

FIRST NAME:

LAST NAME:

2016-SEPT-23

Solutions must include all necessary comments and calculations.

1. (a) Solve $z^4 = (3 - 5i)^4$ (b) Calculate $\left(\frac{1}{2} - i\frac{\sqrt{3}}{2}\right)^{1000}$	
2. Find eigenvalues of $F(x,y,z) = (7x-6y-3z, 2x-y-z, 6x-6y-2z)$. For each eigenvalue find an eigenvector.	
3. Find all local extrema and examine the monotonicity of $p(x) = e^{2x^3-3x^2-36x+2}$	
4. Prove that the function $r(x) = \sin \frac{1}{x}$ has no limit as x approaches 0.	
5. What is the dimension of a vector space? Find the dimension of the subspace of \mathbf{R}^4 consisting of all vectors (a,b,c,d) such that $a-b=c+d$.	