Name:_____
Quiz 7; Saint Patrick's Day
MATH 54 with Prof. Sethian
GSI: Alex Carney

You have 15 minutes to complete the quiz. Calculators are not permitted.

1. (3 points) Compute the following, using any method you'd like:
   (a) $\sqrt{i}$

   (b) $\sqrt{-2+2\sqrt{3}i}$

   (c) $e^{\frac{2}{3}\pi i} + e^{\frac{4}{3}\pi i} + 1$

2. (2 points) Write $\begin{pmatrix} 1 & 5 \\ 5 & 1 \end{pmatrix}$ as PDP^T, where P is orthogonal and D is diagonal.

3. True or False
   - If $A^{-1} = A^T$, then A is orthogonal.
   - Define an inner product on $\mathbb{P}_3$ by $\langle f, g \rangle := \int_{-1}^{1} f(x)g(x)dx$. Then with respect to this inner product, $x^3 + 2x + 1$ and $3x^2 + 4$ are orthogonal.
   - Let $S(t)$ be the number of snakes in Ireland as a function of time, and suppose $S(t) = -S'(t)$. If there are 1000 snakes at time zero, and we round down fractional numbers of snakes, there will eventually be no snakes in Ireland.