

Rosen, Discrete Mathematics and Its Applications, 7th edition, Global Edition
Extra Examples
Section 9.4—Closures of Relations



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

p.577, icon at Example 2

#1. Let R be the relation on $\{1, 2, 3, 4\}$ such that

$$R = \{(1, 1), (1, 4), (2, 3), (3, 1), (3, 3), (4, 4)\}.$$

Find:

- (a) the reflexive closure of R .
- (b) the symmetric closure of R .
- (c) the transitive closure of R .

Solution:

- (a) $\{(1, 1), (1, 4), (2, 2), (2, 3), (3, 1), (3, 3), (4, 4)\}$.
 - (b) $\{(1, 1), (1, 3), (1, 4), (2, 3), (3, 1), (3, 2), (3, 3), (4, 1), (4, 4)\}$.
 - (c) $\{(1, 1), (1, 4), (2, 1), (2, 3), (2, 4), (3, 1), (3, 3), (3, 4), (4, 4)\}$.
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