UNIVERSITY OF WISCONSIN
PLATTEVILLE
DEPARTMENT OF MATHEMATICS

Problem of the Week #7

(Spring 2022)

A positive integer n is a *semi*-1 *number* if exactly half of the integers from 1 through n contain the digit 1. For example, 16 is semi-1, because exactly 8 of the integers between 1 and 16 contain the digit 1:

$$\{1, 10, 11, 12, 13, 14, 15, 16\}.$$

Your challenge: submit the largest semi-1 number you can find! How do you know that your number is semi-1?

Bonus: Are there infinitely many semi-1 numbers, or only finitely many?

[Please fully explain your answer.]

Email solutions to `kwonmi@uwplatt.edu` by 2:00pm on Wednesday, March 23, 2022.

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/`