

## PRE-CALCULUS REVIEW, Part 2

Concepts/Skills to know:

- Define function, use function notation, and understand its meaning.
- Find function values  $f(x)$  at specific  $x$ -values by using function rules.  
Also, simplify functional expressions.
- Distinguish between domain ( $x$ -values) and range ( $y$ -values) of a function and distinguish between independent variable and dependent variable.
- Identify and sketch transformations of a function by looking at the equations and at tables of values:  
vertical shift, up or down,  $y = f(x) + c$   
horizontal shift, left or right,  $y = f(x + c)$   
vertical stretch or compression,  $y = c \cdot f(x)$   
reflection across the  $x$ -axis,  $y = -f(x)$
- Combine two functions using arithmetic operations  $(f+g)(x)$   $(f-g)(x)$   $(f \cdot g)(x)$   $(f/g)(x)$ ,  
i.e., add, subtract, multiply, and divide functions,  
and identify the domain of the result of the arithmetic.
- Combine two functions using composition  $(f \circ g)(x)$   $(g \circ f)(x)$ ,  
i.e., apply one function to the result obtained from the other,  
and identify the domain of the composite function.
- Express a function in a composite function form,  
i.e., given a function  $y = h(x)$ , find  $g(x)$  and  $f(x)$  such that  $h(x) = f(g(x))$ .
- Express volume and surface area of a rectangular prism as functions.
- Express the length of a side or hypotenuse of a right triangle as a function of the length of another side.