Show All Solutions

Rosen, Discrete Mathematics and Its Applications, 7th edition
Extra Examples
Section 9.5—Equivalence Relations

Extra Examples — *Page references correspond to locations of Extra Examples icons in the textbook.*

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p.609, icon at Example 2
#1. (a) Verify that the following is an equivalence relation on the set of real numbers:

$$aRb \ \leftrightarrow \ \lfloor a \rfloor = \lfloor b \rfloor, \ \text{ where } \lfloor x \rfloor \text{ is the floor of } x.$$

(b) Describe the equivalence classes arising from the equivalence relation in part (a).

See Solution

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p.609, icon at Example 2
#2. Let A be the set of all points in the plane with the origin removed. That is,

$$A = \{(x, y) \mid x, y \in \mathbf{R}\} - \{(0, 0)\}.$$

Define a relation on A by the rule:

$$(a, b)R(c, d) \leftrightarrow (a, b) \text{ and } (c, d) \text{ lie on the same line through the origin.}$$

(a) Prove that R is an equivalence relation.

(b) Describe the equivalence classes arising from the equivalence relation R in part (a).

(c) If A is replaced by the entire plane, is R an equivalence relation?

See Solution