It should be evident that here Euler was in his element, operating at the height of his analytic powers. When Euler met l'Hôpital, good things happened.

Acknowledgment. The author thanks Penny Dunham of Muhlenberg College for her many helpful suggestions.

REFERENCES
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Math Bite: A Magic Eight

In many cultures, the number 8 has special significance and is even considered magical. For instance, in China the Olympic Games were scheduled to begin at exactly 8:08 PM on 8/8/08.

Those wishing to advance the cult of the number 8, even in 2009, might enjoy knowing that the sequence

\[
\frac{9}{1}, \frac{98}{12}, \frac{987}{123}, \frac{9876}{1234}, \ldots
\]

converges exactly to 8.

You probably have realized that the ellipses (\ldots) need a suitable interpretation, since numbers greater than 10 and less than 0 are not normally allowed to serve as digits. Check for yourself that, with a suitable placement of the decimal point, the numerator and denominator become

\[
\sum_{k=0}^{\infty} (10 - (k + 1)) \left( \frac{1}{10} \right)^k \quad \text{and} \quad \sum_{k=0}^{\infty} (k + 1) \left( \frac{1}{10} \right)^k.
\]

Summing these series gives 800/81 as the numerator and 100/81 as the denominator. And the magic quotient of these two is 8.

—Paul and Vincent Steinfeld
Darmstadt, Germany