

2012 Summer Workshop, College of the Holy Cross
Foundational Mathematics Concepts for the High School to College Transition

Day 8 – July 19, 2011

Warm-up Exercise

Assume all the usual rules of algebra (and no new rules) apply in the following. Define three functions as follows:

$$\&(\heartsuit) = \%^\heartsuit, \quad \#(\spadesuit) = \spadesuit \cdot \spadesuit, \quad \$(\clubsuit) = \clubsuit + \clubsuit.$$

Which of the following are valid statements? If a statement is not valid, what is the correct right side?

1. $\&(\heartsuit + \heartsuit) = \%^\(\heartsuit)

2. $(\# \circ \$)(\heartsuit) = (\$ \circ \#)(\heartsuit)$

3. $(\& \circ \$)(\eta) = (\# \circ \&)(\eta)$

4. $(\$ \circ \&)(\aleph) = (\& \circ \$)(\aleph)$

5. $\#(\$^{-1}(\spadesuit)) = \frac{\#(\spadesuit)}{\$(2)}$

6. $(\$ \circ \&^{-1})(\clubsuit) = (\&^{-1} \circ \#)(\clubsuit)$