# Module 7 - Assessment: Application/Free Response

1. Population Density.

The population density, *D*, in people/square mile (p/mi²), for the large city Westport is related to the distance *x* (in miles) from the city’s center by the equation:



* 1. Describe the domain of this function.
  2. Create a table of values and graph this function for.
  3. Describe what happens to Westport’s population density as the distance from the city’s center changes from one mile to six miles. What may explain this phenomenon?
  4. Describe what happens to Westport’s population density as the distance from the city’s center changes from ten miles to thirty miles.
  5. Describe the end-behavior of this function? What may explain this phenomenon?
  6. In what areas of the city is the population density below 200 p/mi²?

1. Oil Spill Clean-Up.

The cost, *C*, in United States Dollars ($), of cleaning up *x* percent of an oil spill along the Gulf Coast of the United States increases tremendously as *x* approaches 100. One equation for determining this cost (in millions $) is:



* 1. Describe the domain of this function.
  2. Create a table of values and graph this function for.
  3. Describe what happens to the cleanup costs when the percentage to be cleaned increases from twenty percent to eighty percent. What may explain this result?
  4. Describe what happens to the cleanup costs when the percentage to be cleaned increases from ninety percent to 100 percent. What may explain this result?
  5. For which percentages, *x*, does the cost remain at or below $75 million?