

MAA Metro NY Problem of the Month

Proposed by Dr. John Chiarelli
New York City College of Technology, CUNY

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Let p and q be integers such that series $1 - \frac{1}{2} + \frac{1}{3} - \frac{1}{4} + \cdots + \frac{1}{109} - \frac{1}{110} + \frac{1}{111} = \frac{p}{q}$.
Prove by elementary means that p is divisible by 167.

Computer or AI assisted/generated solutions will not be accepted.