MS Module 15: Linear regression models (overview 3rd edition)

(The attached PDF file has better formatting.)

(Readings from the third 3rd edition of the Devore, Berk, and Carlton text.)

Reading: §12.1 The simple linear regression model

Regression analysis uses conditional distributions, expectations, and predictions. Distinguish between the *y* values in the sample and the fitted *y* value for a given value of *x*. The textbook expresses this as

> Rather than assuming that the dependent variable itself is a linear function of *x*, the model assumes that the *expected* value of Y is a linear function of x. For any fixed *x* value, the observed value of *Y* will deviate by a random amount from its expected value.

Figure 12.3 shows these deviations. Neither the *x* values nor the *y* values are normally distributed, but for any fixed value x*, Y (= $\beta_0 + \beta_1 x^* + \epsilon$) has a normal distribution; see Figure 12.4b.

Final exam problems on linear regression generally ask you to compute β_0, β_1, and σ. They may also ask you to compute probabilities, as example 12.3 does.

Review end of chapter exercises 6, 7, 8, and 11; exercises 8c, 8d, and 11d test the standard deviation of the difference of two independent random variables.

The textbook section on logistic regression has been moved:

! In the second edition of the Devore textbook on mathematical statistics, logistic regression is covered in §12.1 "The simple linear and logistic regression models" (the beginning of regression models) and assigned to Module 15.
! In the third edition of the Devore textbook on mathematical statistics, logistic regression is covered in §12.10 "logistic regression models" (the end of regression models, after correlation and residual analysis) and assigned to Module 21.

The material is the same, but its location in the text has changed. Module 15 is short, but Module 21 is now long; adjust your study schedule accordingly.