

## Divisibility by 7

Consider the sequence of positive integers:  $\{1, 12, 123, 1234, 12345, \dots\}$ , where the next term is constructed by lengthening the previous term at its right-hand end by appending the next positive integer. Notice that this next integer occupies only one place, with “carrying” occurring as in addition: thus the ninth and tenth terms of the sequence are 123456789 and 1234567900 respectively. Determine which terms of the sequence are divisible by 7.