This quiz is worth 10 points. Consider the theorem stated below along with the 12 sentences provided on the second page. Rearrange the sentences so the resulting text forms a logical and well-organized proof of the theorem. Please literally cut out the 12 sentences and tape them to this first page in the order you feel is appropriate and turn in the taped quiz by 4pm on December 8.

You are expected to work alone on this quiz, neither giving nor receiving assistance to/from any classmates, friends or professors. Any violation of this expectation will result in a grade of zero on this quiz for all involved parties.

Theorem: Every integer greater than 1 is expressible as a product of primes.
1. Hence, we see that \( n = (p_1 \cdot p_2 \cdots p_s) \cdot (q_1 \cdot q_2 \cdots q_t) \).

2. But \( a \) and \( b \) must then be expressible as products of primes due to the minimality of \( n \).

3. It also must be the case that \( 1 < b < n \).

4. Then \( n \) must be a composite number (non-prime).

5. Suppose there are some positive integers greater than 1 that are not expressible as products of primes.

6. Thus, \( a = p_1 \cdot p_2 \cdots p_s \) and \( b = q_1 \cdot q_2 \cdots q_t \) where all \( p_i \) and \( q_j \) are primes and \( s, t \geq 1 \).

7. By the Well-Ordering Principle, there must be a smallest such integer \( n \).

8. Therefore, it must be the case that every integer greater than 1 is expressible as a product of primes.

9. As a result, there must be an integer \( a \) such that \( 1 < a < n \) and such that \( a|n \).

10. We proceed using proof by contradiction.

11. Using the definition of divisibility, there is an integer \( b \) with \( a \cdot b = n \).

12. This is contrary to our assumption about \( n \).