Material for Exam 2

Correlation Lecture
z-Scores and Correlation Lecture
Regression Lecture
Probability Lecture
pp. 116 – 133, and 162 – 260 of the text

Equations to Know

Variance (slide 10 of dispersion):
\[ \sigma^2 = \frac{\sum (X - \mu)^2}{N} \]

Line (slide 24 of correlation):
\[ Y = \text{slope} \times X + \text{intercept} \]

z (slide 5 of z-scores):
\[ z = \frac{X - \bar{X}}{s} \]

r (slide 9 of z-scores):
\[ r = \frac{\sum z_X z_Y}{N} \]

“best fit” (slide 12 of regression): minimizes \( \sum (Y - Y')^2 \)

slope (slide 21 of regression):
\[ \text{slope} = r \cdot \frac{s_Y}{s_X} \]

intercept (slide 23 of regression):
\[ \text{intercept} = \bar{Y} - \text{slope} \times \bar{X} \]

total variance (slide 25 of reg.):
\[ s^2 = \frac{\sum (Y - \bar{Y})^2}{N} \]

explained variance (slide 26):
\[ s^2 = \frac{\sum (Y' - \bar{Y})^2}{N} \]

unexplained variance (slide 27):
\[ s^2 = \frac{\sum (Y - Y')^2}{N} \]

addition rule (slide 10 of prob):
\[ p(A \text{ or } B) = p(A) + p(B) - p(A \text{ and } B) \]

multiplication rule for independent events (slide 12 of probability):
\[ p(A \text{ and } B) = p(A) \times p(B) \]

conditional probability of B given A (slide 19 of probability):
\[ p(B \mid A) = \frac{p(A \text{ and } B)}{p(A)} \]

multiplication rule for non independent events (slide 22):
\[ p(A \text{ and } B) = p(A) \times p(B \mid A) \]