

For each situation in #1 and #2 below, do the following:

- a) Clearly define your variables.
- b) Identify the independent and dependent variables.

1. Let L be the length of a person's hair (in inches) at t weeks since her hair was last cut.
2. Let P be the percentage of American adults who own at least three cars and I be the annual income (in thousands of dollars) of an American adult.

For each situation in #3 and #4 below, define your variables, identify the independent and dependent variables, then write your answer in a complete sentence.

3. Let n be the number (in millions) of skateboarders in the United States at t years since 2000. What does the ordered pair $(9, 13)$ mean in this situation?
4. Let p be the percentage of Americans at age A years who say they volunteer. What does the ordered pair $(21, 38)$ mean in this situation?

For 5 & 6, take the following steps.

- a) Clearly define your variables, and identify the independent and dependent variables.
- b) Find two ordered pairs from the given information.
- c) Find the equation of the linear model to describe the data. Round final answers to two decimal places.
- d) Solve the problem using your linear model.
- e) Write your answer in a complete sentence in the context of the problem.

5. The percentage of large or medium-sized companies paying 100% of their employees' health care premiums decreased approximately linearly from 33% in 1999 to 17% in 2004. Let p be the percentage of large or medium-sized companies paying 100% of their employees' health care premiums at t years since 1995. Estimate when 24% of large or medium-sized companies paid 100% of their employees' health care premiums.

6. In Mississippi, a child is eligible for the Children's Health Insurance Program (CHIP) if the child's family meets an income limit. For a family of four, family monthly income must be no more than \$3067. For a family of six, family monthly income must be no more than \$4114. There is a linear relationship between family size s and the income limit I . What is the income limit of a family of seven?

7. The percentage p , of births outside marriage in the United States at t years since 1900 can be modeled by the equation

$$p = 0.77t - 43.81$$

- a) Clearly define your variables and determine the independent and dependent variables.
- b) Rewrite the equation $p = 0.77t - 43.81$ with the function name f .
- c) Find $f(114)$. What does your result mean in this situation?
- d) According to the model, in what year will all births be outside marriage?
- e) Estimate the percentage of births outside marriage in 1997. The actual percentage was 32.4%. What is the error in your estimate? (The error is the difference between the estimated value and the actual value.)

Year	% births outside marriage
1970	10.7
1975	14.3
1980	18.4
1985	22.0
1990	28.0
1995	32.2
2000	33.2
2005	36.8