Homework and Quizzes, First Week

About the homework:

Please be neat! Clearly indicate your final answer. It really helps the grader out. Don't use pink or red pen to do your homework.

Do the problems in the order indicated. For example, on Homework 1 you should have A, B, 1, 2, 5, 6, C, 12adf, etc.

Show your work. It's possible to get a problem wrong because you didn't show work, especially on problems that require several steps. It's also possible to get a problem wrong because you did the work incorrectly. On simple problems you don't need to show work.

Staple assignments separately. For example, keep Homework 1 and Homework 2 separate.

You are encouraged to form study groups with your classmates. However, problems must be written up in your own words (not your classmate's, tutor's, or back-of-the book's words). Duplicate homeworks are not acceptable and will result in 0 credit for all parties.

You may turn the assignments in at class or at my office (120 Sc) by 4:30 pm sharp. Please slide them under my office door if I'm not available.

Don't wait until the last minute. Good luck!

Quiz 1 (Tues, January 8, at the beginning of class)
Know the definitions, symbols, and set notation of natural numbers, whole numbers, integers, rational numbers, irrational numbers, real numbers, and complex numbers.

Quiz 2 (Wed, January 9, at the beginning of class)
Know the definitions of subset, A×B, relation, function, cardinality, partition, and equivalence relation.

Homework 1 (Section 0 Part I): due Thursday, Jan 10, by 4:30 pm sharp

A. List which of the numbers $-7, 4.8, \sqrt{2}, \sqrt{-2}, 0, 5.\overline{5}, e, \frac{3}{6}, 9+i\sqrt{2}, 900, \frac{1}{\sqrt{2}}, \frac{\sqrt{18}}{\sqrt{2}}$ are

   a. natural numbers
   b. whole numbers
   c. integers
   d. rational numbers
   e. irrational numbers
   f. real numbers
   g. complex numbers

B. Draw a Venn diagram with the natural numbers, whole numbers, integers, rational numbers, irrational numbers, real numbers, and complex numbers.

pg 8-9: 1,2,5,6

C. List the elements in $\{o,h\}\times\{b,o,y\}$.

pg 8-9: 12adf,14ac

D. Create your own relation.

E. Prove that the function $f:\Re\to\Re$ given by $f(x)=2x+1$ is one-to-one.

F. Prove that the function $f:\Re\to\Re$ defined by $f(x)=2x+1$ is onto.

G. Find the inverse of $f:\Re\to\Re$ where $f(x)=2x+1$.

pg 8-9: 16abc,17 (just the 1st part on 17), 21 (just the 1st and 2nd part on 21)

H. What is the cardinality of $\{o,h\}\times\{b,o,y\}$?

I. Challenge Problem: (These problems are **optional** and not worth points. They are just for fun!) pg 9 #18

Homework 2 (Section 0 Part II): due Thursday, Jan 10, by 4:30 pm sharp

A. Give a partition of $\mathbb{R}$ that
   a. has one cell.
   b. has two cells.
   c. has a countably infinite number of cells.
   d. has an uncountable number of cells.

pg 10: 23,24,26,29 (On 29, use $\mathbb{Z}^*$), 32

B. Simplify
   a. $(5+6)(mod\ 7)$
   b. $(5-6)(mod\ 7)$
   c. $(40)(mod\ 7)$
   d. $(-40)(mod\ 7)$
   e. $(7)(mod\ 7)$

C. Give five numbers satisfying $x \equiv 13(mod\ 11)$.

D. At 8pm you start your math homework. 57 hours later you finish. What time did you finish? Relate time to modular arithmetic.

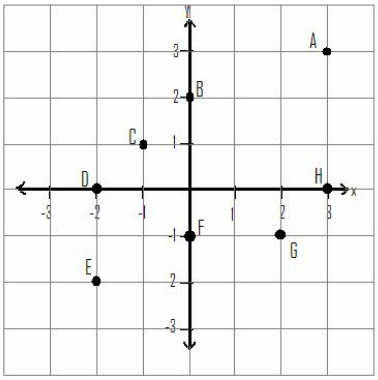
pg 10: 35,36ac

Homework 3 (Section 1): due Monday, Jan 14, by 4:30 pm sharp

pg 19: 2-4,7,10,13

A. Convert to an ordered pair and graph on the complex plane.
   a. $5-2i$
   b. 3
   c. $2e^{i\pi}$
   d. $e^{-i\frac{\pi}{3}}$

B. Write the points shown on the graph in the form of
   a. $a+bi$
   b. $re^{i\theta}$



pg 19: 16,20,22,23,28-30,34,35,38 (on 38 just do the 2nd formula)

C. Challenge Problem: (These problems are **optional** and not worth points. They are just for fun!) "Imaginary" is just a name. Imaginary numbers exist in the same way that real numbers exist and have applications in science and engineering. Philosophers question whether any numbers exist. Read about the debate at http://platosheaven.blogspot.com/2005/12/do-numbers-exist.html.

D. Challenge Problem: (**optional**) Solve $z^2 = i$. Put your answer(s) in the form of $a+bi$. Don't put $\pm\sqrt{i}$.

Homework 4 (Section 2): due Monday, Jan 14, by 4:30 pm sharp

pg 25-28: 1-4,7,8,14-19,21,24abc,25,26,34