Problem 2 (due Monday, March 2)

Recall that the smallest integer greater or equal than a given real number x is denoted by $\left| x \right| \le x \le x$ and called the \$ceiling\$ of x. Let \$p\$ be a prime number and $1\leq x$ an integer. Prove that the number

This problem was solved by only one participant: Yuqiao Huang. The submitted solution does not discuss the case when a=p. For $l\leq p$, the solution claims correctly that $left \leq left(a^{p-1}-1 \cdot p)^{\frac{p}{p-1}} \cdot p^{-1}$ right\real a^p-a , hence the result follows from Fermat's Little Theorem. In order to justify the claim, the solver proves that $a^p-a-1 < \left(a^{p-1}-1 \cdot p\right)^{\frac{p-1}{p-1}} \cdot p^{-1}$ right hand side inequality is fairly simple; the submitted proof of the left hand side inequality is rather long and complicated, and we will not reproduce it here. To see a detailed solution click the following link Solution

From:

 ${\it https://www2.math.binghamton.edu/- \textbf{Department of Mathematics and Statistics, Binghamton University}$

Permanent link:

https://www2.math.binghamton.edu/p/pow/problem2

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