

Math 3200 Homework 7, due Thursday, October 16, 2003

1. Draw the graph of each of the following relations R on the set of real numbers.

(a) $R = \{(x, y) \mid x^2 - 4y^2 \geq 4\}$

(b) $R = \{(x, y) \mid x^2 \geq y^2 \text{ and } y > 2x + 1\}$

(c) $R = \{(x, y) \mid x^2 - y^2 \geq 1 \text{ or } x^2 + y^2 \leq 1\}$

2. Determine whether the following relations are reflexive, symmetric, or transitive. Give a clear explanation in each case.

(a) A is the set of triangles in the plane, and xRy if x is similar to y .

(b) $A = \mathcal{P}(\mathbb{N})$, the power set of the set of natural numbers, and XRY if $X \subseteq Y$.

(c) $A = \mathcal{P}(\mathbb{R})$, the power set of the set of real numbers, and XRY if $X \cap Y \neq \emptyset$.

(d) $A = \mathbb{Z}$, the set of integers, and xRy if xy is even.

(e) $A = \{a, b, c, d\}$ (with a, b, c, d distinct) and

$$R = \{(a, c), (a, a), (a, b), (c, c), (c, b), (b, c), (b, b), (b, a), (c, a)\}.$$

For the following problems from our textbook, don't just give the answers but also explain your reasoning:

Pages 181-182: 5.1.1, 5.1.3, 5.1.4

Pages 189-190: 5.2.1, 5.2.3, 5.2.5