Homework Assignment 1: Solutions

1.   Here the independent variable is the number of Nonfederal waste sites. The dependent variable is the number of Federal Waste sites. Each distinct value of the independent variable has one and only one value of the dependent variable. The numbers that correspond to Ohio and Oklahoma are a little confusing because the data point is repeated. For both states, the value of the independent variable is 30 and the corresponding value of the dependent variable is 3. The number of Federal Waste Sites is a function of the number of the number of Nonfederal Waste Sites. The arrow diagram is shown in Figure 1 (below). The arrow diagram confirms that this relationship is a function because each input is connected to one and only one input by an arrow.
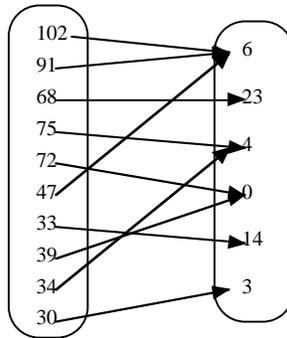

Figure 1: Arrow Diagram with number of Nonfederal Waste Sites as independent variable and number of Federal Waste Sites as the dependent variable.

2.   Here the independent variable is the number of Federal waste sites and the dependent variable is the number of Nonfederal waste sites. This is not a function, as the input value zero corresponds to output values of 72 and 39 (Michigan and Wisconsin). Thus, one value of the input corresponds to more than one value of the output. (This is also true for the input values of 6 and 4.) The arrow diagram is shown in Figure 2 below. You can see that the relationship is not a function from the arrow diagram because one of the values of the input (zero) is connected to two output values by two different arrows. (You can also see this for input values of 6 and 4 as well.)
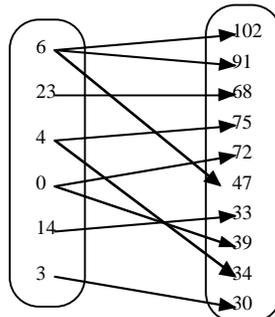

Figure 2: Arrow Diagram with number of Federal Waste Sites as independent variable and number of Nonfederal Waste Sites as the dependent variable.

3.   Most people who go on to attend college are high school graduates. The number of people who eventually graduate from college is related to the number of people who attend college. Therefore, the number of people who graduate from college will likely have something to do with the number of people who graduate from high school. You could plot a graph of percentage of people who have 4 years of college versus the percentage of people who have 4 or more years of high school.

4.   If the theory is correct, the graph should show an increasing trend. The horizontal axis should go from 0 to 100, and the vertical axis should go from 0 to somewhere around 30.

5.   If you actually make the plot described in the answer to Question 8, you get the following graph:
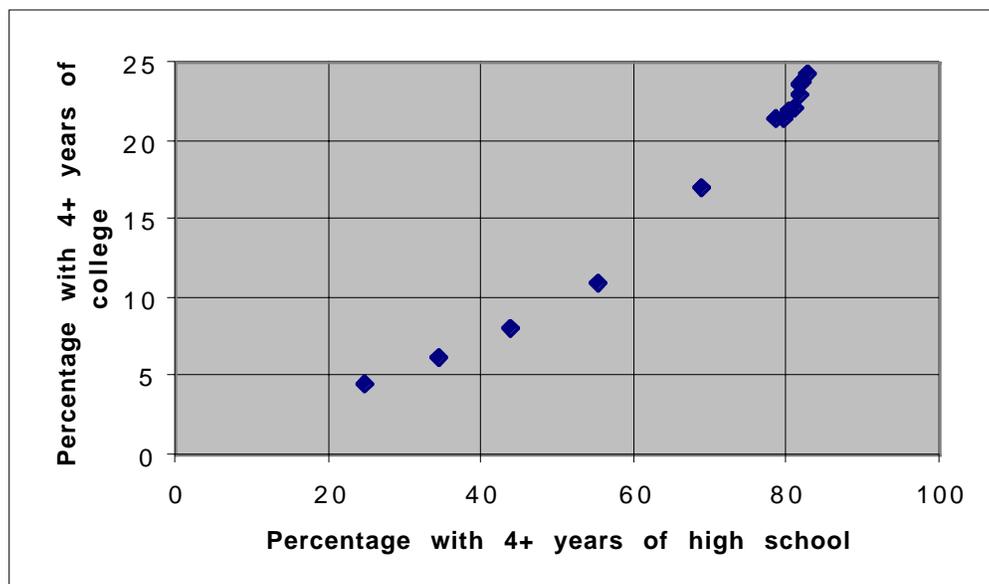
This plot does show an increasing trend, so it may well be true that there is a relationship between the percentage of people with four or more years of high school and the percentage of people with four or more years of college. Until we discover some definite link between the two, the relationship is not confirmed, however. This could all just be a big coincidence, or there might be other factors that have affected both the percentages of people spending four or more years in high school or college.

Points to keep in mind when completing homework:

1. *Make sure you read the question carefully and answer the question.*
2. *Use complete sentences.*
3. *Provide thorough explanations - support answers with evidence.*
4. *Show me that you understand the concepts.*
5. *Write legibly.*