Meramec College Algebra Quiz 6 Solution Spring 2008

NAME: _____Score_____/10

SHOW ALL YOUR WORK IN A NEAT AND ORGANIZED FASHION

1. Write in complete detail a verbal description of the exact meaning of the symbol $\text{hm}\left(\frac{\sqrt{x}+2}{3}\right)$ for the function named hm.

   $\text{hm}\left(\frac{\sqrt{x}+2}{3}\right)$ is the unique range element associated with the domain element $\frac{\sqrt{x}+2}{3}$ by the function named hm.

2. The rule for the function f is $f(x) = x^2 + x + 1$. Find the zeros of f.

The zeros of a function f are found by solving the equation resulting from $f(x) = 0$. Therefore we must solve the equation $x^2 + x + 1 = 0$. Because a factorization is not obvious, we will use the quadratic formula $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ to obtain

$$x = \frac{-1 \pm \sqrt{1^2 - 4(1)(1)}}{2(1)} = \frac{-1 \pm \sqrt{-3}}{2} = \frac{-1 \pm \sqrt{3}\ i}{2}$$

The zeros of f are the complex numbers $\frac{-1+\sqrt{3}\ i}{2}$ and $\frac{-1-\sqrt{3}\ i}{2}$

3. The rule for the function f is $f(x) = x + 2$. The rule for the function h is $h(x) = x^2 + 1$. What is the rule for the composition $h \circ f$. Show your work. Your work should be a string of equalities beginning with $h \circ f(x) = h(f(x)) = h(x+2) = (x+2)^2 + 1 = (x^2 + 4x + 4) + 1 = x^2 + 4x + 5$