We have dealt with the cases of spin 1/2 (electron, Pauli matrices) and spin 1 (homework, 3x3 matrices). Based on these cases, which of the following statements is NOT correct?

○ Spin operators in different directions do not commute.
○ The square of the spin operator in each direction, $(S_i)^2$, is proportional to the identity matrix.
○ The sum of $(S_i)^2$ over all directions, S^2, is proportional to the identity matrix.
○ The operator S^2 commutes with S_i.
◉ Spin operators in different directions share the same eigenvalues.
○ The operator S^2 has a single eigenvalue (i.e., fully degenerate eigenvalues).