

CS 2022/ MA 2201 Discrete Mathematics  
A term 2015

**Homework 1, due Tuesday, September 8**

Most homeworks will be worth 100 points; consider the point value in determining how much time you spend on each question. The exercise and page numbers are from the 7th edition of Rosen: *Discrete Mathematics and Its Applications*. Homeworks must be legible and stapled, with writing on only one side of each piece of paper. Homeworks will be collected at the end of lecture on the due date. This homework assignment and all other handouts are also posted on my home page (URL: <http://web.cs.wpi.edu/~gsarkozy>).

READING: Chapter 1.

1. Exercise 14 on page 13. (20 points)
2. Construct truth tables for each of the following compound propositions.
  - (a)  $(p \wedge q) \vee (p \wedge r)$
  - (b)  $(q \wedge p) \leftrightarrow (q \oplus p)$(20 points)
3. Are the following compound propositions tautologies?
  - (a)  $((p \rightarrow q) \wedge (q \rightarrow r)) \rightarrow (p \rightarrow r)$
  - (b)  $((p \wedge q) \wedge (q \wedge r)) \rightarrow (p \wedge r)$
  - (c)  $((p \oplus q) \wedge (q \oplus r)) \rightarrow (p \oplus r)$

In other words are the logical operators implication, conjunction and exclusive-or transitive? (20 points)

4. Exercise 24 on page 35. (20 points)
5. Exercise 16 on page 66. (20 points)