

August 7<sup>th</sup>

**Find the probability that a three digit palindromic number is divisible by 11.**

There are 90 three digit palindromes:

For each starting digit 1-9, there are 10 possibilities (101,111,121.....,191 etc)

*A test for divisibility by 11 involves summing alternate digits and comparing the 2 totals:*

*For example*

*616: First digit + third digit = 12*

*Second digit = 1*

*These differ by a multiple of 11 (in this case 11 itself), so 616 is a multiple of 11*

How many of the 90 palindromes are multiples of 11?

There will be a maximum of 1 for each “middle” digit, but a quick inspection shows that 0 and 5 are both not possible as a tens digit.

Therefore the required numbers are

121, 242, 363, 484, 616, 737, 858, 979

So the probability that a three digit palindrome is divisible by 11 is

$$\mathbf{8/90 = 4/45}$$