



16. Andrew states that every composite number of the form $8n + 3$, where n is an integer, has a prime factor of the same form. Which of these numbers is an example showing that Andrew's statement is false?

A 19

B 33

C 85

D 91

E 99

1386



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16. **D** By the Fundamental Theorem of Arithmetic, every positive integer greater than 1 is either prime or a product of two or more primes. A number that is the product of two or more primes is called a *composite* number.

We are looking to choose, from the options provided, a composite number which is of the form $8n + 3$ but does not have a prime factor of the form $8n + 3$.

Option A is prime, so is not possible. Options B and C are not of the form $8n + 3$.

Option E is $8 \times 12 + 3 = 99$. The number 99, when expressed as a product of its prime factors, is $3 \times 3 \times 11$ and the factor 11 is of the required form as $11 = 8 \times 1 + 3$.

However, option D is of the form $8n + 3$ as $8 \times 11 + 3 = 91$ but neither of the prime factors of 91, which are 7 and 13, are of the form $8n + 3$.