MS Module 18: Regression analysis: Fitted values and predictions (overview second edition)

(The attached PDF file has better formatting.)

(Readings from the second edition of the Devore text.)

Reading: §12.4 Inferences Concerning $\mu_{Y \cdot x^*}$ and the Prediction of Future Y Values

Know the formula for the variance of $\hat{y}$, or $V(\hat{y})$; the final exam may ask either the variance or the standard deviation. Know the confidence interval in expression 12.7, and review example 12.15.

Know how to form the confidence interval for $\mu_{Y|x^*}$ and the prediction interval for a single Y value. The point estimates for these two items are the same, but the prediction interval is wider.

The formulas for the confidence interval and the prediction interval are similar; they depend on σ^2, the number of observations n, and the squared deviation of the x value from its mean. The prediction interval has an extra term (a "1") under the square root sign; see expressions 12.7 and 12.8. review Examples 12.15 and 12.16 for when to use each interval.

Review end of chapter exercises 45 a, b, and c, 47 a, b, c, and d, 49, 50, 51 a, c, d, e, and f, and 50.

The upper and lower limits of the confidence interval and the prediction interval get farther apart as x moves away from x̄. The opposite relation is true for standard deviations of residuals, discussed in a later module.

A final exam problem may give x values and the width of the 99% confidence interval for the fitted value at one point and ask for the width of the 95% prediction interval at another point.

The final exam does not test Bonferroni's inequality.