- 1st lab overheads on web site
- Optional lab for BIOS students and others interested in more theoretical background - 2/4
- 1st hour: KKMN Ch.5: #3
- 2nd hour: questions

<u>KKMN Ch.5: #3 p.66-67:</u>

Table gives:

- INC (X) $\rightarrow$ husband's annual income
- TIME (Y) $\rightarrow$ time (months) between marriage and birth of 1st child

a. Sketch by eye a line that fits data reasonably well. Comment on relationship between TIME (Y) and INC (X).

See SAS graph 1 (9801215a.gif)

b. Determine l.s. estimates of slope and intercept for straight-line regression of TIME (Y) on INC (X).

See SAS PROC REG output in (980121.lst).

c. Draw estimated regression line. Comment on how well this line fits the data.

See SAS graph 2 (9801215c.gif)

d. Are any of the assumptions for straight-line regression clearly not satisfied?

Linearity.

e. Test the null hypothesis that the true slope is 0. Interpret the results.

To test H_0: $\beta_1 = 0$, use the statistic

$$T = \frac{\widehat{\beta}_1 - \beta_1^{(0)}}{S_{\widehat{\beta}_1}} = \frac{.00071 - 0}{.00035} = 2.023$$

which has two-sided p-value $= .0582 > .05$ so we don't reject H_0 at the $\alpha = .05$ level.

f. Can you suggest a model that would describe the TIME-INC relationship better than a straight line does?

I'd try:

$$Y = \beta_0 + \beta_1 X + \beta_2 X^2 + E$$