Are There an Infinite Number of Twin Primes?

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Twin primes are pairs of prime numbers—such as (3,5), (5,7), (17,19)—that differ by 2. It appears at first glance that twin primes occur among the smaller numbers only, but that is not the case. For example, when one examines the numbers between 800 and 900, one finds the twin primes 821/823, 827/829, 857/859 and 881/883. Even among much larger numbers, there is evidence of twin primes: 9890641/9890643. In fact, even among numbers as large as 11,000 digits, twin primes have been found. "The largest known twin primes are $1,706,595 \times 2^{11,235} - 1$ and $1,706,595 \times 2^{11,235} + 1$, which were found on August 6, 1989, by a team in Santa Clara, California" (*Guinness Book of World Records 1997*, 137).

However, to date no one has presented a mathematical proof that the sequence of twin primes is either finite or infinite.

Two Ferries

Two ferries are traveling continuously but in opposite directions at constant speed across a wide river without any time loss as they turn around. In the morning, they start at the same time from opposite sides of the river and meet for the first time 800 m from the south shore. As they continue back and forth, they meet for the second time 400 m away from the north shore. How wide is the river?