Math 220  
Quiz 12 (take-home)  
Fall 2014

Name ________________________________

(circle your TA discussion section)

▷ AD1, TR 11:00-12:50, Melinda Lanius
▷ AD2, TR 9:00-10:50, Ben Fulan
▷ AD3, TR 1:00-2:50, Mychael Sanchez
▷ ADB, TR 9:00-9:50, Derek Jung
▷ ADC, TR 10:00-10:50, Andrew McConvey
▷ ADD, TR 11:00-11:50, Andrew McConvey
▷ ADE, TR 12:00-12:50, David Poole
▷ ADF, TR 1:00-1:50, Alonza Terry
▷ ADH, TR 3:00-3:50, Argen West
▷ ADI, TR 4:00-4:50, Argen West
▷ ADJ, TR 9:00-9:50, Vanessa Rivera-Quinones
▷ ADK, TR 10:00-10:50, Vanessa Rivera-Quinones
▷ ADL, TR 11:00-11:50, David Poole
▷ ADM, TR 12:00-12:50, Iftikhar Ahmed
▷ ADN, TR 1:00-1:50, Kaiwen Liu
▷ ADO, TR 2:00-2:50, Hannah Burson
▷ ADP, TR 3:00-3:50, Hannah Burson
▷ ADR, TR 9:00-9:50, Stephen Berning
▷ ADS, TR 12:00-12:50, Sarah Mousley
▷ ADT, TR 2:00-2:50, Kaiwen Liu
▷ ADU, TR 3:00-3:50, Iftikhar Ahmed

- You may work with other MATH 220 students. However each student should write up solutions separately and independently – nobody should copy someone else’s work.
- You may use your notes, the textbook, or information found on my course home page.
- There is a higher expectation for the quality of your work on a take-home quiz. Everything should be written logically and legibly with sufficient work to justify each answer. Blank copies of the quiz are available on the course home page.
- Be sure that the pages are nicely stapled – do not just fold the corners.
- The quiz is due at the beginning of your official lecture period on Friday, November 20.
- Note to TAs and Tutors – you should not help students with these specific problems or go over solutions until after 5pm Friday.
1. (4 points) A calculator gives an estimate of 0.0769610411 for the value of $3 \ln(3) - 2 \ln(5)$. Using the techniques of linear approximation found in section 3.10, show that you are able to obtain a very similar estimate of 0.08 without the use of any technology.
2. (2 points) Suppose that the functions $f(x)$ and $g(x)$ are differentiable everywhere. Some values for these functions and their derivatives are given in the table.

<table>
<thead>
<tr>
<th>$x$</th>
<th>$f(x)$</th>
<th>$f'(x)$</th>
<th>$g(x)$</th>
<th>$g'(x)$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>-4</td>
<td>-2</td>
<td>-7</td>
</tr>
<tr>
<td>2</td>
<td>5</td>
<td>6</td>
<td>-1</td>
<td>5</td>
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<td>3</td>
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<td>4</td>
<td>17</td>
<td>14</td>
<td>13</td>
<td>17</td>
</tr>
</tbody>
</table>

Let $w(x) = (f \circ g)(x)$. Use the techniques of linear approximation found in section 3.10 to estimate the value of $w(2.99)$. Simplify and write your answer in decimal form.
3. (4 points) The graph of \( f(x) = x^7 + x^5 + x^3 - 50x^2 - 314x - 42 \) has precisely one inflection point. Determine the \( x \)-value for this inflection point using Newton’s Method with an initial estimate of \( x_1 = 2 \). You should use this method 3 times in order to obtain estimates \( x_2, x_3 \) and \( x_4 \). You are only allowed to use technology for basic arithmetic. Each estimate you obtain should include at least 5 places after the decimal point.