Test 2

Mon December 06
Test time: 4hs

1 Exercise. Let V' be the 5 dimensional representation of A_5 given the permutation representation on 5 elements. Let U be the 1 dimensional sub representation generated by the sum of the basis elements. Let V be the four dimensional representation V'/U. Show that V is irreducible.

2 Exercise. Let V be as in the previous exercise. Find the irreducible components of $V \otimes V$ and $V \wedge V$.

3 Exercise. Let C be the group of rotational symmetries of the regular cube in $\mathbb{R}^3$. Let V be the given 3-dimensional real representation.

   a) Is V irreducible?.

   b) Is $V \simeq V^*$?.

   c) Is $V \simeq V \wedge V$?