Math 210 Exam 3 (Take Home)  
Spring 2015

This exam is due no later than 3pm on  
**Monday, February 23rd, 2015.**  
The exam can be turned in to the Science and Technology offices on the  
third floor of Zimmerman Hall.

An exam will NOT be accepted without a signature below.

By signing the exam below, you are asserting that:

1. No outside sources were used on the exam other than your personal text,  
calculator, and notes from class. Banned assistance includes but is not limited  
to the internet, friends, and other students in the class or other textbooks.
2. The exam took you no longer than 90 minutes to complete. You are to stop at  
the 90 minute mark. Plan to take the exam at a time when you can work  
uninterrupted.

Sign here: ___________________________ Date: ______________

If you have any questions, please come by my office this week!

Reminder: numbers listed in parentheses, such as (1), (2), or (3), indicate point values for the problem.
1. Use the bivariate data in the table at the right and the information below to answer the following questions.

<table>
<thead>
<tr>
<th>X</th>
<th>Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
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<tr>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
</tr>
</tbody>
</table>

SS_X = 10
SS_Y = 8
SS_{XY} = -8

a. Find the covariance. (1)

b. Find the correlation coefficient. (1)

c. Find the coefficient of determination. What does this mean? (2)

d. Find the regression equation of Y in terms of X. (2)

e. Use the answer in (d) to predict Y when X = 7. (1)
2. Use the bivariate data in the table at the right and the information below to answer the following questions.

<table>
<thead>
<tr>
<th></th>
<th>X</th>
<th>Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>17</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>20</td>
<td>12</td>
</tr>
<tr>
<td>3</td>
<td>27</td>
<td>20</td>
</tr>
<tr>
<td>4</td>
<td>21</td>
<td>13</td>
</tr>
<tr>
<td>5</td>
<td>23</td>
<td>15</td>
</tr>
</tbody>
</table>

\[ SS_X = 55.2 \]
\[ SS_Y = 58 \]
\[ SS_{XY} = 56 \]

a. Find the covariance. (1)

b. Find the correlation coefficient. (1)

d. Find the regression equation of Y in terms of X. (2)

e. Use the answer in (d) to predict Y when X = 25. (1)
Use the various distribution tables to find the following values. (1 point each)

3. \( P(Z > 2.76) \)  
4. \( P(Z < -1.01) \)

5. \( P(Z < -1.01) \)  
6. \( P(Z > 7.38) \)

7. \( t_{0.05,9} \)  
8. \( t_{25,8} \)

9. \( P(T > 3.1) \) with 19 df  
10. \( P(T > 0.55) \) with 5 df

11. \( P(T > 1.73) \) with 45 df  
12. \( \chi^2_{0.01,6} \)

13. \( \chi^2_{10,32} \)  
14. \( P(\chi^2 > 35) \) with 27 df

15. \( P(\chi^2 > 41.3) \) with 11 df

16. Find the probability of getting at most 65 tails when a coin is flipped 150 times. (3)
17. If 35% of children prefer M and M’s over Skittles, find the probability that in a sample of 400 children, at least 160 children prefer M and M’s. (3)

18. Which is smaller: $P(X \leq 35)$ or $P(X \geq 35)$ when $n=300$ and $p=.1$? (2)