Exercises - May 9, 2006

1. From (3.6) in Schellekens' notes, derive the transformation rule of a conformal field under conformal transformations.
2. How does $\int d^2\sigma V$ transform under conformal transformations, if V is a dimension $(1,1)$ conformal field?
3. Given an example of a dimension $(1,1)$ conformal field, for example in the free boson theory.
4. For free bosons, derive the operator product of the energy momentum tensor with itself, eq. (3.11).
5. From this expression, derive the Virasoro algebra (3.13).
6. For free bosons, derive an expression for the Virasoro generators L_n in terms of the modes α^i_k.
7. Prove the statement in section 6.2 in Schellekens. (We will use this next week).