Show All Solutions

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

Section 3.5—Primes and Greatest Common Divisors

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

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p.211, icon at Example 2

#1. Find the prime factorization of:
(a) 487.
(b) 6600.

See Solution

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p.214, icon at Example 6

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

$$p_1 p_2 p_3 \ldots p_k + 2 \text{ is prime, for all } k \geq 1.$$

See Solution

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p.214, icon at Example 6

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

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

See Solution

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p.214, icon at Example 6

#3. (Problem A1 from the 1989 William Lowell Putnam Mathematics Competition.) Consider the sequence of integers (in base 10): $101, 10101, 1010101, 101010101, 10101010101, \ldots$. 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.)

See Solution
