# Graph (Map) Quest

Objective: The student will use a graph to model a problem and
               use that graph as a counting tool.

Buster Jones drives a truck for Major Dollar Stores. This company has
distribution centers in Hattiesburg, McComb, Monticello,
Magee, Meridian, Jackson, Winona, Louisville, Kosciusko, and
Starkville. The largest warehouses are in Hattiesburg, Jackson,
and Starkville. When Buster takes a load from Hattiesburg, he
delivers it to McComb, Monticello, Magee, or Meridian. When
he takes a load from Starkville, he delivers it to Winona,
Louisville, or Kosciusko. When he takes a load from Jackson, he can
deliver it to any of the centers other than Hattiesburg or Starkville.
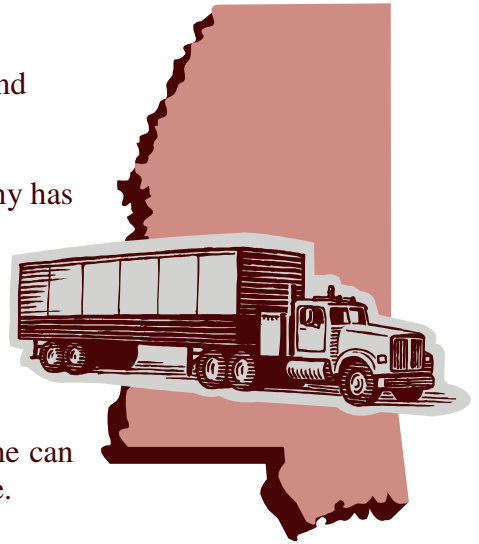
1.   Find the locations of the distribution centers on a map of Mississippi.

2.   Draw a vertex-edge graph to depict the routes that Buster can drive.

3.   Use the vertex-edge graph to determine how many different routes Buster can take to get from the warehouse in Hattiesburg to the warehouse in Starkville. Explain the process that you used to arrive at your answer.

4.   Use the vertex-edge graph to determine the number of different round trips Buster can make that begin at Hattiesburg and include Jackson and Starkville. Explain the process that you used to arrive at your answer.

5.   Suppose that on a round trip Buster does not pass through any city on the return trip that he passed through earlier other than Jackson. Use the vertex-edge graph to determine the number of different round trips Buster can make that begin at Hattiesburg and include Jackson and Starkville. Write a sentence to explain your answer.

6. Count the number of routes from Hattiesburg to Starkville that include McComb or Louisville. Explain the process that you used to arrive at your answer.

7. Count the number of routes from Hattiesburg to Starkville that include Meridian or Magee. Explain the process that you used to arrive at your answer.

8. Describe the rule being used to count the number of routes in problems 3, 4, and 5.

9. Describe the rule being used to count the number of possible routes in problems 6 and 7.