Homework (Bognar)
Introduction to Mathematical Statistics II (STAT:3101)

1. For Exercise 6.5-3, answer the following questions.
   (a) Determine the least squares regression line.
   (b) Make a scatterplot of the data. Plot the least squares regression line.
   (c) Determine $\hat{\sigma}^2$.
   (d) Determine a 95% CI for β.
   (e) Determine a 95% CI for α.
   (f) Determine a 95% CI for σ^2.
   (g) Find a 95% CI for $\mu(x) = \alpha + \beta(x - \bar{x})$ when $x = 80$.
2. For Exercise 6.5-4, answer the following questions.
   (a) Determine the least squares regression line.
   (b) Make a scatterplot of the data. Plot the least squares regression line.
   (c) Determine $\hat{\sigma}^2$.
   (d) Determine a 95% CI for β.
   (e) Determine a 95% CI for α.
   (f) Determine a 95% CI for σ^2.
   (g) Find a 95% CI for $\mu(x) = \alpha + \beta(x - \bar{x})$ when $x = 3.0$.

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# Exercise 6.5-3 (Hogg, Tanis, Zimmerman)
> x <- c(70, 74, 80, 84, 80, 67, 70, 64, 74, 82)
> y <- c(87, 79, 88, 98, 96, 73, 83, 79, 91, 94)
> mean(x)
[1] 74.5
> mean(y)
[1] 86.8
> sum((x-mean(x))^2)
[1] 414.5
> sum(y*(x-mean(x)))
[1] 421

# Exercise 6.5-4 (Hogg, Tanis, Zimmerman)
> x <- c(2.0, 3.3, 3.7, 2.0, 2.3, 2.7, 4.0, 3.7, 3.0, 2.3)
> y <- c(1.3, 3.3, 3.3, 2.0, 1.7, 3.0, 4.0, 3.0, 2.7, 3.0)
> mean(x)
[1] 2.9
> mean(y)
[1] 2.73
> sum((x-mean(x))^2)
[1] 5.04
> sum(y*(x-mean(x)))
[1] 4.64
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