US Population 1982-1988

The below table provides some U.S. Population data from 1982 to 1988:

Year	**Population (*in thousands*)**	**Change in Population (*in thousands*)**
1982	231,664	----
1983	233,792	233,792 - 231,664 = 2128
1984	235,825	2033
1985	237,924	2099
1986	240,133	2209
1987	242,289	2156
1988	244,499	2210

Notice: The change in population from 1982 to 1983 is 2,128,000, which is recorded in thousands in the first row of the 3rd column. The other changes are computed similarly. All population numbers in the table are recorded in thousands.

Source: Census

a. If we were to model the relationship between the U.S. population and the year, would a linear function be appropriate? Explain why or why not.

b. Mike decides to use a linear function to model the relationship. He chooses 2139, the average of the values in the 3rd column, for the slope. What meaning does this value have in the context of this model?

c. Use Mike's model to predict the U.S. population in 1992.

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Commentary

This task focuses on the fact that linear functions are characterized by constant differences over equal intervals. It could be used alongside to F-LE Equal Differences over Equal Intervals I & II. Students should be encouraged to take care to express the magnitude of the slope correctly since numbers are given in thousands.

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Solution

a. The table shows that over one year periods, the population increases by approximately the same amount (just a little over 2 million per year). Hence a linear function is appropriate to model the relationship between the population and the year.

b. The slope of the linear function which will model this relationship will measure the change in population per change in time. Its units will be millions-of-people per year in this problem. A value of 2139 thousand = 2,139,000 for the slope would mean that the population is growing by approximately 2,139,000 people per year.

c. The population in 1988 was 244,499,000. Mike's choice for the slope from problem (b) indicates a population growth of about $4 \cdot (2{,}139{,}000) = 8{,}556{,}000$ people between 1988 and 1992. Therefore Mike's model predicts the 1992 population to be approximately 253,055,000 people.

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