Solving discrete problems — Math 2020, Spring 2005

Schedule For Tuesday, January 25, 2005.

1. Homework hints and notes on problem solving strategies.
2. Introduction to the language of logic.
   See 1.1 in the course book. If you don't have the book, see:
   http://www.math.csusb.edu/notes/logic/lognot/node1.html
3. Introduction to proofs, example of direct proof.
   See 3.2 in the course book. If you don't have the book, see:
   http://www.math.ucsd.edu/∼ ebender/proofs.html

Break

4. Proof by contradiction, examples.
5. Unique prime factorisation of positive integers.
   Page 126 in the course book. If you don't have the book, see:
   http://www.maths.monash.edu.au/mth3122/a4lect3.pdf
5. Proof that there are infinitely many primes.
   Page 125 in the course book. If you don't have the book, see:
   http://odin.mdacc.tmc.edu/∼krc/numbers/infitude.html

Basic Logic (1.1 in the book. Make sure you know all these for a quiz on Thursday)

A **statement**, (also called a **proposition**), is a sentence, which is either true or false.
The **truth value** of a statement is either **true** or **false**. For short, these are written as **T** or **F** resepectively.
Statements are joined together by **connectives**, which are given in the following table, to make **compound** statements.

connective	symbol	formal name
not	$\neg$	negation
and	$\wedge$	conjunction
or	$\vee$	disjunction
if... then (or implies)	$\rightarrow$	conditional
... if and only if...	$\leftrightarrow$	biconditional

Note that "or" is inclusive, unlike in usual English.
Examples: if p, q and r are statements, then $p \wedge (q \vee r)$ means "p and one of q or r".
Exercise similar to **quiz** on Thursday:
Let p be the statement "roses are red",
let q be the statement "I like red",
and let r the statement "I like roses"
Write all the following in symbolic notation. The first is already done.

If I like roses, then roses are red.	$r \rightarrow p$
If roses are red, then I like roses.	$p \rightarrow r$
roses are red and I like roses.	$p \wedge r$
roses are red and I don't like roses.	$p \wedge (\neg r)$
roses are red or I don't like roses.	$p \vee (\neg r)$
If I like red and if roses are red, then I like roses.	$(q \wedge p) \rightarrow r$

You might be interested in the following...

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An email from the organiser of the Allen Hall math tutorials:
 Subject: BRUSH UP your FACTORING
 What:  Brushing up your Factoring Skills
 When:  Thursday, Jan. 27, 2005,
 Time:  1:30- 3:00 PM
 Room:  277 LOCKETT
 INTERESTED students should sign up in ALLEN 39.
 Presented by Susan Saale, Coordinator, Math Tutorial Center.
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