

E-primes supplement to Chapter 7 Problem Set

Let $E = \{1, 2, 4, 6, 8, \dots\}$. In this set there are some numbers that can only be written as a product of 1 and the number itself, but cannot be written as the product of two other elements of the set. An element of E will be called **E-prime** if it can only be expressed as a product of 1 and itself. For example, 6 is E-prime since $6 = 1 \cdot 6$; $6 = 2 \cdot 3$, but 3 is not in E . An even number will be called **E-composite** if it is not E-prime. Note: 1 is not E-prime.

1. Determine the first ten E-primes.
2. Can every E-composite number be factored into a product of E-primes? Justify your reasoning.
3. List several even numbers that have only one factorization into E-primes.
4. Find an even number whose E-prime factorization is not unique, that is, an even number that can be factored into products of E-primes in at least two different ways.
5. Determine a test to decide whether an even number is E-prime.