

Spring 2008 MPC – Set 1, Due by 5pm on Friday, Feb. 22.

Instructions: All GSU Undergrads are eligible. Submit your solutions to the Mathematics office. Please include your name and e-mail address. Have fun!

http://cost.georgiasouthern.edu/math/math_competition/math_competition.php

1. (Dr. S. Kersey, Algebra) Solve $\sqrt{x + \sqrt{2x - 1}} + \sqrt{x - \sqrt{2x - 1}} = \sqrt{2}$.

2. (Dr. V. Maymeskul, Trigonometry) Given that $\sec(2\theta) = \sqrt{2008}$, find the *exact* value of $\cos^8(\theta) - \sin^8(\theta)$.

3. (Dr. Y. Wu, Matrices) Let $A = [a_{n,m}]$ be the 5×5 matrix with $a_{n,n} = a_{n,n+1} = a_{5,5} = 1$ for $n = 1, \dots, 4$ and with all other zero entries. Give an explicit formula for A^k , where $k \geq 2$ is a positive integer.