Stat 204
Quiz 6 4/24/18 **Name:** SOLUTIONS

Read the introduction to Exploration 10.1 on page 525, then answer the following related questions. You will use the **PlateSize** data from the book's website.

1. What is the research question? What are the observational units?

Q: Have dinner plates gotten bigger over time?

units: plates

2. Identify the explanatory and response variables and their types.

explanatory: year of manufacture
response: diameter of plate
} both quantitative

3. What is the correlation coefficient for these two variables?

$r = .604$

4. Based on the scatterplot, does the correlation coefficient seem like a reasonable measure of association?

sure — a positive linear association is evident

5. Using the correlation coefficient as your observed statistic, what are the relevant null and alternative hypotheses?

$H_0: r = 0$ vs. $H_A: r \neq 0$

6. Using the correlation coefficient as your observed statistic, conduct a simulation and compute the relevant p-value. What do you conclude?

$p \approx .0075 = .75\%$ $\Longrightarrow$ reject null; have evidence of an association

Read the introduction to Exploration 10.3 on page 542, then answer the following related questions. You will use the **FootHeight** data from the book's website.

1. What is the research question? What are the observational units?

   Q: Does height depend linearly on foot length?
   units: students

2. Identify the explanatory and response variables and their types.

   explanatory: foot length
   response: height
   } quantitative

3. What is the correlation coefficient for these two variables?

   $r = .711$

4. What is the equation of the regression line for this data?

   height = 38.30 + 1.03 x foot length

5. Answer the first 3 parts of question 9 from Exploration 10.3 (page 544). Be sure to internalize 9(d) before the final exam!

   (a) foot length = 28 cm ⟹ predict height = 67.14"
   (b) foot length = 29 cm ⟹ predict height = 68.17"
   } (c) difference is slope!

6. Answer both parts of question 10 from Exploration 10.3 (page 544). Does part (a) make sense?

   foot length = 0 ⟹ predict height = 38.3"
   ↳ nonsense!

7. What is the coefficient of determination for this regression line? What does it mean?

   $r^2 = .69$ — percentage of variation explained by the linear relationship

8. Using the slope of the regression line as your observed statistic, what are the relevant null and alternative hypotheses?

   $H_0: \beta = 0$ vs. $H_A: \beta \neq 0$

9. Using the slope of the regression line as your observed statistic, conduct a simulation and compute the relevant p-value. What do you conclude?

   $p \approx 0$ ⟹ reject null; have evidence of an association (nonzero slope)