FIRST NAME:

| Your solutions must include all necessary comments and detailed calculations.   |  |
|---|--|
| 1. (a) Solve $z^4 = (3-4i)^4$ (b) Calculate $\left(-\frac{1}{2}+i\frac{\sqrt{3}}{2}\right)^{666}$   |  |
| 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 does it mean that a set of vectors is linearly independent? Is the set { x, sin x, cos 2x } (vectors are functions) linearly independent? |  |