Multiplying those 7s by 11 comes close, but then the first digit is 8.

Dividing 100 7-s by 7 we get 100 1-s. The number we seek is going to be divisible by 7 and the number represented by 100 1-s. Using long multiplication we can get the following structure:

```
11111111...11111 (one hundred 1-s) *
             x1x2x3
____________________
             x1x2x3
           x1x2x3
         x1x2x3
.........................
       x1x2x3
     x1x2x3
   x1x2x3
____________________
xxx..................x
```

In this example I use three-digit number $x_1x_2x_3$.
From this it is apparent that x_3 , x_2+x_3 , $x_1+x_2+x_3+\text{possible carry}$, $x_1+x_2+\text{carry}$, and $x_1+\text{carry}$ must all end with 4, 5, or 7. On top of that the $x_1x_2x_3$ must be divisible by 7.
I see no such 2 or 3-digit numbers, no does a proof come to mind that such number with more than 3 digits does not exist.