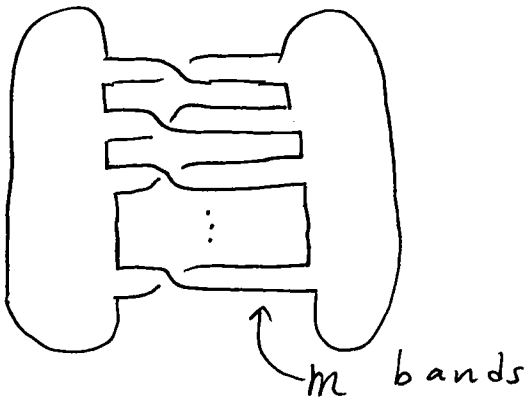
Math 5863 homework

17. (2/15) Use the Classification Theorem to deduce the following facts about the Euler characteristic of a (compact, connected) 2-manifold F.

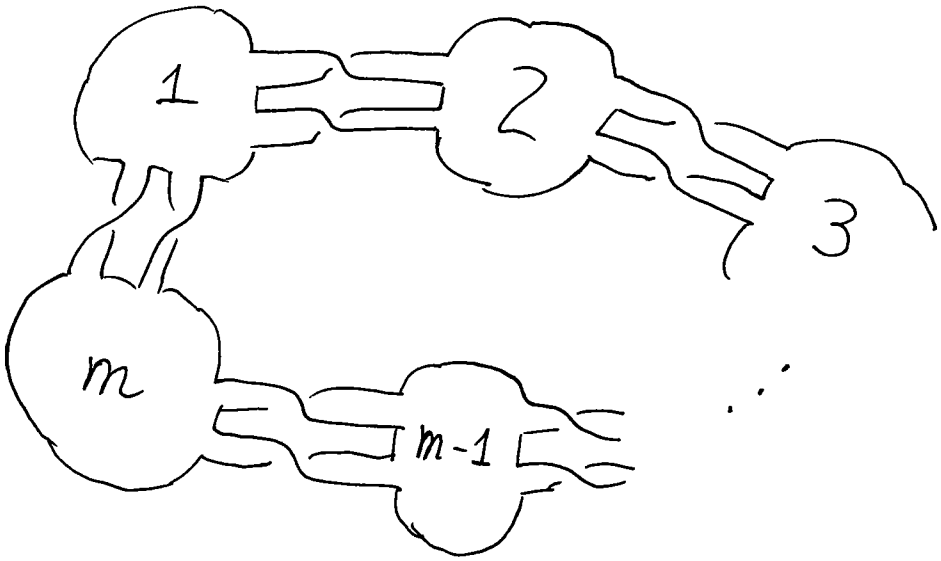
    1. $\chi(F) \leq 2$.
    2. $\chi(F) = 2$ if and only if $F = S^2$.
    3. $\chi(F) = 1$ if and only if F is a disk or a projective plane.
    4. $\chi(F) = 0$ if and only if F is an annulus, Möbius band, torus, or Klein bottle.
    5. Find all F with $\chi(F) = -1$.
    6. Find all F with $\chi(F) = -2$.

18. (2/15) For each of the surfaces shown on the next page, use orientability and Euler characteristic to determine the homeomorphism type of the surface. The answer may depend on whether m is even or odd.

(1)



(2)



(3)