

Math 215a Homework #7, due Monday 12/10 at 1:10 PM

(If you want this graded, please give your paper to Qin Li by 4pm on Thursday 12/6, or email him an electronic version after that. Otherwise, I will give you credit for doing the assignment but I might not be able to grade it.)

1. Show that if M is an odd-dimensional closed manifold, then $\chi(M) = 0$.
2. Show that if M is a simply connected closed oriented 4-manifold, then $H_2(M)$ has no torsion.
3. Show that if M and N are smooth¹ manifolds, then $M \times N$ is orientable if and only if both M and N are orientable.
4. Hatcher section 3.3, exercise 8.
5. Hatcher section 3.3, exercise 17.
6. Hatcher section 3.3, exercise 32. (You may assume the result of exercise 31.)
7. Hatcher section 3.B, exercise 4.

¹The assumption of smoothness is not actually necessary, but makes the problem a little easier.