Review of Part II

Math 2200

Correlation

- Sign of *r* gives the direction of the association
- $-1 \leq r \leq 1$
- X and Y are uncorrelated $\Leftrightarrow r = 0$
- Correlation treats x and y symmetrically
  That is, r(x,y) = r(y,x)
- The correlation coefficient r has no units
- It does not change w.r.t. shifting or rescaling
- Uncorrelated does NOT imply no association
- Sensitive to outliers

TI-83

- When you set DiagnosticsON, then you can get the correlation coefficient in linear regression analysis
- Alternatively, convert x and y to z-scores first, then use 2-VAR STAT to find Σxy, and then divided by $n - 1$.

Linear regression

- How to calculate the slope?

  The slope is $r\frac{S_x}{s_y}$
- Given the slope, and standard deviations, how to calculate the correlation?
- The line always goes through $(\bar{x}, \bar{y})$.

Linear regression (continued)

- Residual: $e = y - \hat{y}$
  - Overestimation
  - Underestimation
  - Residual plot
- Linear association does not imply causaility
- How to interpret R^2?

  $0 \leq R^2 \leq 1$

  The bigger R^2 is, the stronger the linear association.