Show All Solutions

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

Section 5.2—The Pigeonhole Principle

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

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p.348, icon at Example 4

#1. Prove that in any group of three positive integers, there are at least two whose sum is even.

See Solution

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p.348, icon at Example 4

#2. If positive integers are chosen at random, what is the minimum number you must have in order to guarantee that two of the chosen numbers are congruent modulo 6.

See Solution

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p.348, icon at Example 4

#3. Suppose you have a group of n people ($n \geq 2$). Use the Pigeonhole Principle to prove that there are at least two in the group with the same number of friends in the group.

See Solution

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p.348, icon at Example 4

#4. Prove that in any set of 700 English words, there must be at least two that begin with the same pair of letters (in the same order), for example, STOP and STANDARD.

See Solution

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p.349, icon at Example 6

#1. Each type of machine part made in a factory is stamped with a code of the form "letter-digit-digit", where the digits can be repeated. Prove that if 8000 parts are made, then at least four must have the same code stamped on them.

See Solution

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p.349, icon at Example 6

#2. Each student is classified as a member of one of the following classes: Freshman, Sophomore, Junior, Senior. Find the minimum number of students who must be chosen in order to guarantee that at least eight belong to the same class.

See Solution

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p.349, icon at Example 6

#3. What is the minimum number of cards that must be drawn from an ordinary deck of cards to guarantee that you have been dealt
(a) at least three of at least one rank?
(b) at least three aces?
(c) the ace of diamonds?

See Solution

p.349, icon at Example 6

#4. What is the minimum number of cards that must be drawn from an ordinary deck of cards to guarantee that you have been dealt
(a) at least three of at least one suit?
(b) at least three clubs?

See Solution