Project: Population per Square Mile   The populations *P* per square mile of the United States for selected years from 1790 through 2010 are shown in the table. A model for the data is

$$P = -4.5 + 8.4e^{0.0114t}, \quad -10 \le t \le 210$$

where *t* is the year with $t = -10$ corresponding to 1790.
(Source: U.S. Census Bureau)

Year	Population per square mile, *P*
1790	4.5
1800	6.1
1810	4.3
1820	5.5
1830	7.4
1840	9.8
1850	7.9
1860	10.6
1870	11.2
1880	14.2
1890	17.8
1900	21.5
1910	26.0
1920	29.9
1930	34.7
1940	37.2
1950	42.6
1960	50.6
1970	57.5
1980	64.0
1990	70.3
2000	79.6
2010	87.4

DATA

Spreadsheet at LarsonPrecalculus.com

(a) Use a graphing utility to plot the data and graph the model in the same viewing window.

(b) Create a table that compares the actual data values with the values found using the model.

(c) Does it appear that the model is a good fit for the data? Explain your reasoning.

(d) Would you use the model to predict the population per square mile for future years? If so, use the model to predict the population per square mile in 2030. Does your answer seem reasonable? Explain your reasoning.

(e) Do you believe the population per square mile will eventually reach a maximum and begin to decrease? Explain your reasoning.