

Mathematics 13 Fall 2005
Instructor : Nikolaos Apostolakis
Second Exam (Take Home)
November 29 2005

This exam is due Monday December 5, at 2:00 pm. Answer all questions. In order to get full credit you should fully justify your answers. Please present a neat and organized document.

1. Find the domain of the function: $f(x) = \ln(\ln(3x - 2))$.
2. Express as a sum difference or multiple of logarithms: $\log\left(\frac{(x-y)\sqrt[3]{(x+5)^2}}{x^3y^2}\right)$.
3. Solve for y : $\log y^5 - 2\log(x^3 + 2x^2 - 5) + 3\log(x + 4) = 1$.
4. Solve: $2^{x+1} = 3^x$.
5. Solve: $3^x - 15 \cdot (3^{-x}) = -2$.
6. Sketch a graph of the function: $y = \sec x$.
7. Sketch a graph of the function: $y = 4\sin(3x + \frac{\pi}{4})$.
8. Prove: $\csc \theta \sec \theta - \cot \theta = \tan \theta$.
9. Solve: $\sin 2x - \sin 4x = 0$.
10. Let θ be an angle with $0 < \theta \leq \pi$. Find $\cos \theta$ if $\cot \theta = 3$.
11. Find: $\sin(\tan^{-1} x)$.