

### Homework 3 Due February 20

1. The mean serum-creatinine level measured in 12 patients 24 hours after they received a newly proposed antibiotic was 1.2 mg/dL.
  - (a) If the mean and the standard deviation of serum creatinine level in the general population are 1.0 and 0.4 mg/dL, respectively, using a significance level of 0.05, test if the mean serum-creatinine level in this group is different from that of the general population. What is the  $p$ -value for the test?
  - (b) Suppose the sample standard deviation of serum creatinine in part (a) is  $s = 0.6$  mg/dL. Assume that the standard deviation of serum creatinine  $\sigma$  is not known, and perform the hypothesis test in problem (a). Report a  $p$ -value.
2. The data in the table below gives the infant-mortality rates per 1000 livebirths in the United States for the period 1960-1979 ( $x$  =year,  $y$ =infant mortality rate per 1,000 live births).

x	y	x	y
1960	26.0	1974	16.7
1965	24.7	1975	16.1
1970	20.0	1976	15.2
1971	19.1	1977	14.1
1972	18.5	1978	13.8
1973	17.7	1979	13.0

- (a) Fit a linear-regression line relating infant mortality rate to chronological year using these data.
  - (b) Test for significance of the linear relationship developed in part (a).
  - (c) If the trends continued for the next 10 years, then what would be the predicted infant-mortality rate in 1989?
  - (d) Can the linear relationship developed in Problem 11.21 be expected to continue indefinitely? Why or why not?
3. Refer to the data in the attached file:
    - (a) Find the best-fitting linear relationship between duration of hospitalization and age. Test for the significance of this relationship. What is  $R^2$  for this regression? Assess the goodness of fit of the regression line.
    - (b) Construct a multiple-regression model relating duration of hospitalization to the other variables. Compute  $R^2 = \text{Reg SS} / \text{Total SS}$  and assess the goodness of fit.