

October 18th

A palindromic number is in the form aba (e.g. 434)

Show aba is a multiple of 7 when $a + b = 7$ or $a + b = 14$

" aba " =

$$100a + 10b + a =$$

$$101a + 10b =$$

$$3a + 3b + 98a + 7b =$$

$$3(a + b) + 7(14a + b)$$

which can only be a multiple of 7 if and only if $3(a + b)$ is a multiple of 7

Therefore $a + b$ must be a multiple of 7, and since each is a single digit,

Either $a + b = 7$ or $a + b = 14$