Word Problems - Logarithms

1) The amount g (in trilliions of cubic feet) of natural gas consumed in the United States from 1980 to 2010

   can be modeled by: $g = 2.91(1.07)^t$ where t equals the number of years since 1980.

   Identify the: a) initial amount:

                    b) the growth factor:

                    c) annual percent increase:

   d) Estimate the natural gas consumption in 1995.

   e) What year was the consumption about 15.8 trillion cubic feet?

2) In 1980 wind turbines in Europe generated about 5 giga watt-hours of energy. Over the next 15 years, the amount of energy increased by about 59% per year.

   a) Write a model giving the amount E (in giga watt-hours) of energy t years after 1980.

   b) About how much wind energy was generated in 1984?

   c) Estimate the year when 80 gigawatt-hours of energy were generated.

3) From 1971 to 1995, the average number n of transistors on a computer chip can be modeled by:

$$n = 2300(1.59)^t, \text{ where } t \text{ is the number of years since 1971.}$$

a) Identify the initial amount, the growth factor, and annual percent increase.

b) Estimate the number of transistors on a computer chip in 1998.

4) In 1965, the federal debt of the United States was $322.3 billion. During the next 30 years, the debt increased by about 10.2% each year.

a) Write a model giving the amount D (in billions of dollars) of debt t years after 1965. About how much was the federal debt in 1980?

b) Estimate the year when the federal debt was $2,120 B.

5) You have inherited land that was purchased for $30,000 in 1960. The value of the land increased by approximately 5% per year.

a) Write a model for the value of the land t years after 1960.

b) What is the approximate value of the land in the year 2015?

c) At what year would the land be valued at about half a million dollars?