Suffolk County Community College

Michael J. Grant Campus

Department of Mathematics

Wednesday, December 16, 2015

MAT 125: Pre-Calculus II

Final Exam

Instructor:

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Please print the requested information in the spaces provided:

Student:

Name:

Student Id:

Email: *include to receive the final grade via email* ONLY *if you are not getting email updates already*

- *Notes and books are permitted on this exam.*
- *Graphing calculators, computers, cell phones and any other communication devices are strictly prohibited. Their mere presence (even without use) is a sufficient reason for an immediate dismissal from the exam with a failing grade.*
- *Please show all your work — you will not receive full credit for a correct answer if there is no work shown. You may use back pages or attach additional paper if necessary. (If you choose to write even a part of your solution on additional sheets, please indicate*
  1. *"see attached" — in the space provided for the solution,*
  2. *your name — on each attached sheet of paper, and*
  3. *which (sub-)problem is being solved — before each solution.)*

Problem 1. Suppose an angle $\theta \in [0, \pi]$ and $\tan(\theta) = -2$. Find $\cos(\theta)$.

Space for your solution:

Problem 2. Find $\cos\big(\arctan(-2)\big)$. More specifically, find an expression of this quantity that does not use any trigonometric functions.

Space for your solution:

Problem 3. For an arbitrary real number y, find $\cos\big(\arctan(y)\big)$. More specifically, find an expression of this quantity that does not use any trigonometric functions.

Space for your solution:

Problem 4. Solve the equation $\cot(t) = \sin(t)$.

Space for your solution:

Problem 5. In the triangle $\triangle ABC$, the sides $|AB| = 3$, $|AC| = 4$ and the angle $\widehat{BAC} = \frac{\pi}{8}$.

(1). Find the length $|BC|$.

Space for your solution:

(2). Find the angle $\widehat{ABC}$.

Space for your solution:

(3). Find the area of the triangle.

Space for your solution:

Problem 6. Find all complex numbers z, such that $z^3 = -27$. (You may use polar coordinates, but the final answer must explicitly give the $\mathrm{Re}(z)$ and $\mathtt{Im}\,(z)$.) Graph all solutions on the (x, y) plane.

Space for your solution: