

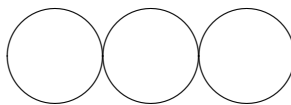
**Mathematics 4530**  
**Assignment 13, due never**

Read Section 59, which contains a baby version of van Kampen's theorem. Then do:

- p. 370: 2, 3

Additional problems:

1. Use the Seifert–van Kampen theorem to compute the fundamental group of the union of three circles pictured below:



2. Explain how one could, in principle, fix the attempted proof in Exercise 2 on p. 370. [Hint: See the additional problem on Assignment 9.] You may just sketch your idea, omitting proofs of “obvious” geometric facts (some of which may in fact be nontrivial to prove rigorously).