HOMEWORK 1
DISCRETE MATHEMATICS I
DUE 01-22

Show your work!
Notes from class discussion: In #1, the rule means "(You can drink beer) only if (you are over 21)"; people over 21 are also allowed to drink Coke. In #2, we are ignoring the fine details of Texas law, and pretending that only people who are over 21 can drink beer legally.

(1) The rule in The Aardvark is "You can drink beer only if you are over 21." You are the bouncer, and you see 4 people at the bar: (1) is clearly under 21, but you can't see his drink; (2) is clearly over 21, but you can't see his drink; (3) is drinking beer, but you can't tell his age; and (4) is drinking Coke, but you can't tell his age. Which people do you have to check on to make sure that everyone is obeying the rule?

(2) Indicate whether each of the following statements is true or false (in Texas, where the drinking age is 21).
  (a) It is legal to drink beer only if you are over 18.
  (b) It is legal to drink beer if you are over 18.
  (c) If it is legal for you to drink beer, then you are over 18.
  (d) That you are over 18 implies that it is legal for you to drink beer.

(3) In English, 'or' sometimes means 'inclusive or', where both disjuncts can be true, and sometimes means 'exclusive or', where it's not allowed to have both disjuncts true. In mathematics, if we just say 'or', then we always mean 'inclusive or'.
  (a) Give an example sentence for each of the two different kinds of 'or'.
  (b) Give one argument that the way mathematicians use 'or' is a good choice.
  (c) Give one argument that the way mathematicians use 'or' is a bad choice.

• **Seven** problems from the notes: #1.1.18, 19, 20, 23, 31, 32, 35.