Math 10A
Midterm Exam 2
November 25, 2014
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Version A

Instructions

1. **No calculators or other electronic devices are allowed during this exam.**
2. **You may use one page of notes, but no books or other assistance during this exam.**
3. **Write your *Name*, *PID*, and *Section* on the front of your Blue Book.**
4. **Write the *Version* of your exam at the top of the page on the front of your Blue Book.**
5. **Write your solutions clearly in your Blue Book**
   (a) **Carefully indicate the number and letter of each question and question part.**
   (b) **Present your answers in the same order they appear in the exam.**
   (c) **Start each question on a new side of a page.**
6. **Read each question carefully, and answer each question completely.**
7. **Show all of your work; no credit will be given for unsupported answers.**

0. (1 point) Carefully read and complete the instructions at the top of this exam sheet and any additional instructions written on the chalkboard during the exam.

1. (4 points) Find the derivative of each of the following functions.
   (a) $f(x) = x^2 \sin(2x)$
   (b) $g(x) = \dfrac{\ln(2x)}{x}$

2. (6 points) Suppose $F(2) = 3$, $F'(2) = 4$, $G(7) = 2$, $G'(7) = 8$, $F(7) = 5$, and $F'(7) = 6$. Compute the following:
   (a) $H'(7)$, where $H(x) = F(G(x))$.
   (b) $H'(7)$, where $H(x) = F(x) \cdot G(x)$.
   (c) $H'(7)$, where $H(x) = \dfrac{F(x)}{G(x)}$.

3. (6 points) Consider the function $f(x) = x^2(x+3)$.
   (a) On what interval(s) is the graph of $f(x)$ increasing?
   (b) On what interval(s) is the graph of $f'(x)$ increasing?

Note: Problem 4 is on the other side of this page.

4. (6 points) The length of daylight t (in hours) in San Diego on the τ^{th} day of the year is given by the function $D(\tau)$.

   (a) What is the meaning of the equation

   $$D'(25) = 0.02?$$

   Be sure to specify the units of the 25 and 0.02 as part of your answer.

   (b) What is the meaning of the equation

   $$D^{-1}(11) = 45?$$

   Be sure to specify the units of the 11 and 45 as part of your answer.

   (c) What are the units of the quantity

   $$\frac{d}{dt}D^{-1}(t)?$$