

Homework 1

Math 416 (sections 200 [Honors] and 500 [Regular]), Spring 2017

This homework is due on Thursday, January 19.

0. (*This problem is not to be turned in.*) Read the syllabus. Bookmark the course webpage on your computer, if you have one. Set up your piiazza.com account. Mark all exams and their times on your calendar. (a) Where and what time are the regular office hours for this course? (b) If you miss class, where can you find the homework assignments? (c) (How) will grades be “curved”? (d) A student has received the following grades on Homeworks: 9, 10, 8, 8 (out of 10) and Exam 1: 78%. What is this student’s current grade in the class?

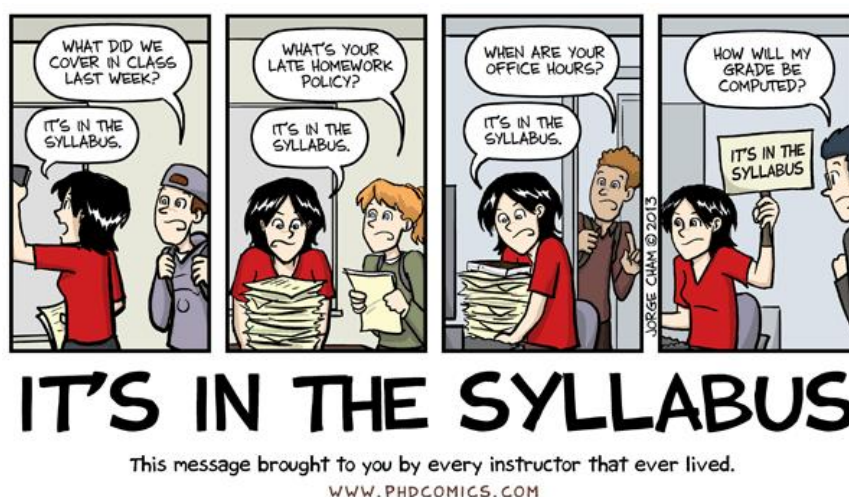


Figure 1: <http://www.phdcomics.com/comics.php?f=1583>

1. Complete the survey (separate handout).
2. Complete the following sentences.
 - (a) A function $\phi : A \rightarrow B$ is a bijection if and only if there exists a function $\psi : B \rightarrow A$ such that $\phi \circ \psi$ is the identity function on _____ and $\psi \circ \phi$ is the identity function on _____.
 - (b) If H is a _____ of a group G , then the _____ form a group, denoted by G/H , in which the operation is defined by _____ and the identity element is _____.
 - (c) In the group $G = \mathbb{Q} \times \mathbb{Q}$, the elements $(-1, 3)$ and $(0, _)$ are in the same coset of the subgroup $H := \{(x, y) \mid y = -2x\}$.
3. Prove the statement in #2(a) above.
4. (Honors only!) Prove the statement in #2(c) above.