**1.** If Janice Position-Classification, personnel offi cer for the Bureau of Forms, can forecast agency separations 6 months from now, she can plan recruitment efforts to replace these people. Janice believes that separations 6 months from now are determined by the number of agency people passed over for promotion (X1), the number of agency people 64 years old or older (X2), and the ratio of government salaries to private sector salaries (X3). Using regression, Janice finds the following:

Y^ = 27.4 + .35X1 + .54X2 - 271X3

sb1 = .0031 sb2 = 0.136 sb3 = 263 Sy|x = 54

R2 = .89 Adj. R2 = .85 N = 214

Write a one-page memo explaining the results, and then forecast the number of separations if 418 people are passed over for promotion, 327 people are 64 years old or older, and government salaries equal those in the private sector.

**2,** The McKeesport Fire Department wants to know how likely it is that a truck pump will fail. The fire chief, George Pyro (no relation), thinks pump failure is a function of age (X1) and water hardness (X2 measured on a scale of 1 to 10). The department statistician runs a regression on a dummy variable (coded 1 for failure and 0 for no failure) for 217 pumps. She finds the following:

Y^ = .14 + .01X1 + .05X2

sb1 = .0002 sb2 = .025 Sy|x = .04 R2 = .93 Adj. R2 = .92

Write a memo explaining what the regression means. If the average water hardness is 3 and the chief would like to replace any pump with a probability of failing of .80 or more, at what age should pumps be replaced?