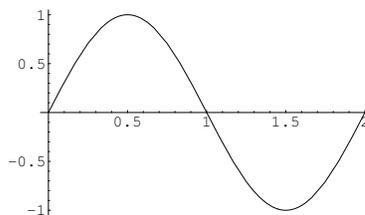| x	-2	-1	0	1	2	3	4
$f(x)$	0	2	1	3	4	-2	5
$g(x)$	2	3	4	1	3	-1	0
$h(x)$	3	4	-3	2	8	1	2

Find each of the following.

(a) $f(-1) \cdot f(-1)$

(b) $f(g(-1))$

(c) $g(f(-1))$

(d) $h(g(f(2)))$

(e) $\dfrac{f(0) + 2}{g(0)}$

(f) $5h(3) + f(f(1))$

(g) $f(f(f(0)))$

2. How many ways can you find to decompose the function

$$h(x) = 5 \left(\frac{1}{x - \pi} \right)^2 + 4 \left(\frac{1}{x - \pi} \right) + 7$$

into functions f and g such that $f(g(x)) = h(x)$?

3. Gwendolyn, a common parabola, was taking a peaceful nap when her dream turned into a nightmare: she dreamt that a low-flying pterodactyl was swooping towards her. Startled, she flipped over the horizontal axis, darted up (vertically) by three units, and to the left (horizontally) by two units. Finally, she woke up and realized that her equations was $y = (x - 1)^2 + 3$. What was her equation before she had the bad dream?

4. Shown below is the graph of $y = f(x)$ for some function f. Use this graph to sketch the graph of the following functions.

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

(b) $y = -f(3x)$

(c) $y = f(4 - x)$

(d) $y = |f(\frac{x}{2})|$

(e) $y = \frac{1}{2}f(2x - 2) + 5$