Math 3C Winter 2014 – Exam 2 version A

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.

Question 1: (6 points) Find a polynomial $p(x)$ of degree 3 such that 1, 3, and -5 are roots (zeros), and with $p(0) = 30$. (You do not need to multiply out your answer.)

Question 2: (6 points) Consider the rational function $r(x) = \dfrac{5x^2 - 8x + 11}{-2x^2 + 7}$.

(a) What is the domain of $r(x)$?

(b) Find the horizontal asymptote of $r(x)$ (or if there is no horizontal asymptote, state that none exists).

Question 3: (6 points) Suppose you have a bag full of nickels (5 cents each) and dimes (10 cents each) with a total of 11 coins, and the total value is 80 cents. How many of each kind of coin do you have?

Question 4: (6 points) Solve the equation for x: $\log(x + 2) - \log(x - 3) = 2$.

Question 5: (8 points) In this problem, since you do not have a calculator, leave all answers unsimplified.

(a) Suppose you have \$1000 in a bank account with a 8% annual interest rate, compounded 4 times per year. How long will it take for the amount in the bank account to reach \$2500?

(b) A culture of bacteria starts with 1000 cells, and after 3 hours has 2500 cells. What is the continuous growth rate of this culture (with time measured in hours)?

Question 6: (8 points) Consider the angle $\theta = -660^\circ$ on the unit circle.

(a) What is the point (x, y) on the unit circle corresponding to this angle? (It may help to draw a sketch of this angle and re-express it as an angle between 0° and 360°.)

(b) Find the length of the circular arc of the unit circle starting at the point $(1, 0)$ and going counter clockwise to the point in part (a).