UNIVERSITY OF WISCONSIN
PLATTEVILLE
DEPARTMENT OF MATHEMATICS

Problem of the Week #9

(Spring 2019)

For any integer $n \geq 1$, let $f(n)$ denote the number of times that the digit 2 appears in the integers from 1 through n. For example, $f(32) = 14$, because the digit 2 appears in the natural numbers $\{2, 12, 20, 21, 22 \text{ (twice)}, 23, 24, 25, 26, 27, 28, 29, 32\}$.

Find an integer n with the property that $f(n) = n$.

Bonus challenge: Are there infinitely many values of n for which $f(n) = n$?

[Please fully explain your answer.]

Solutions should be submitted to Cinda Furry, in Gardner Hall 435, by 4:00 P.M. on Wednesday, April 3, 2019.

Every week, the best solution submitted earns a $10 Platteville gift certificate; the top scorer each semester also wins a cash award. Good luck!
You can always see the Problem of the Week (and complete rules) online at:

`http://uwpmath.weebly.com/`