# FUNCTIONS, CONTINUED:
## DEFINITIONS AND VERBAL REPRESENTATIONS

**II. Formal Definitions and Function Notation**

Discuss with your group the following terms and notation and come up with formal definitions:

1. Function

2. Domain

3. Range

4. Independent Variable

5. Dependent Variable

6. $y = f(x)$  (What is the independent variable and what is the dependent variable?)

**III. Verbal Representations of Functions**

A function can be represented verbally by giving the rule that assigns to one quantity the value of a second quantity.

Decide whether each of the following rules is a **function**. If so, determine the domain and range. If not, explain why not.

1. The rule that assigns to each day of the year the official temperature at noon at Hopkins Airport.

2. The rule that assigns to each counting number $n$ the number of external sides of a "square train" with $n$ squares.

3. The rule that assigns to each class at KSU the instructor of the class.

4. The rule that assigns to each function its representation.

5. The rule that assigns to each real number its square.

6. The rule that assigns to each real number its square root.

7. The rule that assigns to each real number its cube root.

8. The rule that assigns to each counting number the number 2.

What are some advantages and disadvantages of giving a verbal representation of a function? In what situations might it be preferable to the other types of representations?

# FUNCTIONS, CONTINUED: MORE VERBAL REPRESENTATIONS

**IV. Functions in Context**

Describe a functional relationship in each of the following:

1. A rental car costs $45 per day plus 10¢ per mile.

   a. John plans to rent a car for three days, but will drive various numbers of miles each day.

   b. Whenever Paul rents a car he always drives it 84 miles each day, but the number of days he needs the car varies each time he rents it.

   c. Every time it rains, George's car breaks down and he has to rent a car for a day to drive the 37 miles to work and back.

   d. Ringo likes to drive but has no car. He sells umbrellas on the street during the week to make money to rent a car to drive on Saturday. He sets aside $5 per umbrella for his "mileage money" and on Saturday he drives as a many miles as he can afford.

2. Mick has children living in various places around the world, with more discovered by journalists and anthropologists all the time. He has been ordered to pay $17,000 per month in child support for each (known) child.

3. Keith, for as yet unknown reasons, was climbing a palm tree when he lost his grip about 30 feet up in the tree and fell. As he fell toward the Earth, mumbling something incoherent but no doubt profound, he accelerated to near terminal velocity before landing on his head.

4. Give your own example of a context with functional relationships and describe the relationships. (It need not involve any rock legends.)