Show All Solutions

Rosen, Discrete Mathematics and Its Applications, 8th edition Extra Examples

Section 4.1—Divisibility and Modular Arithmetic



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

p.252, icon at Example 2

#1. Certain rules allow us to determine by inspection when a positive integer n is divisible by a positive integer k. For example, $5 \mid n$ if and only if n ends in the digit 5 or 0. Similarly, $2 \mid n$ if and only if n ends in one of the digits 0, 2, 4, 6, 8.

There is also a rule to determine divisibility by 3:

 $3 \mid n$ if and only if the sum of the digits in n is divisible by 3.

For example 3 | 478, 125 because the sum of the six digits in 478, 125 is 27, which is divisible by 3. Why does the rule work?

p.252, icon at Example 2 #2.

- (a) Find the number of positive integer divisors of $648 = 2^3 3^4$.
- (b) Find the sum of all positive integer divisors of 648.

See Solution

p.254, icon at Example 4

#1. For each pair of numbers, when the division algorithm is used to divide a by d, what are the quotient q and remainder r?

- (a) a = 88, d = 11.
- (b) a = -29, d = 9(c) $a = 58^{237}$, $d = 58^{168}$

Show All Solutions

Rosen, Discrete Mathematics and Its Applications, 8th edition Extra Examples

Section 4.2—Integer Representation and Algorithms

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

p.261, icon at Example 4

#1. Find the decimal expansion of $(D5A3)_{16}$.

See Solution

p.261, icon at Example 4

#2. Find the hexadecimal expansion of $(35,491)_{10}$.

See Solution

p.261, icon at Example 4

#3. Find the binary expansion of 547.



p.261,	icon	at	Example	4
--------	------	----	---------	---

#4. Find values a, b, and c (not all 0) such that $(abc)_5 = (cba)_8$, or prove that there are none.

Show All Solutions

Rosen, Discrete Mathematics and Its Applications, 8th edition Extra Examples

Section 4.3—Primes and Greatest Common Divisors

Extra Examples

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

p.272, icon at Example 2

#1. Find the prime factorization of:

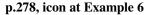
- (a) 487.
- (b) 6600.

See Solution

p.278, icon at Example 6

#1. Suppose the odd primes 3, 5, 7, 11, 13, 17, ... in order of increasing size are p_1, p_2, p_3, \ldots Prove or disprove:

 $p_1p_2p_3 \dots p_k + 2$ is prime, for all $k \ge 1$.



#2. Suppose the odd primes 3, 5, 7, 11, 13, 17, ... in order of increasing size are p_1, p_2, p_3 Prove or disprove:

 $p_i p_{i+1} + 2$ is prime, for all $i \ge 1$.

See Solution

p.278, icon at Example 6

#3. (Problem A1 from the 1989 William Lowell Putnam Mathematics Competition.) Consider the sequence of integers (in base 10): 101, 10101, 1010101, 101010101, 10101010101, Prove that 101 is the only number in this sequence that is prime. (*Hint*: Use place value to write each number in terms of the sum of its digits; for example, $abcde = a10^4 + b10^3 + c10^2 + d10 + e$. Then examine how the sum might be factored.)

