Section A

1. For the two matrices A and B related to each other through a non singular matrix X as $A = X^{-1}AX$ which of the following statements, in general, is not true.

   (A) Both have the same rank.

   (B) Both have the same set of eigenvalues.

   (C) Both have the same determinant.

   (D) Both have the same set of eigenvectors.

2. Complex numbers $z = x + iy$ satisfying

$$\left|\frac{z-i}{z+i}\right| < 1$$

   lie in the

   (A) upper half plane.

   (B) lower half plane.

   (C) left half plane.

   (D) right half plane.

3. The determinant of an orthogonal matrix is

   (A) always zero.

   (B) always $+1$.

   (C) always -1.

   (D) either $+1$ or -1.

4. The graph shown in the figure corresponds to the function

   (A) $y = x$.

   (B) $y = -x$.

   (C) $y = |x^2|$.

   (D) $y = |x|$.