Math 3C Winter 2014 – Exam 1 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: (8 points)

(a) Find an equation of the line that passes through the points $(4, 5)$ and $(2, 4)$. Express your answer in slope-intercept form $(y = mx + b)$.

(b) Find an equation of the line perpendicular to the line found in part (a) that goes through the point $(-2, 3)$. Express your answer in slope-intercept form.

(c) Find an equation of the line parallel to the line in part (a) whose y-intercept is 8.

Question 2: (4 points) Express the set of all x with $|x - 2| < 3$ (i.e. $\{x : |x - 2| < 3\}$) as an interval.

Question 3: (4 points) Find all real numbers t such that the point $(t, 1)$ is on the circle of radius 3 centered at $(0, 0)$.

Question 4: (7 points) Let $f(x) = 3x^2 + 6x - 4$.

(a) Find the vertex of the parabola given by this quadratic.

(b) Find the zeros of the parabola (i.e. set $3x^2 + 6x - 4 = 0$).

Question 5: (8 points) Suppose you have a function $f(x)$ whose domain is the interval $[-1, 5]$, and whose range is the interval $[-6, 2]$. Define a new function $g(x)$ by $g(x) = -2f(x - 3) + 4$.

(a) List the transformations (shifts, stretches, etc.) that take the graph of f to the graph of g.

(b) What is the domain of g?

(c) What is the range of g?

Question 6: (5 points) Define the function $f(x) = \sqrt{x - 2} + 3$.

(a) Find a formula for the inverse function f^{-1}.

(b) Compute the composition $(f^{-1} \circ f)(x)$.

Question 7: (4 points) Simplify the expression $\left(\dfrac{(x^{-3}y^2)^{-4}x^3}{x^6y^{-2}z^{-3}} \right)^3$ as much as possible using laws of exponents (your answer should be in a form like $x^a y^b z^c$).