Show All Solutions

Rosen, Discrete Mathematics and Its Applications, 6th edition
Extra Examples

Section 8.1—Relations and Their Properties

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

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p.523, icon at Example 10

#1. Let R be the following relation defined on the set $\{a, b, c, d\}$:

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

Determine whether R is:

(a) reflexive. (b) symmetric. (c) antisymmetric.

See Solution

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p.523, icon at Example 10

#2. Let R be the following relation on the set of real numbers:

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

Determine whether R is:

(a) reflexive. (b) symmetric. (c) antisymmetric.

See Solution

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p.523, icon at Example 10

#3. 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 R on A by the rule:

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

Determine whether R is:

(a) reflexive. (b) symmetric. (c) antisymmetric.

See Solution

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p.523, icon at Example 10

#4. Let $A = \{(x, y) \mid x, y \text{ integers}\}$. Define a relation R on A by the rule

$$(a, b)R(c, d) \;\leftrightarrow\; a \le c \;\text{ and }\; b \le d.$$

Determine whether R is:

(a) reflexive. (b) symmetric. (c) antisymmetric.

See Solution

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p.523, icon at Example 10

#5. Let $A = \{(x, y) \mid x, y \text{ integers}\}$. Define a relation R on A by the rule

$$(a, b)R(c, d) \;\leftrightarrow\; a = c \text{ or } b = d.$$

Determine whether R is:

(a) reflexive. (b) symmetric. (c) antisymmetric.

See Solution

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p.524, icon at Example 13

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

Determine whether R is transitive.

See Solution

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