Homework 3 – due on 11/19/12

1) Which of the following ordered pairs belongs to the binary relation ρ on N?

a) $x \rho y \leftrightarrow x + y < 7$; (1,3), (2,5), (3,3), (4,4)

c) $x \rho y \leftrightarrow 2x + 3y = 10$; (5,0), (2,2), (3,1), (1,3)

2) For each binary relation on R, draw a figuret to show the region it describes:

c) $x \rho y \leftrightarrow x^2 + y^2 \leq 25$

d) $x \rho y \leftrightarrow x \geq y$

3) Identify each relation on N as one-to-one, one-to-many, many-to-one or many-to-many:

1. $\rho = \{(12,5), (8,4), (6,3), (7,12)\}$
2. $\rho = \{(2,7), (8,4), (2,5), (7,6), (10,1)\}$
3. $\rho = \{(1,2), (1,4), (1,6), (2,3), (4,3)\}$

4) $S = \{0, 1, 2, 4, 6\}$. Which of the following relations are reflexive, symmetric, antisymmetric, and transitive. Find the closures for each category for all of them

1. $\rho = \{(0,0), (1,1), (2,2), (4,4), (6,6), (0,1), (1,2), (2,4), (4,6)\}$
2. $\rho = \{(0,0), (1,1), (2,2), (4,4), (6,6), (4,6), (6,4)\}$
3. $\rho = \{(0,1), (1,0), (2,4), (4,2), (4,6), (6,4)\}$

5) For the relation $\rho = \{(1,1), (2,2), (1,2), (2,1), (1,3), (3,1), (3,2), (2,3), (3,3), (4,4), (5,5), (4,5), (5,4)\}$

What is [3] and [4]?

6) Construct the PERT chart for building a house from the table data in the Practice 17 example on page 312 in the book. Compute the minimum time to completion and the nodes on the critical path.