

## Math 3C Fall 2013 – Exam 2, version A

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**Instructions:** Put your name, PID, section number, and TA's name on your blue book. Also, write which version of the test on the front of your blue book (this is Version A). No calculators or electronic devices are allowed. Turn off and put away your cell phone. You may use one page of handwritten notes, but no other notes, books, or resources. Make sure your solutions are clear and legible, and show all your work. Credit may not be given for unreadable or unsupported answers. Write your solutions in your blue book, keeping the questions in order, and clearly indicating which problem is on which page.

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**Question 0:** (1 point) Read the instructions above and make sure you have followed them all, as well as any instructions given by the professor during the test.

**Question 1:** (6 points) Solve for  $x$ :

$$\frac{\ln(2x + 3)}{\ln x} = 2.$$

**Question 2:** (6 points) Suppose you have a handful \$2 bills and \$5 bills. Further suppose that you have a total of 13 bills, worth a total of \$44. How many of each type of bill do you have?

**Question 3:** (8 points)

- (a) Suppose you start with some money in a bank account that pays an interest rate of 40% per year, compounded 2 times per year. How many years will it take to double your initial amount of money in the account? (The answer is not necessarily an integer.)
- (b) Suppose you start with some money in a bank account that pays continuously compounded interest. What annual interest rate is needed in order to triple your initial amount of money after exactly 8 years?

**Question 4:** (6 points) Suppose  $f$  is a function with exponential growth such that  $f(1) = 6$  and  $f(3) = 54$ . Find a formula for  $f$ .

**Question 5:** (9 points) Find the coordinates of the endpoints of the radii of the unit circle corresponding to the following angles (write your answers in the form  $(x, y)$ ):

- (a)  $120^\circ$
- (b)  $-\pi/4$  rad
- (c)  $4\pi$  rad

**Question 6:** (4 points) Let

$$r(x) = \frac{3x^2 - 2x + 7}{x^2 - 4}.$$

- (a) Find the domain of  $r$ . Write your answer using interval notation.
- (b) Find the horizontal asymptote of  $r$ .