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**(a)** Let  $n \in \mathbb{N}, 1 < n$ . If  $n$  is composite, then  $n$  can be written as a product of primes.

*Proof.* (Strong induction).

Let  $n = 6$ , so  $n = 3 * 2$ . Since 3 and 2 are prime, it follows that  $n = 6$  can be written as a product of primes.

Now suppose  $m \in \mathbb{N}$  is prime, or  $m$  is composite and can be written as a product of primes, for all  $1 < m < n$  and some composite  $n \in \mathbb{N}$ . Then  $n = ab$  for some  $a, b \in \mathbb{N}, 1 < a, b < n$ . Since  $a$  and  $b$  are either prime, or can be written as a product of primes, respectively, it follows that  $n$  can be written as a product of primes.

Therefore, by induction on  $n \in \mathbb{N}, 1 < n$ , it follows that if  $n$  is composite, then  $n$  can be written as a product of primes.